Report
July 2020

Towards an appropriate legal and regulatory framework for smart futures on transport

Urban Transport Group
Our ref: 23684601

steer

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Glossary

Definitions of the main terms used to describe new technologies and services are presented in the table below.

Term	Description
Bike share	Bike share offers bicycles available for shared use by individuals in accessible locations. Models include self-service on-street bikes which are available at either docking stations or without docking stations (dockless), folding bikes available from lockers, workplace pool bikes and peer to peer sharing.
Car clubs	Car clubs offer shared vehicles available for use by individuals and businesses. Car club users typically access vehicles via an app that shows an interactive map where they can select a convenient vehicle, make a reservation and locate the car.
Connected and Autonomous Vehicle (CAV) services	CAV services are vehicles accepting passengers or delivering goods with autonomy of at least Level 4[1]; and include both vehicles with a safety driver and without (e.g. autonomous delivery pods).
E-scooters	E-scooters are low speed two-wheeled vehicles powered by a small electric motor designed to be used by a single standing rider. Shared e-scooters schemes have been widely adopted in different countries including in Europe, North America, Latin America and Asia.
Microtransit	Microtransit refers to a form of on-demand service provided for the public, typically using vehicles larger than a car and smaller than a bus. Microtransit is related to traditional Demand Responsive Transport enabled by technology to allow immediate booking, integrated payment and driver routing. The terminology in this area is emerging and is also referred to as Digital Demand Responsive Transport.
Mobility as a Service (MaaS)	MaaS is an integrated platform where transport operators (public and private) and other solution/technology providers ideally work in collaboration to deliver personalised travel solutions in a city/ region/country/globally.
Private Hire Vehicles (PHVs)	Private Hire Vehicles (PHVs) include a range of vehicles including minicabs, executive cars, chauffeur services, limousines and some school and day centre transport services. All PHV journeys must be pre-booked via a licensed PHV operator.
Taxi	Taxis are vehicles able to be hired immediately by hailing on the street or at a rank. Taxis are also referred to as Hackney Carriages, black cabs and cabs.

[1] Level 4 - High Automation. Automated driving system undertakes all aspects of the dynamic driving task in defined conditions

Executive summary

Overview

The Department for Transport published its Future of Mobility: Urban Strategy in March 2019 and, at the same time, announced a forthcoming review into the regulations surrounding new transport modes. The review will focus on four key areas: micromobility vehicles; Mobility as a Service (MaaS); data sharing; and bus, taxi and private hire vehicle (PHV) legislation. The first consultation as part of the regulatory review has now been launched and covers micromobility vehicles, flexible bus services and MaaS. In a response to public transport capacity challenges due to Covid-19, shared e-scooter trials have been brought forward by the Department with services launching in selected locations during the Summer.

The government has stated that a thriving mobility sector needs an innovative and flexible regulatory framework. That framework must keep people safe and promote active and accessible travel, while providing certainty for investment and space for innovation and trials. As the pace of change accelerates and the differences between modes of transport and business models blur, new products and services will challenge existing regulatory structures and scope.

Urban Transport Group has commissioned Steer to explore opportunities and challenges associated with development of an appropriate legal and regulatory framework for smart transport technologies and services.

UK regulatory and legislative framework

This report explores opportunities and challenges associated with the development of legal and regulatory framework for the following smart transport technologies and services:

- **Bike share;**
- **Car clubs;**
- **Connected and Autonomous Vehicle (CAV) services;**
- **E-scooters;**
- **Microtransit (Digital Demand Responsive Transport);**
- **Mobility as a Service (MaaS); and**
- **Taxi and Private Hire Vehicle (PHV) services.**

The review of regulation is split into different components to show the breadth of various aspects such as licensing of vehicles, drivers and operators, vehicle specifications, quantity restriction, public space allocation and data sharing. International case studies have been reviewed and added to the section summarising what has worked well and not so well in the cities around the world. This shows different approaches which countries and cities are taking to prepare and adapt for new transport technologies providing both inspiration and key lessons learnt.

The current regulatory structure for different new mobility services varies with the mode type. Furthermore, there are no established regulations for emerging technologies and services such as MaaS and CAV services.

Priority areas and quick wins

Priority areas and quick wins for each smart transport technologies and services have been identified across different policy themes.

One policy area which has been identified as “red” for each mode and service is **data sharing**. Data regarding the use of transport services is important for transport and city authorities as it

enables effective decisions about transport strategy and operations to deal with issues such as congestion, air pollution and transport network disruption. Issues that arise around data include to what extent transport authorities and transport operators share data and on what basis. This also relates to issues around trust and the privacy of personal data, along with the quality and compatibility of data.

Quick wins are defined as areas where the government can implement regulatory changes at a faster speed (typically within existing regulations) and are summarised below.

Area	Potential quick win
Data sharing	Development of a Code of Conduct or National Guidance on data sharing and standardisation would be beneficial. The guidance should establish a unified approach to the way the data is collected, stored, used and shared across all transport modes and services between both public and private sectors. Data sharing requirements can be introduced as mandatory when is issuing the licence for a service to operate (e.g. taxis and PHVs). This will support transport authorities in acquiring data from private transport operators. Although, it will not solve the issue of varying standards between different local authorities.
MaaS	Prior to establishment of formal regulations for MaaS, the industry would benefit from a Code of Conduct for MaaS regarding quality standards required and level of service expected from MaaS operators.
CAV services	To make it mandatory to consult with local and transport authorities before launching trials of CAV services in their areas. Local and city authorities should be key stakeholders given that development of CAV services will have direct consequences for their communities.
Bike share and e-scooters	Mandatory service level agreements (SLAs) for dockless bike share or e-scooter schemes could be introduced including the requirements to share data, provide a required level of service and remove bikes from streets in timely manner if needed. Formalising the CoMoUK accreditation, local authorities can require proof that the operator is in compliance with all relevant national or international regulations in relation to vehicles, environmental demands and business practices.
Taxi, PHVs and microtransit	A wider consultation by the government for on demand services including taxis, PHVs and microtransit is required. The definitions and requirements for these types of services are blurring and an assessment of how or whether they fit within existing legislation is needed especially ahead of industry transition to CAV services.

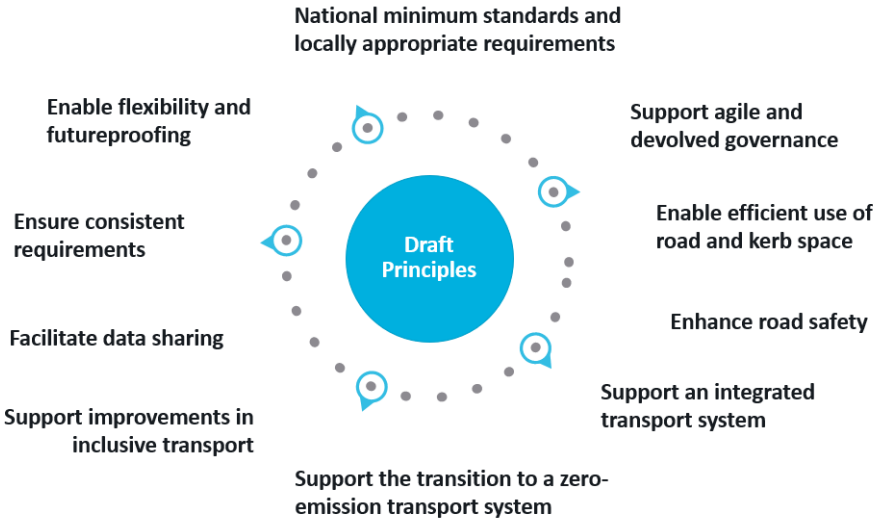
Anticipatory regulation

The concept of anticipatory regulation is presented in Chapter 3. It is recommended that the government should explore opportunities for establishment of anticipatory regulation in the transport sector, which can be introduced to test new services or those which are not permitted at the moment. The government should assess a process for establishing sandboxes for new transport technologies and services to explore the requirements for regulation through local trials.

One of the potential issues in the transport sector is the absence of a regulator in key areas. In order to establish anticipatory regulation, a regulatory body should exist. For example, the Financial Conduct Authority (FCA), the Civil Aviation Authority (CAA), and the Office of Gas and Electricity Markets Authority (Ofgem) are regulators, who have the power to flex the existing regulation and allow testing of new services and technologies. The government should assess the process for establishing sandboxes and opportunities for transport and city authorities to become a regulator for services operating specifically in their areas.

Draft Principles

A set of draft principles which could underpin the legislative and regulatory framework for smart transport technologies and services is introduced in Chapter 4 with key headings presented below. These principles can be used to determine whether the government's proposals for regulatory reform will facilitate the achievement of wider economic, social and environmental objectives for the city regions.



1 Introduction

The Urban Transport Group (UTG) is the UK's network of city region transport authorities. Full members are Merseytravel, Nexus, South Yorkshire PTE, Transport for Greater Manchester, Transport for London, Transport for West Midlands and West Yorkshire Combined Authority. UTG's associate members are Strathclyde Partnership for Transport, Nottingham City Council, West of England Combined Authority, Tees Valley Combined Authority, Translink and Transport for Wales.

1.1 UTG works to ensure that transport plays its full part in making city regions greener, fairer, happier, healthier and more prosperous places. For UTG, it is important that the legal and regulatory framework for smart transport technologies and services supports these objectives and ensures that the city region transport authorities can manage the impacts and secure the benefits of fast paced technological change in urban transport.

Objectives

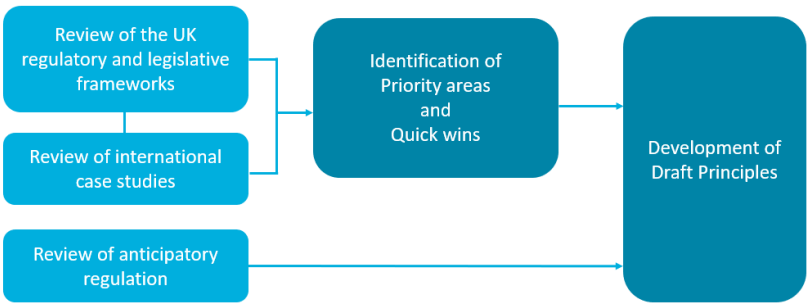
1.2 UTG has commissioned Steer to explore opportunities and challenges associated with development of an appropriate legal and regulatory framework for smart transport technologies and services. In particular, UTG required:

- An overarching analysis of the strengths and weaknesses in the current UK regulatory and legislative framework in relation to key challenges that UK transport authorities face;
- An analysis of the different approaches that other comparable countries and world cities are taking to prepare for, and manage, smart transport technology developments, including learning from where things have gone wrong;
- An assessment of the potential for anticipatory regulation (e.g. sandboxes) in relation to identifying, building and testing smart transport technologies and services in our cities;
- Recommendations for priority areas for legislative and regulatory change in relation to smart transport technology developments; and
- A draft set of principles which should underpin the legislative and regulatory framework for smart transport technology developments in the UK.

Approach

1.3 Figure 1.1 presents an overall approach and key tasks completed to develop this report. The analysis is based on desktop research and is supported by intelligence gathered through interviews with key members of UTG.

Figure 1.1: Study Approach



Report structure

The report is structured as follows:

- Chapter 2 provides a review of the current regulatory and legislative frameworks in the UK for a selection of transport technologies and services;
- Chapter 3 explores the concept of anticipatory regulation; and
- Chapter 4 presents a set of draft principles which should underpin the legislative and regulatory frameworks for managing transport technologies and services.

2 Review of the UK regulatory and legislative frameworks

Introduction

2.1 This section provides an overview of the current UK regulatory and legislative frameworks for the following smart transport technologies and services:

- Bike share;
- Connected and Autonomous Vehicles (CAV) services;
- Car clubs;
- E-scooters;
- Microtransit;
- Mobility as a Service (MaaS); and
- Taxi and Private Hire Vehicles (PHVs).

2.2 In some cases, there is a lack of an existing regulatory or legislative framework for specific technologies or services. The analysis is based on desktop research and is supported by intelligence gathered through interviews with key members of UTG[2].

2.3 Key questions and areas of research include:

- An assessment of whether existing legal and regulatory frameworks provide city authorities with a sufficient level of flexibility to facilitate or restrict new smart transport technologies, based on whether they meet or oppose policy goals;
- An assessment of whether the regulation is fit for purpose and identification of the current and potential future challenges, including regulatory gaps; and
- Who holds the power to make decisions on the implementation of smart transport technology at the local, regional, and national level?

2.4 The review of regulation is split into different components to show the breadth of various aspects such as licensing, vehicle specifications, data sharing etc. The current regulatory structure for different new mobility services varies with the mode type. Furthermore, there are no established regulations emerging technologies and services such as MaaS and CAV services.

2.5 Additionally, priority areas and quick wins for smart transport technologies and services have been identified. The findings were validated through the workshop with the members of UTG's Smart Futures Group. Priority areas have been identified using the following principal criteria:

- The lack of suitability of existing legislation and regulations; and
- The relative potential impact of changes.

[2] Transport for London, Transport for Greater Manchester, West Yorkshire Combined Authority, Merseytravel, Nexus, South Yorkshire Passenger Transport Executive and Transport for West Midlands.

2.6 Quick wins are defined as areas where the government can implement regulatory changes at a faster speed (typically within existing regulations).

2.7 The analysis is based on desktop research and is supported by intelligence gathered through interviews with key members of Urban Transport Group (UTG). International case studies have been reviewed and added to the section summarising what has worked well and not so well in the cities around the world. This shows different approaches which countries and cities are taking to prepare and adapt for new transport technologies providing both inspiration and key lessons learnt.

2.8 It is important to note that this is a fast-moving industry, and therefore our assessment and analysis, while accurate at the point of writing, is likely to date quickly.

2.9 In this chapter a review of each service is included with examples of current practice from across the world.

Bike share

2.10 Bike share can be broadly defined as any setting where bicycles are pooled for multiple users. Models include self-service on-street bikes which are either available at docking stations or without docking stations (dockless), folding bikes available from lockers, workplace pool bikes and peer to peer sharing.[3] The focus of our work is publicly accessible services, where bikes are available for public use on a trip by trip basis and are located in the public realm when not in use.

2.11 Bike share schemes are available in towns and cities across the country: for example, the Santander London Cycle Hire scheme in London or Nextbike schemes across the UK. Initially, most schemes were publicly funded, docked bike share schemes, but the market has since been disrupted by dockless bike share schemes, hybrid schemes and the addition of ebikes in some contexts.

2.12 However, there have been significant problems with the dockless bike share model in the UK and worldwide. During the last three years, a significant number of privately funded operators including oBike, Urbo, Ofo, entered the market but later withdrew and closed their operations. Reasons for their withdrawal include: vandalism, poor maintenance, along with questions around the commercial feasibility of the schemes. The next generation of dockless companies, including shared electric bike schemes, have now appeared in the market with companies such as Lime, Beryl and Freebike launching in the UK in the past 18 months.

2.13 This development of primarily privately operated dockless bike share models has exposed a lack of national regulation and effective powers for regional and local authorities to manage the operations of these services.

Current regulations

Highway code

2.14 There are certain mandatory rules for cyclists stated in the Highway Code. Where a Highway Code rule is expressed as something you 'must' or 'must not' do, the rule reflects a legal requirement imposed by legislation, breach of which is a criminal offence. With regards to bike

[3] https://como.org.uk/shared-mobility/shared-bikes/what/

share, the highway code primarily specifies the safe use of bikes and does not distinguish between private bikes and shared bikes.

Dockless bikeshare

2.15 Under the current legislation, dockless bike share operators do not require consent or a licence from the local or city authority to operate; as typically there is no infrastructure needed to be installed on the roads/pavements/public space. However, there are recent examples, such as the City of London and Watford, who are piloting dedicated parking bays and physical hubs (on the carriageway and on the pavement).

2.16 Additionally, there is no legal restriction on the number of operators entering an area, meaning that local authorities have no control over the number of operators in their municipality.

2.17 The only national legislation and regulations which exist and can be applied to the dockless bike share schemes are the Highways Act 1980 and Public Space Protection Orders. These can be used to remove the bikes if they cause obstruction and danger. For example, when oBike launched their bikes in London in 2017, Hammersmith and Fulham Councils managed to remove the bikes under the Highways Act (1980) as obstructions.

2.18 CoMoUK provides a voluntary national accreditation scheme for bike share operators (formerly known as Bikeplus accreditation), which can be used to maintain certain standards. Moreover, some local authorities have signed a Memorandum of Understanding (MoU) with the dockless bike share operators – however, the MoU is only voluntary and does not oblige the operators legally adhere to it. In London, TfL has developed a Code of Practice, setting out how it wants and expects dockless bike share schemes to operate. In response to the lack of current powers, TfL and London Councils are currently developing a dockless vehicle byelaw to plug legislative gaps.

Docked public bike share

2.19 If the scheme requires dedicated docks to park and store the bikes, permission is required from the local authority, which facilitates control on where the scheme can operate. Due to capital costs, these schemes are usually funded by local authorities. In addition, if a contract is signed (as is typically the case if a financial contribution from the local authority is made), the operators are required to sign Service Level Agreements (SLA) with local authorities. This covers maintenance of the bikes, reporting and dealing with any issues on streets and customers complaints.

Ebikes

2.20 You can ride an electric bike in England, Scotland and Wales if you are aged 14 or over, as long as the bike meets certain requirements. These electric bikes are known as 'Electrically Assisted Pedal Cycles' (EAPCs). You do not need a licence to ride one and it does not need to be registered, taxed or insured.[4] The exception is Northern Ireland - you need a moped licence to ride an electric bike, and the bike must be registered, taxed and insured.[5]

2.21 The specification of an EAPC includes that its electric motor:

[4] https://www.gov.uk/electric-bike-rules

[5] https://www.gov.uk/electric-bike-rules/northern-ireland

- must have a maximum power output of 250 watts; and
- should not be able to propel the bike when it's travelling more than 15.5mph.

2.22 If a bike meets the EAPC requirements, it is classed as a normal pedal bike. This means you can ride it on cycle paths and anywhere else pedal bikes are allowed. Any electric bike that does not meet the EAPC rules is classed as a motorcycle or moped and needs to be registered and taxed. A driving licence is required to ride the bike and a crash helmet must be worn.

International case study: Germany, Berlin

The bike share market is very competitive in Berlin, with multiple companies competing for space and users. Some of the bike share companies with presence in Berlin are: Byke, Donkey Republic, Lidl Bikes, Lime Bikes, Mobike, Nextbike and Sacoora. Most operators are privately funded, although Lidl bike is a partnership with the German Railway Deutshe Bahn.

The Berlin Senate Department for the Environment, Traffic and Climate Protection has distributed official guidelines for the Districts and providers of dockless bikes, but there is not an established regulatory framework. The guidelines recommend there not be more than four bikes in one place, but they do not regulate the overall number in the city or have information on their movements. Bikes should not block sidewalks or U-Bahn entrances or be parked in parks and broken bikes must be repaired or removed by their providers within 24 hours, but there is no agency designated to monitor and enforce these rules. Issues with bikes being left on pavements, obstructing pedestrians and vandalism have been reported.

Implementation of dockless bikes is market-led and there are no regulations restricting operations of bike share operators. There are also no restrictions on the number of dockless bike share operators, which led to a large number of bike share operators in Berlin. There is no permit process for dockless bikes, and no cap imposed on the number of bikes that can be made available for hire.

Priority areas

2.26 Table 2-1 summarises the findings related to the assessment of fitness for purpose of existing regulations and identifies the gaps where current regulation does not exist, which have been coded through Red/Amber/Green colour codes. The "red" areas have been identified as priority areas and classified as those causing issues and imposing significant challenges or/and having a high probability of causing issues in future.

Table 2-1. Bike share - Summary of current state of regulations

Quantity restriction (vehicles, operators)	Licensing (vehicles, operators)	Licensing (Drivers)	Vehicle specifications	Data Sharing	Guarantee of Provision	Regulated Pricing	Public space allocation[6]	Public space fees
None, number of bikes not limited unless agreed through a local authority agreement. No regulatory ability to limit number of operators	**None**, voluntary standards for vehicles and operators through CoMoUK industry accreditation	**None**	**Yes,** must meet the Pedal Bicycles Safety Regulations 2010	**None**, unless agreed through a local authority contract	**None**, unless agreed through a local authority contract	**None**, unless agreed through a local authority contract	**None**, unless agreed through a local authority contract/agreement	**None,** unless agreed through a local authority contract

2.29 There is no national regulation for bike share schemes and only the Highways Act 1980 and Public Space Protection Orders can be used by local authorities to remove the bikes if they cause obstruction and danger. This causes several "red" issues:

- Transport authorities lack the powers to license and regulate dockless bike share schemes; they also cannot effectively prohibit operators entering the market.
- There is no regulation to limit the number of operators allowed in an urban area, and legislative change would be required to facilitate this.
- The parking allocation, pricing, number of bikes and data sharing agreements are out of local authorities' control with only limited control available through a voluntary MoU or CoMoUK industry accreditation.
- There are issues with cross-border operations, for example, in London each borough controls its own area, which make it difficult for bike share schemes to expand across London as each local authority has different priorities, rules for users and availability of on street space for parking.

2.30 Guarantee of provision, regulated pricing and public space fees are classified as "amber" policy areas, where a unified approach across the City Region may be desirable. For example, currently, some bike share companies pay a fee to local authorities for an allocation of public space for the parking of their bikes, while other local authorities do not require payments. A unified approach to policy and pricing would be beneficial in supporting fair competition, cross-border operations and helping to deliver policy aims, including increasing cycle mode share.

Potential next steps

2.31 It is important to provide local government and transport authorities with the right tools to manage dockless bike share in order to align private sector operations with long-term transport policies such as a mode shift to sustainable transport and improvements in road safety. However, it is also important not to weigh down potential mobility innovations with excessive regulations and restrictions which may limit private sector investment.

[6] parking and drop off/ pick up locations

2.32 Regulation across City Regions instead of localised regulation for each local authority can also facilitate the cross-border operations of bike share schemes.

Quick win

2.33 Mandatory service level agreements for dockless bike share schemes could be introduced with the requirements to share data, provide a required level of service and remove bikes from streets in timely manner if needed. Formalising the use of CoMoUK accreditation allows local authorities to ensure that the operator is in compliance with all relevant national or international regulations in relation to bicycles, environmental demands and business practices; such as legal bicycles (in terms of lights and brakes to national/international standards and road rules), data protection, public liability insurance and financial protection for consumers (e.g. deposits, refunds), etc.

Car clubs

2.34 Car clubs offer shared vehicles, available for use by individuals and businesses. Car club users typically access vehicles via an app that shows an interactive map where they can select a convenient vehicle, make a reservation and locate the car.

2.35 Primarily there are three different car club models, including:

- Round-trip car clubs;
- Fixed one-way (point-to-point) car sharing; and
- Flexible one-way car clubs.

2.36 Alongside car club operators, peer-to-peer car club services, where existing car owners make their vehicles available for others to rent for short periods of time, are gaining popularity in the UK. In this type of service, peer-to-peer platform providers link car owners with potential users through their online platform, where users can find, book, reserve and pay for a car.

Current regulations

2.37 Currently, there is not a standard set of rules for car club operators to follow when operating services in the UK. The car club model is based on the concept of offering access to shared vehicles in public areas, typically within walking distance from the user. Therefore, vehicles need to be parked at strategic locations (public or private) for users to locate and use them. The main regulation that applies to car club operators surrounds securing on-street parking permits, which can differ between round trip and one-way models.

2.38 CoMoUK[7] has developed a voluntary accreditation scheme for operators and guidelines for local authorities to follow when defining parking locations. Local authorities are able to tender car club rights to specific operators only for a fixed period of time through control of on-street parking spaces.

Round trip

2.39 Round-trip car club bays can be permitted by local authorities and provided for car club operators. They require a Traffic Regulation Order (TRO) to be implemented. Traffic

[7] CoMoUK is a charitable organisation which promotes the benefits of shared mobility

Management Act 2004[8] offers guidance to local authorities on the civil enforcements of parking contraventions. This Statutory Guidance is published by the Secretary of State for Transport under section 87 of the Traffic Management Act 2004. There are several elements that need to be addressed when in the process of attaining on-street parking. Various local authorities/ boroughs have approached it in different ways, though there are common factors, such as the use of Traffic Management Orders (TMOs) and Traffic Regulation Orders (TROs).

Traffic Management Order/ Traffic Regulation Orders

2.40 The operator should enter into an agreement with the local authority based on several requirements, including precise preferred locations, along with alternate options if these are unsuitable. In addition to engagement with the local authority, the operator should inform highways and planning departments about the provision of the service; and local authorities may sometimes issue an experimental TRO as opposed to a permanent one when commissioning a new parking bay to a car club operator.

Off-street/ Private parking

2.41 The government recently updated its guidance for local authorities, clarifying that homeowners do not need planning permission to rent out their driveways. This means that driveways can be used more efficiently – allowing homeowners to make extra money and providing much needed parking to visitors, particularly in areas where there is a shortage of space.

One way

2.42 Free-floating car clubs require a car club parking permit from local authorities, which could be a pre-existing universal permit, or the permits can also be obtained through tenders. Usually, the permits are issued for a year, and the terms of contract, types of vehicles and permit costs depend on the arrangements with the local authority. There are limited examples of authorities in the UK of local authorities who have developed this type of permit.

Guidelines

2.43 BVRLA and CoMoUK are the two organisations that have developed a set of guidelines for car club planning and implementation strategies. They support this development by ensuring that operators are treated fairly by policymakers and provide evidence to support the benefits and impacts of car clubs. CoMoUK runs a voluntary accreditation schemes for car club operators which provides assurance to local authorities on an agreed set of standards expected of operators when providing services.

International case study: Madrid, Spain

Madrid is one of the European cities with the largest number of car club users which has been achieved through a combination of factors including regulations, policies and incentives from the government. Car club developments in Madrid have mainly been private sector led. The local government has focused on facilitating the conditions for these companies to operate and to scale up. Local projects such as Low Emission Areas in the centre of the city have promoted and increased the use of car clubs.

[8]Traffic Management Act 2004 **https://www.gov.uk/government/collections/traffic-management-act-2004-overview**

The car club market in Madrid is well established with various companies such as SHARE NOW, Emov, Zity, Respiro, Ubeeqo and Wible operating mainly in the centre of the city. Some of them are using a 100% electric fleet and all of them offer Electric Vehicles (EVs) in their fleet. The EV car clubs benefited from Madrid Central Plan, which introduced a low emission zone restricting the polluting vehicles in the centre of the city and allowing free parking for electric vehicles.

The "New Ordinance for Madrid's Sustainable Mobility" regulates aspects of car clubs such as:

- The vehicles must be low emission;
- The vehicles must be easily identified and provide details about the entity or company responsible for it;
- The companies must share the geolocation information of its vehicles with the local authority; and
- The local government has the power to make decisions about scaling availability of these services or restricting the number of vehicles or its use in the public space.

The Air Quality and Climate Change Plan for the City of Madrid defined a series of actions for promoting car clubs through:

- Developing communication, awareness and marketing strategies for car clubs
- Enabling parking facilities for car club users; and
- Promoting reservation of parking spaces for car club vehicles.

Priority areas

2.48 Table 2-2 summarises the findings related to the assessment of fitness for purpose of existing regulations and identifies the gaps where current regulation does not exist, which have been coded through Red/Amber/Green colour codes. The "red" areas have been identified as priority areas and classified as those causing issues and imposing significant challenges or/and having a high probability of causing issues in future.

Table 2-2. Car clubs - Summary of current state of regulations

Quantity restriction (vehicles, operators)	Licensing (vehicles, operators)	Licensing (Drivers)	Vehicle specifications	Data Sharing	Guarantee of Provision	Regulated Pricing	Public space allocation[9]	Public space fees
None, but the number of cars on-street are typically limited by local authority parking controls. Number of operators on-street can be	**None**, voluntary standards for vehicles and operators through CoMoUK industry accreditation	**Yes,** all drivers require a valid driving licence	**Yes**, must meet national vehicle standards	**None**, unless agreed through a local authority contract	**None**, unless agreed through a local authority contract	**None**	**Yes**, Traffic Regulation Orders (TRO) are required for use of public parking space. There are no restrictions on private parking spaces	**Yes**, parking bays are typically chargeable by local authorities

[9] parking and drop off/ pick up locations

limited by procurement							(depends on terms of contract with parking space owner)	

2.52 A key issue related to car clubs, which has been identified as "red", is a lack of data sharing standardisation. Currently, there are no standard agreements or formats for data sharing regarding car club trips or car club bays/cars and the parking spaces available to local and regional authorities, as there is no requirement for operators to share their data.

2.53 Local authorities control the allocation of bays and there is no control at a regional or national level, which imposes a number of "amber" issues:

- Each local authority has its own policies and appetite for car club provision, as such, the offer of car clubs in the region can be fragmented reducing potential for user demand and benefits. This can result in patchy provision of car club services, with services focused around areas with a current high density of users;
- Pricing of car clubs is currently regulated by the market, as such there is not a minimum price band, which could lead to price wars between the operators; and
- There is no guarantee of provision by car club operators unless agreed through a contract with a local authority.

Potential next steps

2.54 A National Car Club Strategy similar to Germany's[10] Carsharing Act (which came into effect in September 2017) could be introduced to overcome the current challenges. The main objective of the Car Sharing Act is to enable the authorities to give priority to shared vehicles with regards to parking fees and parking spaces on public roads for the benefit of the end user. The act also allows car clubs providers with a low emission fleet to apply for multiple sites on town roads, promoting environmentally friendly driving.

2.55 There is also an opportunity for greater UK-wide policy direction and national support for car clubs. Some policies, such as vehicle taxation and local authority procurement frameworks, are managed at a national level and are currently not fully exploited for the promotion of car clubs.

CAV services

2.56 CAV trials are taking place in major towns and cities across the world. The UK is home to four CAV test beds and three additional sites focused on highways, rural areas and parking and more than 80 collaborative R&D projects underway.

2.57 CAV services refer to vehicles accepting passengers or delivering goods with autonomy of at least Level 4[11] and include both vehicles with a safety driver and without (e.g. autonomous delivery pods).

[10] https://www.whitecase.com/publications/article/car-sharing-act-new-benefits-car-sharing-offerings-germany

[11] Level 4 - High Automation. Automated driving system undertakes all aspects of the dynamic driving task in defined conditions

Current regulations

2.58 The Law Commission[12] of England and Wales and the Scottish Law Commission are currently reviewing the regulatory framework for the safe deployment of automated vehicles in the UK. This is a three-year project running from 2018 to 2021, which includes three rounds of consultation. The second consultation paper on the regulation of Highly Automated Road Passenger Services (HARPS) was published in October 2019. The final recommendations will be provided in 2021.

- First Consultation (November 2018 – February 2019): the central finding from the work so far relates to safety assurance. There was overwhelming support for a national safety assurance scheme for automated driving systems.
- Second consultation (October 2019 to February 2020): a national licensing scheme for HARPS is being considered alongside private ownership, accessibility for older and disabled people, how to control congestion on public roads and how regulation can help self-driving vehicles integrate with public transport.
- Third consultation (in 2020) will draw on responses to both previous papers to formulate overarching proposals on the way forward.

2.59 Other:

- *Principles of cyber security for connected and automated vehicles*.[13] An overview of the principles for obtaining good cyber security within the automotive sector has been developed by the Department for Transport, in conjunction with the Centre for the Protection of National Infrastructure (CPNI).
- *Automated and Electric Vehicles Act 2018*. The first part of the act establishes that insurers are required to deal with all claims even when the vehicle is operating in automated technology mode. Insurers will also have a right of recovery against manufacturers and the right to exclude liability where the relevant individual fails to keep the software up to date. The second part of the act deals with the electric vehicle charging infrastructure, including issues such as availability, compatible vehicle types, reliability standards and standardising how infrastructure is paid for.
- Zenzic and TRL released the *Safety Case framework 2.0* which sets out detailed safety requirements to be used across the CAV Testbed UK ecosystem. BSI has recently released *PAS 1880:2020 – Guideline*s, for developing and accessing control systems for autonomous vehicles. The guide is developed to help companies assess the safety of their control systems and provide confidence in their end-conduct.

National trials

2.60 Those trialling CAVs on UK roads must follow the Department for Transport's (DfT) Code of Practice: Automated Vehicle Trialling[14]. This code of practice provides guidance on testing automated vehicle technologies on public roads or in other public places in the UK. It makes

[12] https://www.lawcom.gov.uk/project/automated-vehicles/

[13] https://www.gov.uk/government/publications/principles-of-cyber-security-for-connected-and-automated-vehicles

[14] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/776511/code-of-practice-automated-vehicle-trialling.pdf

recommendations on how to maintain safety and minimise potential risks. The Code was first published in 2015 and was updated in 2019.

2.61 Trialling any level of automated vehicle technology is possible on any UK road if carried out in line with UK law. Trialling organisations do not need to obtain permits or pay surety bonds when conducting trials in the UK. As part of complying with the law, they will need to ensure that they have:

- A driver or operator, in or out of the vehicle, who is ready, able, and willing to resume control of the vehicle;
- A roadworthy vehicle; and
- Appropriate insurance in place.

2.62 The government acknowledges the desire to conduct advanced trials on public roads. Such trials may not readily fit within the current UK legislation, so the DfT's agencies will introduce and operate a process to support those looking to safely conduct advanced trials. This process will be available to support industry when they are ready to do such trials. Those planning to conduct advanced trials should contact the Centre for Connected and Autonomous Vehicles in advance.

2.63 General guidance on the legislative requirements relating to the use of prototype vehicles on the roads is currently available. In normal circumstances, all vehicles used on the public road have to comply with the 'Road Vehicles (Construction and Use) Regulations 1986' (known as C&U), 'Road Vehicles Authorised Weight Regulations 1998' and 'Road Vehicles Lighting Regulations 1989' (RVLR)'. However, certain exemptions are available for vehicles that are prototypes, or that contain prototype equipment not developed specifically for CAVs.

International case studies: Singapore and Arizona, U.S.

Singapore

Singapore has become a leader in developing and testing CAVs by introducing an anticipatory approach to regulation and encouraging collaboration between key stakeholders and the government. The technical standards of vehicles and regulation required for deployment of CAVs are considered together and are being tested and developed through various testbeds and trials.

Through collaboration and partnerships, Singapore built a test town in 2017 replicating real-world conditions for testing of CAVs with all data collected by the Land Transport Authority (LTA), which allowed the government to draft and introduce new regulations.

As a result, the national standards TR 68 have been developed, which include the guidelines for safe deployment of CAVs including vehicle behaviour, functional safety, cybersecurity, and data formats. TR 68 will be updated as the development of CAVs progress further and more evidence is collected through trials and pilots. Singapore has also introduced specific standards for new estate developments, which accommodate CAVs and discourage car ownership; those include fewer parking spaces, narrow streets and road markings designed to be easily recognisable by CAVs[15].

[15] https://futurist.law.umich.edu/exploring-singapores-tight-vehicle-regulation/

Arizona, U.S.

In the U.S. companies such as Google, Lyft, Uber and several car manufacturers are testing self-driving vehicles. In the absence of finalised federal requirements specific to CAV testing, state polices play a significant role. As of 2019, two-thirds of states in the US have regulations in place for CAVs.

Arizona was one of the first three states to allow testing of Level 4 vehicles on public roads without the presence of a human driver to take control, with over 600 self-driving cars operating on public roads in the state in 2019. In 2015 the Arizona Governor issued an executive order directing state agencies to "undertake any steps necessary to support the testing and operation of self-driving vehicles" on public roads in the state. The order helped facilitate the Phoenix metro area's development as a key testing ground for CAV technology and laid the groundwork for Waymo's move to roll out its driverless service commercially in the state.

The state has also been the target of criticism for not focusing enough on safety, particularly in the aftermath of a deadly crash involving an Uber-operated CAV in March. Arizona did not have any special legislation or regulations related to self-driving cars: companies only needed to carry minimum liability insurance to operate the vehicles. They were not required to track crashes or report any information to the state.

In 2018, the Governor issued a new executive order laying out additional requirements that companies operating CAVs must comply with in order to operate on Arizona's streets. While the new order is still designed to facilitate the proliferation of CAVs, it includes new requirements that CAV owners affirm that the vehicles meet all relevant federal standards, and that they are capable of reaching a "minimal risk condition" if the autonomous system fails. Critics have called the new executive order's modest increase in safety requirements too little for such an unknown and potentially dangerous technology.

Priority areas

2.74 Table 2-3 summarises the findings related to the assessment of fitness for purpose of existing regulations and identifies the gaps where current regulation does not exist, which have been coded through Red/Amber/Green colour codes. The "red" areas have been identified as priority areas and classified as those causing issues and imposing significant challenges or/and having a high probability of causing issues in future.

Table 2-3. CAV services - Summary of current state of regulations

Quantity restriction (vehicles, operators)	Licensing (vehicles, operators)	Licensing (Drivers)	Vehicle specifications	Data Sharing	Guarantee of Provision	Regulated Pricing	Public space allocation[16]	Public space fees
None	**Partly,** even at Level 4, vehicles can be licensed provided they have the features of a conventional vehicle e.g. steering wheel, wing mirrors, able to meet crash-testing requirements.	**Yes,** for vehicles up to Level 4, but a driving licence may not be required for Level 5 vehicles as there would be no need for the occupant to intervene.	**Partly**[17], when testing CAVs, the CCAV Code of Practice must be followed. Regulations for vehicles designed without space for a driver do not yet exist.	**None**	**None**	**None**	None	**None**

2.78 While work is ongoing at a national level, there is little ability for local authorities to manage or influence trials, instead they are being encouraged to facilitate them. Currently, local authorities could refuse to license autonomous vehicles in their area for use as taxis, or private hire services under existing taxi or private hire regulations but not for use as private vehicles.

2.79 As a result, almost all relevant policy areas are classified as "red", as there is not established regulation and there is a need for these issues to be addressed in order for cities to maintain control and management of services and their potential impact on other transport modes. These policy areas include:

- Licensing of CAV services for the provision of passenger services;
- Vehicle specifications and data sharing;
- Public space allocation; and
- Regulation of the number of CAV service vehicles.

Potential next steps

2.80 There is the potential to provide powers to local authorities to control trials of CAV services in their areas. At a regional and local level, transport and city authorities should be given powers to regulate specific aspects of CAV service deployment through licensing, such as use of road space, kerb space, time of operations for certain services etc. This would allow local authorities to set standards that are in line with their specific goals and priorities considering the local context. For example, a current PHV licence does not accommodate for CAV services and a change in regulation will be required.

2.81 Authorities also need the power to prioritise certain CAV services over others – for example, they may want to license a number of smaller feeder services that connect people to high-capacity public transport networks and/or prioritise larger CAVs for out of hours services. Also,

[16] Parking and drop off/ pick up locations

[17] All relevant national vehicle requirements (e.g. MOT, C&U regs etc.) still apply.

there is currently little ability for local authorities to refuse permission for CAV trials on their roads, rather they are being encouraged to facilitate them.

2.82 The number of CAV vehicles operating as part of passenger transport services circulating in the city should be regulated, allowing local authorities to control the transport network. For example, licensing could be used to limit vehicle numbers. Giving power to local or regional authorities to control the number of licences for CAVs in passenger transport services can help them to control vehicle quantities on the streets helping to prevent CAV services from circulating unnecessarily. Additionally, road user charging should be explored as the tool to influence the number of private CAVs on the roads.

2.83 Currently, all CAVs in the UK require a human driver or operator (in or out of the vehicle), who can resume control of the vehicle if needed. With the deployment of CAV services on public roads, the need for a driver could eventually disappear and the focus will need to be extended to the licensing of CAV operators in addition to vehicles.

2.84 Local authorities need powers to ensure the quality and standards of CAV services. Beyond the national safety baseline, licensing authorities should be free to set higher standards for CAV services, as they currently do for taxi and private hire vehicles, for example considering the type of vehicle used.

2.85 Similar to other services and modes, data sharing from shared CAV fleets should be an established and regulated process.

Quick win

2.86 The current Code of Practice produced by CCAV and DfT notes that trialling organisations "should speak with the road and enforcement authorities, develop engagement plans, and have data recorders fitted.' It is of concern to City Regions that the word 'should' rather than 'must' is used, meaning that transport authorities could in theory find CAVs being trialled in their area without prior consultation. A potential quick win will be for the government to make it mandatory to consult with local and transport authorities before trialling the CAV services in their areas. Local and city authorities should be key stakeholders given how the development of CAV services has direct consequences for their places and communities, impacting local priorities and transport policy.

E-scooters

2.87 E-scooters are low speed two-wheeled vehicles powered by a small electric motor, designed for a single standing rider. Shared e-scooters schemes have been widely adopted in different countries including in Europe, North America, Latin America and Asia.

Current regulations

2.88 Current UK regulations were introduced prior to the development and introduction of e-scooters and do not allow for the use of e-scooters on either the road or pavement.

2.89 E-scooters fall within the legal definition of a 'motor vehicle' and must conform to the same laws. The Road Traffic Act 1988 sets out the legal definition of a 'motor vehicle'. The DVLA requires motor vehicles to be registered, insured, licensed, checked for safety, taxed and fitted with number plates in order to use the road. Riders need a driving licence, and to wear a helmet.

2.90 E-scooters are powered by a battery and are therefore classified as a Personal Light Electric Vehicle (PLEV) by the Department for Transport (DfT), making it illegal to use them on UK roads and pavements. However, it is legal to use them on private land and property, with the permission of the land/property owner:

- Section 72 of the Highway Act 1835 makes it an offence to ride on a carriage on any pavement. The rule applies to almost all vehicles, including powered transporters. Special legal exceptions apply for mobility scooters and wheelchairs.
- Section 34 of the Road Traffic Act 1988 also forbids the use of powered transporters (mechanically powered vehicles) on footpaths.

2.91 The UK Government announced the biggest regulatory review in a generation to explore regulation around new transport modes in the'Future of Mobility: Urban Strategy' policy paper. The review will explore regulations around new types of vehicles including e-scooters.

2.92 As part of this review the DfT is undertaking a consultation for evidence on micromobility vehicles including e-scooters. The review will also consider if local authorities should have extra powers in order to manage the impacts of e-scooters on public space, for example parking locations/restrictions. Additionally, in May 2020 the government launched an additional consultation seeking views on the proposed regulatory changes to allow shared e-scooter trials to begin in the UK[18].

International case studies: Santa Monica, U.S., Mexico City, Mexico and Paris, France

Santa Monica, U.S.

In addition to federal guidelines, many cities across the U.S. have implemented their own regulations governing e-scooter use. This is the case in the City of Santa Monica. In June 2018, Santa Monica City Council directed staff to develop a Shared Mobility Device Pilot Program, regulating dockless shared micro-mobility companies and technologies. The challenge was to enable a low-emission, reliable and affordable transportation option for Santa Monica, whilst also managing public right-of-way and addressing safety concerns. An ad hoc pilot project was designed with the intent to be reflective of existing market conditions and evolving technology.

According to the rules outlined in Santa Monica's Shared Mobility Device Pilot Program, 2,500 e-scooters and ebikes, split between four operators, are allowed on city streets at any time. Each operator must pay $20,000 for the right to operate, $130 per device, and $1 per device per day for the privilege of parking on the public sidewalk. This is money that the city can use to invest in infrastructure and safety improvements. Over time, as companies proved their vehicles were being utilized at a high enough rate, they'd be given permission to operate more vehicles.

Recently, the Santa Monica City Council approved the extension of the city's initial 16 month e-scooter program through until May 2020. Santa Monica will use the initial pilot results[19]: to inform "a second pilot program with intensified regulations that facilitates

[18] https://www.gov.uk/government/consultations/legalising-rental-e-scooter-trials-defining-e-scooters-and-rules-for-their-use

[19]https://www.smgov.net/uploadedFiles/Departments/PCD/Transportation/SantaMonicaSharedMobilityEvaluation_Final_110419.pdf

greater customer reliability and affordability, and more effectively achieves safety and public outcomes." Proposed new regulations are expected in early 2021.

Santa Monica also adopted the Mobility Data Specification (MDS), a micro mobility data standard created by Los Angeles's Department of Transportation. Some feedback from the pilot program annual report are described below:

- 85% of riders and 90% of the general public reported a general awareness of the pilot's basic parking and riding rules;
- 49% of shared mobility trips replaced trips that would have otherwise been made by car, either alone or through services like Lyft/Uber;
- Over a third of trips taken on these devices replaced walking trips; and
- The City installed 107 parking and pick-up zones citywide, helping to organize rider parking and manage service provider fleet deployment.

As one of the first locations where shared e-scooters were launched, and due to a proactive local authority, Santa Monica has established itself amongst national leaders in city policy and technical expertise related to micro-mobility data and pilot project management. It should be noted that the way the MDS standard was developed and implemented has not been well received by all mobility operators and has been the subject of some controversy.

Mexico City, Mexico

The first e-scooter companies started operations in Mexico City in the first half of 2018, where an initial laissez-faire approach to regulation created a high level of competition between operators and consequentially, a chaotic, unsafe operating environment. Following this, SEMOVI implemented a pilot program for e-scooters aimed at regulating these services. This pilot program required companies to submit operational data and to provide their service within a specified area for each company. Unfortunately, there was a lack of enforcement and some operators did not share the required data nor follow the rules and eventually the program ended in 2018.

Under a new administration, SEMOVI conducted a second pilot program in February 2019 for a 45-day period. There were some specific changes, most notably the introduction of a new unified operational area for all companies, along with a 1,100/500 bike/e-scooters limit and mandatory weekly reporting of the data on trips and number of accidents. Based on key findings from the pilot program, SEMOVI implemented an official annual regulatory scheme, including a requirement for a licence to operate and an annual fee per vehicle used to fund parking infrastructure for these services.

Companies interested in obtaining a licence to operate would have to go through a bidding process established by SEMOVI. For this process, SEMOVI set a total maximum number (considering all operators) of 3,500 scooters and a minimum annual per vehicle fee of $1,350 MXN (£50) which was calculated based on[20]:

- Usage of public space (parking space for scooters);
- Infrastructure for parking;
- Maintenance of parking locations; and
- Discount for emission savings.

[20]https://semovi.cdmx.gob.mx/storage/app/uploads/public/5cf/5d5/736/5cf5d57363a30867997403.pdf

From six companies originally interested in participating (Jump, Movo, Lime, Bird, Grin, Motum) only four ended up participating in the bidding process. The selected combination allowed Lime and Grin to operate 1,750 scooters each, with an annual fee per vehicle of $7,200 MXN (£260) and $14,000 MXN (£500) respectively.

Once these results were made public, Lime declined to pay claiming "lack of legal certainty throughout the process"[21], and not long after, Grin had to stop operations temporarily due to a high number of vehicles being stolen. An extraordinary process to allocate the remaining 1,750 scooter slot originally awarded to Lime took place, awarding Bird with this number of vehicles at a $5,400 MXN (£200) fee each.

Throughout this process, some companies initiated legal action against SEMOVI, allowing them to operate while the legal process was carried out. Currently any user in Mexico City can access at least four different e-scooter services (Grin, Bird, Movo, Lime) even though only two of them were awarded with operating licences. The legal status under which Lime and Movo operate is not clear.

Paris, France

The French government introduced the Loi d'Orientation des Mobilités (LOM - or Mobility Orientation Law) in December 2019 which sets a legislative framework for transportation policy. The law has four objectives: stop car dependency, accelerate the growth of new mobility, succeed the ecological transition and program investments in transport infrastructure.

The LOM provides a regulatory framework to ensure that fleets are deployed in a sustainable and controlled manner. It sets out the requirements that companies must meet in order to obtain the licence to operate (e.g. the number of deployed vehicles, technical requirements etc.). Interestingly, prior to introduction of the LOM, Paris has been acting incrementally to ensure that public spaces and pedestrian safety were respected while promoting sustainable mobility offers. When e-scooters were introduced to Paris, 12 different operators were present with around 20,000 e-scooters on the streets. There was no regulatory framework in place to control the operators and the use of the e-scooters by the public, which resulted in vandalism, accidents and e-scooters being left on pavements without any control.

The city's permitting process came as a result of Bird, Lime and other services deploying their e-scooters without permission in the city during the summer of 2018 leading to public backlash and accidents. Following a national decree published in the Official Journal in October 2019, e-scooters now fall within the scope of the Traffic Law:

- Speed limits: the speed-limit is set to a maximum of 25km/h throughout the capital (with a fine up to €1,500).
- Circulation of e-scooters is limited to bicycle lanes and on roads where the maximum speed is no higher than 50 km/h. Riding on pavements is strictly prohibited and punishable by a fine of €135.
- Promotion of the use of helmets and a step up in road accident prevention campaigns. Like with bicycles, e-scooters must be equipped with front and rear lights, a horn and a

[21] https://www.eleconomista.com.mx/politica/Semovi-lastima-certeza-juridica-en-regulacion-de-scooters-y-bicicletas-en-la-CDMX-critican-operadores-20190717-0096.html
https://www.animalpolitico.com/2019/07/monopatines-cdmx-lime-mexico-no-pagara-cuota-anual-semovi/

reflector. The rider must be at least 12 years old. Breaking these rules can lead to a fine of €35.

- Transporting other passengers is prohibited and punishable by a fine of €135.
- Prohibition of parking electric scooters on all pavements; e-scooter users must park in cars and motorcycles parking spaces located on the road or in one of the 15,000 dedicated parking spaces that the City is currently making available.

The City of Paris has issued a Request For Proposals (RFP) to launch a permit allotment in the capital. E-scooter operators could submit their application up until March 2020. The Paris mayor has worked with the e-scooter companies on a code of conduct for riders and announced plans to limit the number of operators in the city to three.

Priority areas

2.108 Table 2-4 summarises the findings related to the assessment of fitness for purpose of existing regulations and identifies the gaps where current regulation does not exist, which have been coded through Red/Amber/Green colour codes. The "red" areas have been identified as priority areas and classified as those causing issues and imposing significant challenges or/and having a high probability of causing issues in future.

Table 2-4. E-scooters - Summary of current state of regulations

Quantity restriction (vehicles, operators)	Licensing (vehicles, operators)	Licensing (Drivers)	Vehicle specifications	Data Sharing	Guarantee of Provision	Regulated Pricing	Public space allocation[22]	Public space fees
None	None	None	None	None	None	None	None	None

2.111 The majority of policy areas including quantity restriction, licensing, vehicle specification, data sharing and public space allocation are marked as "red" due to the fact that UK national law prohibits the use of e-scooters and it is not currently possible for regional or local authorities to allow their use on public highway or pavement with the exception for shared e-scooters in trial areas currently being agreed with the Department for Transport.[23]

Potential next steps

2.112 As e-scooters currently fall under the same law as all other motorised vehicles, the regulation should be reviewed following the emerging shared e-scooter trials. The questions about licensing, insurance, protective helmets, tax, speed limit etc. should be reviewed and answered specifically for e-scooters and other similar devices. The definition of e-scooters and other emerging vehicle types should be revisited and potentially be removed from being defined as a motor vehicle and instead be classified separately, along with a separate set of regulations for use.

2.113 If the vehicles are to be legalised, new city powers are required to enable the effective management of the e-scooter rental market. Cities need the ability to manage fleet sizes and the number of operators. In the event of changes in national legislation to permit the use of e-

[22] parking and drop off/ pick up locations

[23] https://www.gov.uk/government/consultations/legalising-rental-e-scooter-trials-defining-e-scooters-and-rules-for-their-use

scooters, cities should have the ability to issue permits and licences for operators of shared e-scooters, allowing them to gain control of the way the schemes are being rolled out and ensure they work to help achieve the cities' goals and objectives.

2.114 Similar to the case with dockless bike share, if e-scooters are legalised, currently the only way for local authorities to request data sharing will be though voluntary MOUs which are not legally binding. There are also limited ways for local authorities to control the allocation of parking space for privately funded shared e-scooters, again, through voluntary MOUs.

2.115 If e-scooters are legalised at a national level, there is then potential for local and regional government to implement further local controls or conditions - for example, to prohibit use of e-scooters in certain locations or to enforce controls on shared e-scooter systems.

2.116 Any changes to the status of e-scooters in UK law should take into consideration how this has already been achieved in other countries (e.g. referring to EU laws).

Microtransit

2.117 In recent years, new forms of on-demand services (sometimes called microtransit) have started to be introduced, catering for more general transport needs and users. While offering a similar flexible service to traditional Demand Responsive Transport, these newer services are technology enabled, allowing immediate booking, integrated payment and driver routing. To date these services have been launched commercially in the UK (e.g. ArrivaClick in Liverpool), and also in partnership with public bodies (e.g. GoSutton and Slide pilot services in London under contract to Transport for London).

2.118 The terminology in this area is emerging and is also referred to as Digital Demand Responsive Transport.

Current regulations

2.119 There are separate guiding regulations set by the Transport Act 1985 that apply for microtransit operations across England and Wales, Scotland and London. For the purposes of this study, we consider only publicly accessible semi-flexible/ flexible route services as microtransit. Fully fixed route services are not included.

2.120 The DfT recognises the need to introduce flexible on-demand services to increase transport options, particularly in underserved areas. It allows Traffic Commissioners to issue a flexible bus service licence in the absence of sufficient information on the route: in cases where it would not be possible to provide a principal start and finish point, a description of the route identifying the roads used and a timetable for the service is required.

2.121 Licensing for such services is usually undertaken through the Traffic Commissioners, but in some cases, it is carried out by local authorities through private hire operator licences. The regulations applicable to microtransit services in the UK currently differ depending on the number of passengers that can be carried in the vehicle.

Licencing Regulations

2.122 Whilst there is no specific limit on the number of passengers carried, vehicles designed to carry more than eight seated passengers excluding the driver will need to apply for a Public Service Vehicle Operator's Licence from the relevant Traffic Commissioner, or, in the case of non-profit making bodies, a permit issued under Section 22 of the Transport Act 1985. Vehicles with eight passenger seats or less currently fall under Private Hire Vehicle licensing.

Table 2-5: Microtransit service operator licencing regulations

Type of Vehicle	Licencing Authority	Service Operator Licence
Public Service Vehicle (9 or more seated passengers)	England & Wales: Office of the Traffic Commissioner in Leeds Scotland: Traffic Commissioner for Scotland based in Edinburgh London: Transport for London (TfL) For cross-border operations, a valid licence should be obtained for each region.	Amendments were made to the PSV Regulations in 2004 to include flexible routed public bus services. Operators must meet the requirements of the Transport Act 1985, Transport Act 2000, the Public Service Vehicles (PSV) Regulations 1986, and the Bus Services Act 2017 to obtain a valid licence. As per regulations, microtransit operators require a valid PSV operator licence[24], similar to a standard (fixed route) bus service. Except while registering the service, operators do not need to mention the route plan/ timetables of their service. They need to define a geographical area where the service will operate. If a fixed route service is included as part of the service, they must include the information about the fixed stops. Each vehicle used for the service should be registered as a PSV with the local authority. All drivers need a valid PSV driver's licence to provide the services. In addition to the PSV licence, operators require a London Service Permit[25] from TfL to provide service in London.
Private Hire Vehicle (8 or less seated passengers)	Local Authorities of the area of operation London: TfL	All operators require a valid PHV[26] operator licence. Charges and licensing conditions differ by local licensing authority objectives. Each vehicle used for the service should be registered as a PHV with the local authority, and each driver needs to hold a valid PHV driver's licence. Licence Validity: PHV operator licences last for a maximum of 5 years, driver's licences for up to 3 years and vehicle licences for up to 1 year. The driver, vehicle and operator must all be licensed by the same authority.

Flexible Public Service Vehicle (PSV) (9 or more seated passengers)

2.123 The Office of the Traffic Commissioner also sets out some additional regulations for operators of PSVs (including flexible bus service operator). They are as following:

- The suggested route by the operator can be any length, as long as passengers can get off within 15 miles (measured in a straight line) of where they got on;
- Free services, where there is no payment of separate fares, are not required to register for a PSV service;
- The Bus Services Act 2017 mandates that in England (outside London) there is now a 28-day period (14 days for holders of section 22 permits) where a local authority is given chance to scrutinise an application. Therefore, the service operators are required to

[24] Guidelines for Flexible Bus operators **https://www.gov.uk/government/publications/registration-of-flexibly-routed-local-bus-services-guide-for-operators**

[25] Bus services that do not form part of the London bus network and are not secured by or operate under agreement with London Buses need to secure a London Service Permit **https://tfl.gov.uk/info-for/suppliers-and-contractors/london-service-permits**

[26] Private Hire Vehicle licences **https://www.gov.uk/taxi-vehicle-licence**

submit their application and associated paperwork to the relevant local authority before sending it to the traffic commissioner. However, there is no pre-registration period for local bus services operating in Wales, where the notice period to the Traffic Commissioner remains at 56 days.

2.124 If an operator wishes to register a PSV service commercially, they need to apply with the following details:

- The address of the operator;
- A description of the area of operation and a map of a scale not smaller than 1:50,000 showing the sections of flexible operation and fixed sections of the route (if any);
- Details of any fixed stopping places and the stopping arrangements at those places;
- An indication of any fixed stopping places where the vehicles used on the service may or will stand longer than the time required to pick up or set down passengers;
- The terms on which, and the methods by which, journeys may be booked; and
- Either, the timing of the service or where it is impracticable to specify an exact time of arrival at, or departure from, a fixed stopping place or other point within the area of operation, a time window may be specified.

2.125 The vehicles used for PSV service should comply with the vehicle specifications/ construction requirements as set out in Schedule 6 of the Road Vehicles (Construction & Use) Regulations 1986. Additionally, the number of passengers carried and the way they will be carried should also be confirmed with the insurance company.

Flexible PHV (8 or less passengers)

2.126 Microtransit vehicles that carry up to eight passengers are governed by the PHV regulations as set under section 48 of the Local Government (Miscellaneous Provisions) Act 1976 or section 7 of the Private Hire Vehicles (London) Act 1998.

2.127 Vehicles with a higher seating capacity than the vehicles typically licensed as taxis and PHVs (for example those with six, seven or eight passenger seats) may be used for flexible services. They can be provided in two forms as following:

- **Shared taxis and private hire vehicles (section 11, Transport Act 1985):** It allows licensed taxis and PHVs to provide a service at separate fares for up to eight passengers sharing the vehicle. The operator takes the initiative to match up passengers who book in advance and agree to share the vehicle at separate fares (lower than for a single hiring).
- **Taxibuses (section 12, Transport Act 1985):** The Local Transport Act 2008 contains a provision which allows the owners of PHVs to acquire a 'restricted public service vehicle (PSV) operator licence'. The taxi owner can then use the vehicle to run a bus service for up to eight passengers. The route must be registered with the Traffic Commissioner and must have at least one stop in the area of the local authority that licensed the taxi.

2.128 Further details about the existing rules and regulations for PHVs are discussed under taxi & PHV service regulations.

International case study: Mexico City, Mexico

Minibus services in Mexico City have been crucial in providing accessibility to transport in areas not covered by public transport services, especially for accessing deprived or hard-to-reach places. Supplementing these services, in recent years several on-demand app-based services (Jetty, Bussi and Urbvan) have launched in Mexico City, mostly focused to serve

white collar worker demand in areas with high numbers of business centres and poor public transport provision.

These services are private initiatives, which are privately operated and were assigned the status of ride-hailing companies. When using their apps, users can choose an origin and a destination point. The app matches users to the closest vehicle available and provides the walking time to the closest pick up point.

Some of these companies have faced conflict with traditional operators of this type of service and had to suspend operations. In addition to this, SEMOVI (the city's transport authority) has published an addendum to the city´s mobility regulation, in which carpooling was prohibited for ride-hailing services[27]. Some companies entered negotiations with the government and have re-started operations.

Further regulations for microtransit services like Bussi, Jetty and Urbvan are still needed as there is no specific regulation for these types of services and there is an overall lack of certainty/clarity on the legal status under which they operate.

Priority areas

2.133 Table 2-6 summarises the findings related to the assessment of fitness for purpose of existing regulations and identifies the gaps where current regulation does not exist, which have been coded through Red/Amber/Green colour codes. The "red" areas have been identified as priority areas and classified as those causing issues and imposing significant challenges or/and having a high probability of causing issues in future.

[27] https://www.animalpolitico.com/2017/12/cdmx-licencia-manejo/

Table 2-6. Microtransit - Summary of current state of regulations

Quantity restriction	Licensing (vehicles, operators)	Licensing (Drivers)	Vehicle specifications	Data Sharing	Guarantee of Provision	Regulated Pricing	Public space allocation [28]	Public space fees
None, <9 seated passengers: No ability to limit number of vehicles, operators or drivers. >9 seated passengers: No ability to limit number of services, but number of vehicles per service should be agreed as part of licencing application	**Yes,** licence type depends on number of passengers carried by each vehicle <9 seated passengers: Vehicles: PHV licence Operator: PHV operator licence >9 seated passengers: Vehicles: PSV licence Operators: PSV operator licence/ Community Bus Permit Service, Outside London: PSV service permit from regional traffic commissioner Inside London: London Service Permit	**Yes,** licence type depends on number of passengers carried by each vehicle <9 seated passengers: PHV driver licence >9 seated passengers: Passenger Carrying Vehicle (PCV) driver licence	**Yes**, < 9 seated passengers: must meet national vehicle standards for Taxis and PHVs >9 seated passengers: must meet national vehicle standards for Buses and minibuses	**Yes**, >9 seated passengers: Bus Services Act apply, where all PSVs require to share data on service publicly. **None**, <9 seated passengers, but PHV operators registered in London are required to provide limited information on drivers and vehicles requested by TfL	**None**, but for >9 seated passengers - failure to provide the registered service may impose disciplinary action including a fine	**None**, unless agreed through a local authority contract such as >9 seated passengers: accepting concessionary fares on flexibly routed bus service might be part of service permit	**None**	**None**

2.153 The two policy areas identified as "red" are as follows:

- Licensing of vehicles, operators and services - current regulation on licensing is based on either private hire or bus regulation and varies depending on number of passengers per vehicle. In effect the regulation is determined by the size of vehicle and not the type of service provided; and
- Data sharing - there are no existing data sharing requirements for vehicles carrying less than nine passengers, this data could help transport authorities to plan wider transport networks and ensure microtransit complements other services.

2.154 Quantity restrictions, guarantee of provision, public space allocation and regulated pricing are classified as "amber". These are currently unregulated areas and do not provide local or city region authorities with powers to act, unless agreed through a local authority contract. However, currently, the volume of services is relatively low, and no significant tensions or issues have been identified.

2.155 There are potential challenges associated with the public space allocation policy area - currently there are no dedicated passenger pick-up or drop-off locations for flexible services/

[28] parking and drop off/ pick up locations

microtransit vehicles. Larger microtransit vehicles (9 or more passengers) generally use existing bus stops for such purposes, while PHVs use existing taxi and PHV loading/unloading bays, or less formal locations. Consideration of this will grow in necessity if demand for microtransit grows and as CAV services are introduced in future.

Potential next steps

2.156 Consideration of new regulations tailored for on-demand services is relevant for microtransit services and will become more important with the growth of CAV services, and blurring of the distinction between a bus, taxi and PHV service.

2.157 Additionally, the current guidelines for the flexible PSV service focus on the service plan in terms of area of operation, number of passengers carried and potential times of operation. Some of the challenges that need to be addressed in future policies include:

- Provision for inter-city/ regional service: There are no regulations for long distance/ regional flexible bus services. Service licences are provided at local authority level, with no provision for obtaining licences from multiple local authorities. Current regulations dictate that operators must include stops in the area where the vehicle/service is licensed in.
- The existing guidelines do not provide any regulations for technology provision. Bookings are made in advance either by calling the operator or through the mobile app of the operator. Considerations should be made towards the accessibility of booking methods, for example for individuals without access to a smartphone.

Quick win

2.158 A wider consultation by the government for on-demand services, including taxis, PHVs and microtransit is required. The definitions and requirements for these types of services are blurring and an assessment of whether they fit within existing legislation is needed, especially ahead of any industry transition to CAVs.

Mobility as a Service (MaaS)

2.159 MaaS is an integrated platform where transport operators (public and private) and other solution/technology providers ideally work in collaboration to deliver personalised travel solutions in a city/region/country/global setting. Journeys can be optimised based on user travel needs, for example, whether they want to take the cheapest, fastest, or the most environmentally friendly route. With MaaS, the users can potentially make a single payment on a single platform for an entire multi-modal journey.

2.160 MaaS is in the early stages of development and is not yet generally available to users in the UK, beyond a few small trials and early innovators. The success of MaaS is dependent on public and private organisations working together to share data, systems and commercial agreements between transport operators and MaaS platform providers. Several private operators (Uber, Citymapper, Moovit, etc.) and integrators (MaaS Global, Ubeeqo, etc.) are trialling multi-modal transport services in the UK which feature many elements of MaaS and are delivered through strategic partnerships.

Current regulations

2.161 The UK government's Foresight Future of Mobility Evidence Review[29] explored key drivers of change in mobility needs, the objectives of MaaS, and the implications of different MaaS business models for decision makers. A key commitment set out in the Future of Mobility Industrial Strategy[30] is to "explore ways to use data to accelerate development of new mobility services and enable the more effective operation of our transport system".

2.162 The **Transport Data Initiative[31] (TDI)** is a not for profit body founded in 2016. Set up by local authorities, its goal is to help its members (local/ national authorities and from the private sector) improve the way they collect, store, and use data to improve transport services whilst reducing the costs of delivery.

2.163 Transport for London (TfL) made the policy decision to open-up all of their data since 2010 as per the **TfL Open Data Policy**[32], which has resulted in the deployment of new journey planning apps, such as Citymapper. It is now being used in over 600 apps and has changed the way people use TfL and the wider London transport network. Similar initiatives are required outside London to facilitate MaaS.

2.164 The Department for Transport (DfT) has taken steps to make bus data available to the public through the **Bus Services Act 2017.**[33] It requires all PSV operators in the UK to openly publish and share up-to-date data on timetables, fares and live location. While the local bus route and timetable data from 2019 onwards is available in Open Bus Data portal, delivering data on fares and ticketing requires data to be made available in a standard format (comparable to NeTEx (Network Timetable Exchange) the European Standard for exchanging multimodal public transport data). All operators would need to make all fares and ticket data, including complex tickets such as village fares, available via the Bus Open Data portal by the end of 2022. This may help not only to improve bus services, but also allow mobility technology companies to explore the possibility of delivering MaaS.

[29] Mobility as a Service in the UK: change and its implications, Future of Mobility **https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766759/Mobilityasaservice.pdf**

[30] Future of Mobility: Urban Strategy **https://www.gov.uk/government/publications/future-of-mobility-urban-strategy**

[31] **http://transportdatainitiative.com/**

[32] TfL Open Data Policy **https://tfl.gov.uk/info-for/open-data-users/open-data-policy**

[33] Bus Services Act 2017: Creation of Bus Open Data **https://www.gov.uk/government/consultations/bus-services-act-2017-bus-open-data/bus-services-act-2017-bus-open-data-html**

International case studies: Finland and the Netherlands

Finland

Finland was one of the first countries to launch MaaS and is a good example of the government supporting MaaS and taking action to encourage its implementation. In July 2018, the Finnish government introduced new legislation - the Act on Transport Services[34], which aims to enable and promote transport integration and is considered as a stepping-stone to MaaS. The Act is part of the Transport Code project and represents a step towards Finland's vision of providing MaaS and creating a digital future for mobility. According to the Act, all transport providers must provide access via open APIs to information on timetables, routes, ticket prices as well as real-time location data.

The key objective of the Act is the promotion of innovation and the provision of customer-oriented transport services. It encourages fairness of competition between transport service providers. The Act will be monitored by the Finnish Transport Agency. According to the Finnish government, the initial effects of the Act largely meet expectations: "the effects observed do not suggest any need to amend the Act on Transport Services".

The effects of the Act will be closely monitored to recognise changes in the transport system and the market. The Finnish government plans to create a market forum for various transport operators and local authorities to exchange experiences about the effects of the legislation.

The Netherlands

The Dutch government appreciates that MaaS offers opportunities for integration of transport modes and promotion of sustainable transport potentially leading to a decrease in congestion and improved air quality.

The Dutch Ministry of Infrastructure and Water Management allocated 20M EUR and is trialling seven national MaaS pilots, to collect data and develop an understanding of various aspects of MaaS (operations, governance, commercial feasibility etc.) The pilots will run for two to three years starting in 2020. Each pilot has different policy objectives and target groups. For example, the sustainable aspect of mobility is being trialled in Eindhoven and cross-border transport solutions are being investigated in Limburg.

The Dutch government will be directly involved in data collection and analysis, which will be used for an assessment of the need for regulatory change and design of the future policy. The specific requirements (e.g. data sharing, customer safeguards etc.) have been set for the companies selected to run the MaaS pilots.[35] Based on the results and outcomes of the pilots, the government will consider a need for additional regulation and the legislative framework.

[34] https://valtioneuvosto.fi/en/article/-/asset_publisher/liikennepalvelulain-ensivaikutukset-odotetunlaisia

[35] https://maas-scotland.com/wp-content/uploads/2019/07/Eric-Mink_Dutch-Ministry.pdf

Priority areas

2.165 Table 2-7 summarises the findings related to the assessment of fitness for purpose of existing regulations and identifies the gaps where current regulation does not exist, which have been coded through Red/Amber/Green colour codes. The "red" areas have been identified as priority areas and classified as those causing issues and imposing significant challenges or/and having a high probability of causing issues in future.

Table 2-7. MaaS - Summary of current state of regulations

Quantity restriction (vehicles, operators)[36]	Licensing (vehicles, operators)	Licensing (Drivers)	Vehicle specifications	Data Sharing	Guarantee of Provision	Regulated Pricing	Public space allocation[37]	Public space fees
None	**None**	**N/A**	**N/A**	**None**	**None**, unless agreed through a local authority contract	**Partly**[38]	**N/A**	**N/A**

2.166 There is not an established business model for the delivery of MaaS in cities and regions. Principles for delivering MaaS, including governance arrangements and the key policies required to enforce those principles - such as data sharing terms, competition law, minimum service standards, fare capping (if non-competitive service) – are expected to be explored and agreed upon first.

2.167 A key "red" issue is the data sharing and standardisation which is considered as a stepping stone for successful MaaS implementation. There are no existing consistent methods in place for local authorities to enforce data sharing from private transport operators.

2.168 In the future, it may be important to develop regulations on the licensing of MaaS operators and quantity restrictions in terms of the number of companies offering MaaS platforms and apps, therefore those components are classified as "amber".

Potential next steps

2.169 Regulations are expected to first explore the principles for delivering MaaS and then develop key elements required to enforce those principles, such as data sharing terms, competition law, minimum service standards and fare capping (if a non-competitive service). While the technology is available, and the DfT is making considerable efforts to make real-time data on public transport available for app developers, a high level of collaboration amongst public and private stakeholders and operators is required to successfully deliver MaaS.

2.170 For MaaS to successfully function between users and public and private providers, agreed data protocols and data sharing are needed. The government has an important role to play in

[36] Quantity restriction in relation to MaaS imply restriction of a number of MaaS operators in the city/region

[37] Parking and drop off/ pick up locations

[38] Pricing varies depending on modes, e.g. maximum taxi fares are limited in London

setting open data policies and frameworks along with creating a collaborative ecosystem and conditions to attract business and users to use the services and share data.

2.171 In order to make MaaS successful, policy makers must consider policy reform around the governance arrangements of MaaS in terms of:

- How transport service providers must provide access to essential information in a computer-readable format including routes, timetables, stops, prices and accessibility information;
- How different operators can collaborate: the degree of interoperability required;
- How the data is shared;
- How MaaS can be safe and socially inclusive;
- How MaaS can meet policy objectives (e.g. encourage people to use more public transport and increase cycling and walking compared to other modes);
- How payment and ticketing services can be set up to allow for a multimodal travel with a single ticket purchase;
- How interoperability of different MaaS modules such as ticketing, payment, journey planning etc. can be delivered.

Quick win

2.172 Prior to the establishment of formal regulation for MaaS, the industry would benefit from a Code of Conduct around MaaS, stating the quality standards required and level of service provided to the end users expected from the MaaS operators such as the need for the services to be inclusive and accessible for everyone.

Taxi and PHVs

2.173 The DfT is currently seeking views on proposed statutory guidance to taxi and private hire vehicle (PHV) licensing authorities.[39] The DfT has proposed the following definitions for taxis and PHVs[40]:

- "Taxis are referred as 'hackney carriages', 'black cabs' and 'cabs'. Taxis are able to be hired immediately by hailing on the street or at a rank." The term taxi is used throughout this report to refer to all such vehicles.
- "Private hire vehicles (PHVs) include a range of vehicles including minicabs, executive cars, chauffeur services, limousines and some school and day centre transport services. All PHV journeys must be pre-booked via a licensed PHV operator." The term PHV is used in this report to refer to all such vehicles.

2.174 The increased ease and speed of taxi and PHV hiring thanks to technological advances is blurring the lines between taxis which 'ply for hire' and pre-booked services. Companies, like Uber, Gett, Ola, Kapten, which allow users to book and pay for a vehicle via an app, must have a PHV operator licence in order to launch their services in the UK. Adding further complexity,

[39] https://www.gov.uk/government/consultations/taxi-and-private-hire-vehicle-licensing-protecting-users

[40] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784216/taxi-phv-licensing-protecting-users-draft-stat-guidance.pdf

some platforms like Gett offer taxi services whilst other platforms, such as Uber, Ola and Kapten offer private hire vehicles.

Current regulations

2.175 Taxi and private hire are governed by taxi and private hire vehicles (PHV) regulations in the United Kingdom[41]. There are certain distinguishing features between taxis and PHVs. Taxis can be hailed on streets or can use taxi ranks, as well as undertake pre-booked journeys, whilst private hire vehicles can only be engaged by way of a pre-booking. The local authority sets the meter charges for the licensed taxis (although the driver might choose to negotiate a lower fare with the customer).

2.176 Taxis are licensed under the provisions of the Town Police Clauses Act 1847 and Town Police Clauses Act 1889, as applied by the Public Health Act 1875 and the Local Government (Miscellaneous Provisions) Act 1976 in England. In London, taxis are registered under the Metropolitan Public Carriage Act 1869 and the London Cab Order 1934 (SI 1934/1346).

2.177 "Private Hire Vehicle"[42] means a vehicle licensed under section 48 of the Local Government (Miscellaneous Provisions) Act 1976 or section 7 of the Private Hire Vehicles (London) Act 1998.

2.178 Regulation 100 of The Road Vehicles (Construction & Use) Regulations 1986 (SI 1986 No. 1078) also applies to taxis and private hire vehicles. This requires information on:

- The motor vehicle, and all its parts and accessories;
- the number of passengers carried, and the way any passengers are carried in or on a vehicle; and
- the weight, distribution, packing and adjustment of the load of a vehicle.

2.179 All private hire operators require a private hire operator licence in the UK, as the vehicles cannot be hailed in a traditional manner (i.e. by hand) on roads and trips need to be booked in advance. Vehicles and drivers must hold the appropriate private hire licence to provide services.

2.180 The Scottish Government is responsible for regulating the powers of Scottish local authorities to license taxis and private hire vehicles. Licensing is the responsibility of local authorities under powers contained in the 1982 Civic Government Act. Local authorities have wide discretion when determining the appropriate licensing arrangements in accordance with local needs and circumstances, along with their own legal advice.

Table 2-8: Licence types: taxi and private hire

	Licence type	Validity of Licence	Licensing Authority
Operator	PHV operator licence	Up to 5 years	Outside London: Local Councils/ Authorities London: TfL
Vehicle	Taxi licence/ PHV licence, depending on the type of vehicle used for the service	1 year, to be renewed every year	

[41] Taxi and private hire vehicle licensing in England https://researchbriefings.files.parliament.uk/documents/SN02005/SN02005.pdf

[42] Legal framework for Taxi & PHVs in England and Wales https://www.gov.uk/government/publications/taxi-and-private-hire-services

	Licence type	Validity of Licence	Licensing Authority
Driver	Taxi driver's licence/ PHV driver's licence, depending on the type of vehicle used for the service	Up to 3 years	The driver, the vehicle, and the operator must be licensed by the same licensing authority

2.181 The DfT has national responsibility for taxi and private hire legislation in England and Wales, and the Department's Best Practice Guidance[43] was issued for local authorities. Some of the best practice guidance includes:

- Local authorities should encourage drivers to undertake disability awareness training, to improve accessibility and their drivers' awareness of the needs of disabled people. In 2019 only 44% of licensing authorities had this as a requirement for taxi drivers and 41% for PHV drivers in the licensing process.[44]
- Licensed taxi drivers in England and Wales have a duty to carry guide, hearing and other prescribed assistance dogs in their taxis without additional charge.
- Local licensing authorities should encourage the installation of security measures in the vehicle to protect the driver e.g. a screen between the driver and passengers or CCTV.
- Authorities are encouraged to consider setting vehicle emissions standards for taxis and PHVs, however they are also reminded to carefully and thoroughly assess the impact of such a policy; for example, the consequential effect on the supply of taxis and PHVs in the area.

Licensing Outside London

2.182 Under the current law, there are separate statutes regulating taxis and PHVs, and London and Plymouth[45] have different legislations compared to the rest of England and Wales. Local authorities are in control of the licensing regulations in their area. Operators need to apply for a private hire operator licence with the local authority in which it wishes to operate the service. There are over 340 licensing areas across England and Wales.

2.183 Each vehicle and driver providing services need to hold a valid taxi or private hire licence. Local authorities are allowed to set their own licensing regulations, including restrictions on the number of taxis that can operate in an area. In Scotland, however, the Air Weapons and Licensing (Scotland) Act 2015 does allow Scottish licensing authorities to refuse "to grant private hire car licences on grounds of overprovision".[46]

London

2.184 In London, Transport for London (TfL) is responsible for the licensing of taxis and PHVs and this is delivered by TfL Taxi and Private Hire. Taxi and Private Hire is accountable to the Mayor of

[43] DfT Taxi and private hire best practice guidance, 2010 **https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/212554/taxi-private-hire-licensing-guide.pdf**

[44] **https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/833569/taxi-and-phv-england-2019.pdf**)

[45] Plymouth Private hire licencing policy **https://www.plymouth.gov.uk/sites/default/files/Hackney_Carriage_Private_Hire_Licensing_Policy%202018.pdf**

[46] http://www.legislation.gov.uk/asp/2015/10/pdfs/asp_20150010_en.pdf

London and responsible for delivering the Mayor's Transport Strategy. In London, local councils have no direct role in licensing taxis and PHVs.

2.185 TfL introduced new taxi licensing regulations in January 2018[47], aiming to reduce emissions from the London taxi fleet. These new taxi regulations require taxis presented for licensing for the first time to be zero emission capable (ZEC), this means CO_2 emissions of no more than 50g/km and a minimum 30-mile zero emission range. Also, first time taxi licences are no longer granted to diesel taxis.

2.186 PHV regulations in London have also been recently updated and will be implemented in two stages, as of January 2020 all PHVs under 18 months old must be ZEC and meet the Euro 6 emissions standard when licensed for the first time. To be ZEC, a PHV must either emit no more than 50g/km CO2 and be capable of being operated with no exhaust emissions for a minimum range of 10 miles or emit no more than 75g/km CO2 exhaust emission and be capable of being operated with no emissions for a minimum range of 20 miles. Also, PHVs over 18 months old must have a Euro 6 engine when licensed for the first time. Then, as of January 2023, all PHVs licensed for the first time must be ZEC and meet the Euro 6 emissions standard.

Licence Duration

2.187 All taxi and private hire vehicles are required to renew their vehicle licences with the local authority annually, while the private hire operator licence is valid for up to five years. Although the authority may wish to offer operators the option of a licence for a shorter period if requested.

International case study: New York, U.S.

In the U.S., taxi drivers, owners and fleets are governed by extensive regulations that cover nearly every aspect of taxi service, particularly in large cities. Taxis and For Hire Vehicles[48] (FHV) are most often regulated by local governments, primarily by municipal governments in the U.S., e.g. New York. They are regulated at the county level in some states, e.g. Florida, Maryland, and Virginia.

The New York City market has grown to become the largest and most mature taxi and FHV market in the U.S. In 2018, the NYC Council passed landmark regulations for the industry:

- NYC Council passed Local Law 150; directing the Taxi & Limousine Commission (TLC) to implement a driver minimum pay standard ($17.22 per hour after expenses); and
- The City Council passed Local Law 147; freezing new For Hire Vehicle registrations for a year (with a few exceptions, e.g.: wheelchair-accessible vehicles).

Taxi companies argued that they provide the same service, yet are regulated much more heavily, so lawmakers extended the current regulations to Transportation Network Companies (TNC[49]). Uber, Lyft and other companies have to follow the same rules and regulations as taxis under the new law that took effect in 2019. Taxis and TNCs are required to register annually with the state and pay a per-vehicle fee. Drivers register through the

[47] TfL taxi and private hire **https://tfl.gov.uk/info-for/taxis-and-private-hire/emissions-standards-for-taxis**

[48] The term For Hire Vehicle is used for services such as Uber, Lyft in the U.S.

[49] TNC is a term used in the U.S. to describe a company that matches passengers with vehicles, via websites and mobile apps, e.g. Uber and Lyft

companies, not through the state. Companies are required to conduct background checks and annual vehicle inspections.

In August 2019, a cap on For Hire Vehicles has been extended for another year which led to Uber and Lyft suing the city. Following this, in December 2019, a New York State Supreme Court judge ruled that there was "no rational basis" to calculate the time drivers spend looking for new passengers. The judge annulled the regulation, which would have gone into effect starting in February.

On one hand, some see the Mayor of NYC's regulatory efforts as a good example of how powers of local government can be used to control the likes of Uber or Lyft and protect other businesses (e.g. taxis). On the other hand, some commentators state that the decision to extend a once-temporary cap on new FHVs is arbitrary and is not evidence based.

Priority areas

2.188 **Error! Reference source not found.** summarises the findings related to the assessment of fitness for purpose of existing regulations and identifies the gaps where current regulation does not exist, which have been coded through Red/Amber/Green colour codes. The "red" areas have been identified as priority areas and classified as those causing issues and imposing significant challenges or/and having a high probability of causing issues in future.

Table 2 9. Taxi and PHVs - Summary of current state of regulations

	Quantity restriction (vehicles, operators)	Licensing (vehicles, operators)	Licensing (Drivers)	Vehicle specifications	Data Sharing	Guarantee of Provision	Regulated Pricing	Public space allocation [50]	Public space fees
Taxi and PHVs	**Yes, Taxis outside London only**: Local councils have the power to limit the number of taxis they licence in their area. **No** restrictions on taxi numbers in London **No** regulations to limit number of PHVs	**Yes**, Vehicles: Taxi licence/ PHV licence, depending on the type of vehicle used for the service Operators: PHV Operator licence	**Yes,** Taxi driver licence or PHV driver licence, depending on the vehicle used for the service	**Yes**, must meet national vehicle standards for Taxis and PHVs, local licencing authority might impose additional standards. **Additional regulations for London**: • To comply with air quality standards, all taxis must be within a certain age limit to be licensed. • From 1 Jan 2020[52], PHVs under 18 months old must be zero emission capable (ZEC) and meet the Euro 6 emissions standard when licensed for the first time.	**None**, but PHV operators registered in London are required to provide limited information on drivers and vehicles requested by TfL	**None**	**Yes**, Taxis only (can't charge above specified tariffs) **None,** PHVs	**Yes, Taxis only.** Only licensed taxi drivers can park their vehicles at taxi ranks as pre-designated locations, but a driver must be present inside the vehicle. Also, some local authorities make specific	**None**

[50] Parking and drop off/ pick up locations

[52] https://tfl.gov.uk/info-for/taxis-and-private-hire/new-private-hire-regulations

	No restrictions on number of operators.[51]			Air Quality (Taxi and Private Hire Vehicles Database) (England and Wales) Regulations[53] 2019 apply				parking provision for taxis. **None,** PHVs	

2.189 The increased ease and speed of taxi and PHV hiring thanks to technological advances is blurring the lines between taxis which 'ply for hire' and pre-booked services. A range of different regulations surrounding taxis and PHVs are widely regarded as outdated. In May 2014 the Law Commission of England and Wales released a report[54] containing recommendations on changes to the legal frameworks relating to taxis and private hire vehicles, however the main legal framework governing taxi services has not had any significant reform in nearly 200 years. Whilst the 2014 Law Commission report offers a consolidation and update to the current legislations, which would result in a single piece of legislation, the government has yet to respond.

The "red" regulatory areas include:

- Quantity restriction - existing regulation does not allow authorities to control the number of Private Hire licences issued. Outside London, councils can limit the number of taxis licensed in their area, but not the number of PHVs. Transport for London have no powers to limit numbers of taxis or PHVs.
- Data sharing - current licensing does not require the operators to share data; for example, there is no way for transport authorities to understand how taxi and private hire vehicles are moving around the city, or the trips being made.
- Licensing – councils have powers to act only against a vehicle or a driver that they have licensed, meaning local authorities have no powers of enforcement over vehicles or drivers that are operating in their area but are licensed elsewhere, this is commonly referred to as the 'cross-border' issue. In addition, some local authorities may have lower licensing fees than others, which can lead to operators choosing to acquire their licences at the lowest cost, rather than where they operate.
- Vehicle specification – there is a lack of set minimum national standards for vehicles. This results in many local authorities having different standards and regulations. Due to standards being set by local districts (outside of London) this leads to different vehicle standards within a single city or region, resulting in varying standards for passengers, particularly for disabled users. A vehicle that is licensed in an area which sets low standards for entry can currently operate in an area which sets much higher standards.

[51] In Scotland however, the Air Weapons and Licensing (Scotland) Act 2015 does allow Scottish licensing authorities to refuse "to grant private hire car licences on grounds of overprovision".

[53] Air Quality Regulations 2019 http://www.legislation.gov.uk/uksi/2019/885/made

[54]Taxi and PHV licensing Councillors' handbook (England and Wales) https://www.local.gov.uk/sites/default/files/documents/10.9%20Councillor%20Handbook%20-%20Taxi%20and%20PHV%20Licensing_November_2017.pdf

Potential next steps

2.190 As mentioned above, the DfT has sought views on proposed statutory guidance to taxi and private hire vehicle (PHV) licensing authorities.[55] Some of the next steps suggested below have been suggested by UTG in their consultation response.

2.191 It is recognised that modernisation and simplification of taxi and PHV law, along with potential deregulation, has potential to increase economic efficiency in the sector. It is necessary for national legislation to be updated and simplified in order to support councils to strengthen and better guide their ability to accommodate smart transport technologies in relation to taxis and PHVs.

2.192 Statutory national minimum standards for the licensing of taxis and PHVs with a focus on ensuring public safety would be beneficial. Beyond this national baseline, licensing authorities should be free to set higher standards where they see fit.

2.193 Additionally, standards, controls and enforcement in relation to the licensing of drivers should be implemented to maintain the adequate quality level of services provided. For example, an enhanced criminal record check should become a statutory requirement for taxi and PHV driver's licences. Furthermore, mandatory disability awareness and safeguarding training would improve safety and support professionalisation of the sector.

Quick win

2.194 A wider consultation by the government for taxis and PHVs is required. The definitions and requirements for these types of services are blurring and an assessment of whether they fit within existing legislation is needed, especially ahead of an expected industry transition to CAVs.

Conclusion

2.195 This section provides an overview of the current legal and regulatory frameworks for smart transport technologies and services, summarising identified gaps, key priority areas and quick wins.

2.196 One policy area which has been identified as "red" for each mode and service is data sharing. Data regarding the use of transport services is important for transport authorities as it enables effective decisions about transport strategy and operations to deal with issues such as congestion, air pollution and transport network disruption. Issues that arise around data include to what extent transport authorities and transport operators share data and on what basis. This also relates to issues around trust and the privacy of personal data, along with the quality and compatibility of data.

2.197 Opening access to data is also an important step in enabling further innovations in transport, including MaaS and CAV services. Consideration should be given to the extent to which data sharing agreements should be extended to legacy modes to avoid unequal burdens on new mobility operators.

2.198 It has been indicated that the issue of a Code of Conduct or national guidance on data sharing and standardisation would be beneficial. The guidance should establish a unified approach to

[55] https://www.gov.uk/government/consultations/taxi-and-private-hire-vehicle-licensing-protecting-users

the way the data is collected, stored, used and shared across all transport modes and services between both public and private sectors.

2.199 The first step should be identifying what level of data aggregation and what type of data is required to help local and transport authorities to manage their networks in ways which improve services for all. This should be developed in collaboration between private and public sectors.

2.200 Data sharing requirements can be introduced as mandatory when a local or transport authority is issuing the licence for a service to operate (e.g. taxis and PHVs). This will support transport authorities in acquiring the data from private transport operators. Although, it will not solve the issue of varying standards between different local authorities.

3 Anticipatory regulation

Introduction

3.1 Anticipatory regulation supports the development and acceptance of new transport technologies and services that may not exist yet but will appear in future. Anticipatory regulation should cater for the following applications of new services and innovations on transport:

- Transport services and technologies that do not yet exist or for which there is no or limited regulation – e.g. CAV services and Mobility as a Service (MaaS).
- Transport services and technologies that exist but for which the current UK regulation restricts their use - e.g. e-scooters.

3.2 This section explores the potential for using anticipatory regulation to help develop appropriate regulatory frameworks for new transport technologies and services. The chapter is structured as follows:

- **Definition** of anticipatory regulation;
- **Anticipatory regulation for transport** including the opportunities for anticipatory regulation to assist with the development of new transport technologies and services;
- **Process steps** for the implementation of anticipatory regulation;
- **Challenges and limitations** of anticipatory regulation; and
- **Conclusions**.

3.3 The interest in anticipatory regulation is driven by:

- the need for local or regional government to have appropriate tools to ensure that new technologies serve the public good and meet the particular local context; and
- the need to provide certainty to operators and technology providers about regulatory approaches to encourage development of new technologies and services.

3.4 Broadly speaking, from the public sector side, there is a need to develop and test an appropriate legal framework and regulatory tools for new technologies and services to balance consumer benefits with the wider public interest. From the private sector side, there is often a desire for more flexibility and less restrictive regulation.

Definition

3.5 The ongoing government regulatory review reflects wider views that the existing regulatory framework is too rigid, unable to respond to rapid changes in the sector – both in terms of its ability to encourage innovation or to facilitate intervention in the case of negative impacts.

3.6 The development of anticipatory regulation for transport is still in its infancy. At present, there are few transport professionals with significant UK expertise in anticipatory regulation and few

international case studies available for reference. The *Renewing Regulation* report by Nesta[56] is a valuable contribution to the debate on the topic of anticipatory regulation. Nesta proposes the following definition of anticipatory regulation:

> "Anticipatory regulation provides a set of behaviours and tools – essentially, a way of working – that is intended to help regulators and government identify, build and test solutions to emerging challenges".

3.7 There is a need for regulators to test various types of services and technologies assessing their impact on society and the economy. Naturally, the services and technologies being trialled in test beds and sand boxes vary greatly from one innovator to another. Nesta developed a set of key principles of anticipatory regulation (see Figure 3-1), as a framework for regulators.

Figure 3-1: Key principles of anticipatory regulation

Source: Nesta

3.8 The six principles are described by Nesta as follows[57]:

- **Inclusive and collaborative** – in engaging the public and diverse stakeholders where new technologies raise ethical issues with sensitive political implications, and in leveraging the capabilities of businesses, cities and civil society to secure policy goals (for example the collaboration between the National Highway Traffic Safety Administration and NASA on car software issues).
- **Future-facing** – in developing resilient, adaptive strategies that can cope with the inherent uncertainty of fast-changing markets.
- **Proactive** – in engaging with innovators and innovation early to enable timely, proportionate responses to issues that may scale rapidly.

[56] https://www.nesta.org.uk/feature/innovation-methods/anticipatory-regulation/

[57] https://www.nesta.org.uk/feature/innovation-methods/anticipatory-regulation/

- **Iterative mindset** – in taking a test-and-evolve rather than solve-and-leave approach to novel problems.
- **Outcomes-based** – in focusing on validating companies' efforts to achieve well-defined goals, rather than setting rules, and incentivising platforms to support regulatory objectives.
- **Decentralised experimentation** – in facilitating diverse responses to the regulation of early-stage opportunities and risks, and where national or global policies and standards are still to be established.

3.9 One of the key objectives of anticipatory regulation is to understand the impact of new services and technologies on people and the economy and what regulation should be in place. Anticipatory regulation provides a range of solutions, which include sandboxes; experimental testbeds; use of open data; interaction between regulators and innovators; and, in some cases, active public engagement.

3.10 Table 3-1 presents a selection of examples of anticipatory regulation in other sectors, including test beds and sandboxes. Test beds and sandboxes are spaces, established by the regulator, which provide a safe environment to test new products, services and business models. These sandboxes and test beds allow the evaluation of new services which may not fit within existing regulatory frameworks but have potential to provide benefit to both the public and the economy through providing business opportunities.

Table 3-1. Examples of anticipatory regulation: sandboxes and testbeds

Regulator	Description
Civil Aviation Authority (CAA), UK	The Regulatory Sandbox provides a capability for users to work with the CAA to test and trial innovative solutions in a safe environment under real-life conditions.
Financial Conduct Authority (FCA), UK	The FCA established the 'regulatory sandbox': a safe space where firms can work with the regulator to trial innovative products, services and business models with consumers, without having to meet all the usual requirements for compliance.
The Office of Gas and Electricity Markets Authority (Ofgem)[58], UK	Ofgem has a regulatory sandbox service, where certain licencing conditions can be lifted/adapted to enable companies to experiment and test innovative concepts. Ofgem stated that it will support innovators, where possible, by removing regulatory barriers to trial new business models, products and services.
Department for Transport (DfT), UK	DfT has facilitates CAV testbeds in the UK and a Code of Practice for testing CAVs on the public road has been developed by Centre for Connected and Autonomous Vehicles (CCAV)
Singapore's Committee on the Future Economy (CFE), Singapore	Singapore has taken 'anticipatory' approach to its whole economic policy from financial sandboxes to CAV testbeds. Regulatory innovation tests and sandboxes are established in collaboration with industry to enable trials of new products and services. Regulatory agencies are encouraged to allow new models to be piloted and to collaborate on reviews of regulation.

[58]https://www.ofgem.gov.uk/system/files/docs/2018/10/insights_from_running_the_regulatory_sandbox.pdf

3.11 Attributes of sandboxes and test beds include but are not limited to:

- **Conforming to a broad set of regulatory obligations:** Businesses and companies are able to test new services and technologies through testbeds and sandboxes, which still need to conform to a broad set of regulatory obligations (e.g. bank accounts, insurance, registration, authorisation etc);
- **Temporary and spatially restricted regulation exemptions:** Testbeds and sandboxes vary in size, number of participants involved, and types of services being tested depending on the industry, but they usually have a common set of activities[59]. These include bespoke guidance and advice on navigating and complying with regulation, as well as offering certain temporary regulatory exemptions and restricted licensing, for example, capping the number of vehicles operating in the area.
- **Role of regulators:** Support from regulators can also vary from a hands-on to a more hands-off approach.
- **Eligibility criteria for innovators**: Sector and context dependent.

Testing innovations vs testing policy

3.12 The focus of sandboxes can vary from testing **innovations** to testing **policy and regulations**. These elements are not necessarily mutually exclusive, but sandboxes and testbeds tend to have a stronger focus on testing technological innovations.

3.13 Even though the focus of product or service-testing sandboxes is the technological innovation, they can also test policy instruments and regulatory frameworks. The 2020 *Regulator Approaches to Facilitate, Support and Enable Innovation* report by the UK Government's Department for Business, Energy Industrial Strategy, however, states that there are few examples of pure policy-testing sandboxes and little evidence on when policy has been changed based on the result of testing in sandboxes. Examples of sandboxes testing policy and regulation include Singapore's Monetary Authority and the Ministry of Health. The latter's Licensing Experimentation and Adaptation Programme is aimed at evaluating changes to their respective legislative and regulatory frameworks.

Emerging role of cities

3.14 An example of the successful implementation of an anticipatory approach and the development of sandboxes and testbeds in Singapore, highlights an emerging role for cities or regions in setting the framework. Cities have a great potential to lead and encourage collaboration between innovators, transport authorities, citizens and other stakeholders and create a safe space for testing new services and technologies, particularly in the transport sector where much of the innovation seen from the private sector has been focused on the urban environment.

3.15 City and city region governments can be more responsive and agile when dealing with innovations in transport rather than their central government counterparts. This applies to cases where there are grey areas of regulation or where no legislative and regulatory frameworks exist. Transport powers should be devolved to the most appropriate level to allow for integrated and agile transport governance, supportive of the objectives and priorities of cities.

[59]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/861078/regulator-approaches-facilitate-support-enable-innovation.pdf

3.16 Sandboxes and testbeds implemented by cities could also inform changes to emerging national legislation and policy. In particular, exemplifying the levels of government regulation and standards that are required. For instance, for testing of CAVs in the US, there are national safety design principles, but each state has their own rules for the operation of vehicles and driving conditions, which allows the states to create test beds and test the CAVs faster. However, this approach brings its own challenges around ensuring the safety of trials, illustrated by a number of high-profile automated vehicle crashes on public roads.

Anticipatory regulation for transport

3.17 Local authorities can create a safe environment that encourages innovation without weakening the existing transport network and introducing additional safety risks for the public through the well targeted, closely monitored and evaluated use of testbeds and sandboxes.

Challenges which innovations and new services pose

3.18 New transport technologies and business models pose a range of regulatory dilemmas around services and technologies including the following:

- **New types of vehicles:** Testing e-scooters on public roads and developing the right level of regulation for this type of vehicle;
- **Blurring vehicle classification:** Blurring difference between definition of ebikes, e-scooters, powered ebikes and other forms of powered mobility;
- **Transport data standardisation:** Data standardisation and data sharing agreements between private and public transport operators facilitating Mobility as a Service;
- **Transition period:** Transition period to fully autonomous CAVs fleet and issues with mixed fleet operations;
- **Safety standards:** Design and safety regulations of CAVs;
- **Shared vehicles:** Licensing of shared use fleets involving fleets of CAVs.

3.19 Regulatory and legislative challenges, such as those highlighted above, can potentially be addressed through sandboxes and testbeds in which companies and policymakers work together closely and ensure that any solutions that are developed maximise public policy objectives whilst also considering commercial viability.

Anticipatory approach to transport services and technologies

3.20 Anticipatory regulation can support the transport industry through achieving the following objectives:

- **Providing certainty about regulation** to transport operators and technology providers;
- **Providing the ability** for the cities and government to test products and services in a real-life environment and in a safe manner;
- **Providing the ability** for cities to manage negative impacts should outcomes prove undesirable;
- **Providing appropriate consumer protection** safeguards into new transport products and services;
- **Reducing time-to-market** at a potentially lower cost; and
- **Encouraging collaboration between the public and private sector**: knowledge-sharing and partnerships.

The role of a regulator

3.21 In order to establish anticipatory regulation, a regulatory body should exist. For example, as highlighted in the examples of existing sandboxes, the FCA, CAA, Ofgem are regulators, who have the power to flex the existing regulation and allow the testing of new services and technologies.

3.22 One of the challenges for transport is the complex nature of regulation in the sector. The absence of a clear and institutionally separate regulator in transport as is the case for energy (Ofgem) or finance (FCA) is a challenge.

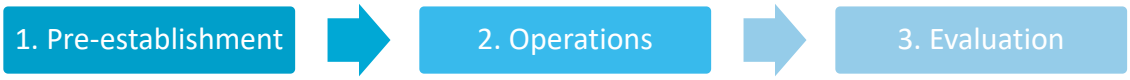
3.23 Currently, the DfT acts as the regulator on some transport issues. For example, in the case of the UK CAV test beds, the DfT act as a regulator through CCAV (which is a part of DfT/BEIS) and has developed and updated the Code of Practice for testing CAVs in the UK. Other institutions with regulatory oversight on transport matters include the Traffic Commissioners, the Driver and Vehicle Licensing Agency, and Highways England. At a more disaggregate local level, taxis and private hire vehicles are usually regulated at the local authority level.

3.24 A regulator should have, or develop, the right level of skills and knowledge to perform its functions and be accountable for the development of sandboxes and test beds. A regulator should assure public safety and act to overcome market failures.

Process steps: implementation of anticipatory regulation

3.25 Three key process steps for the implementation of anticipatory regulation are presented in Figure 3-2 and described in further detail below..

Figure 3-2. Process steps



1. Pre-establishment

3.26 The report by the European Supervisory Authorities (ESMA), 2018, recommends that prior to the establishment of a sandbox or a testbed, "rigorous analysis should be carried out to identify the appropriate expertise, powers, processes, and structures required in light of local market conditions and the resources available to the competent authority."

3.27 Key activities to be undertaken include:

- Identification of the powers required by a regulator;
- Identification of skills and knowledge required by a regulator;
- Establishment of a regulator (creating a new body or assigning powers to existing authorities) – this can be at a national, regional or local level;
- Stakeholder and market engagement prior to the launch of a sandbox to make sure the objectives of a regulator and innovators are transparent, and a regulator fully understands the aspirations of innovators. Local and regional authorities should be engaged to build an understanding of the local policies and constraints. It is important for regulators to spend time talking to innovators to understand their needs and interpret the rules that affect them. There is a potential to co-create a sandbox with innovators;
- Assessment of the technological feasibility and benefits of the sandbox;
- Development of the criteria for assessment of innovators' applications by a regulator setting conditions such as the size of the business, support of local policy objectives, the level of innovation, the feasibility of the business model or the contribution to the local

economy, assisting/contravening with local policy objectives. For example, the FCA criteria includes the following categories[60]:
  - In scope;
  - Genuine innovation;
  - Consumer benefit;
  - Need for a sandbox; and
  - Ready for testing.
- Kick off an application process.

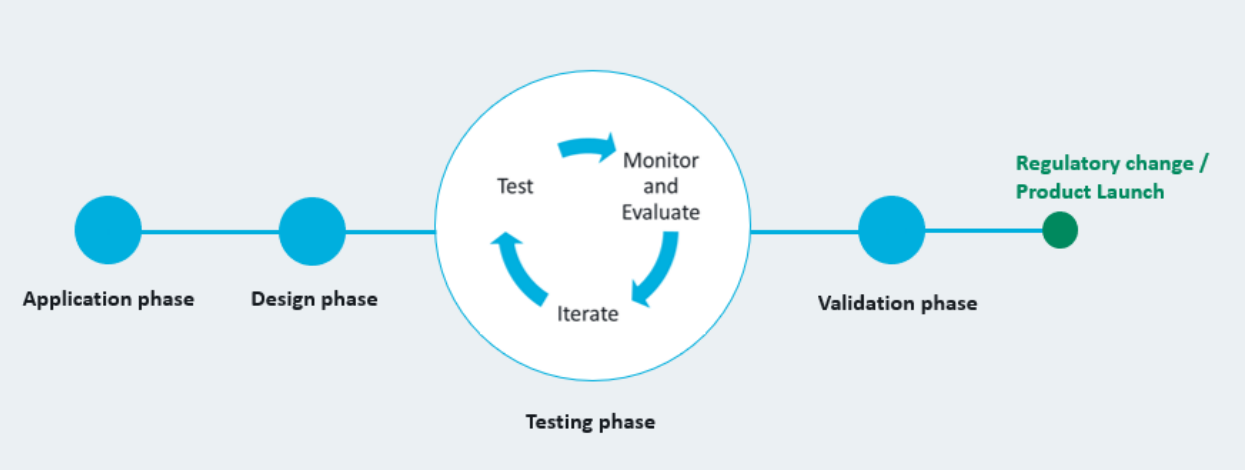
3.28 The design of a regulatory sandbox should be flexible enough to allow innovators to test and trial their services and technologies. Successful approaches to the development of sandboxes have also established the following:

- The scope of sandbox and rules should be clear to all innovators and they should understand expected outcomes;
- Clear communication on timelines and expectations given to innovators;
- Provision of clear information about the services and tools, including advice and regulatory reliefs, that are available;
- Due diligence performed on the companies applying;
- Adequate safety, consumer protection, cybersecurity and dispute resolution mechanisms are in place; and
- A sandbox should be demonstrably representative of the target market.

2. Sandbox operations

3.29 Once a sandbox is established, the sandbox journey from the innovators and regulators perspective usually has four key phases presented in Figure 3-3.

Figure 3-3. Anticipatory regulation phases



Source: Steer

Application phase

3.30 In order to participate in a sandbox, innovators will need to go through an application process. Companies should meet the relevant requirements set up by a regulator for authorisation of

[60] https://www.fca.org.uk/firms/innovation/regulatory-sandbox-prepare-application

the activities they want to conduct. These requirements are designed to assure that innovators have the necessary competence and financial viability to protect their operations and customers. Applications should include descriptions of innovation, commercial feasibility, legal and regulatory risks with mitigation measures, team composition and company background information.

3.31 Based on the assessment criteria, a regulator reviews the proposals from innovators and decides on their eligibility. To ensure a balanced approach towards testing, more than one commercial supplier/operator should participate in the sandbox and different geographies should be considered.

Design Phase

3.32 After the application and assessment process, successful innovators design a trial in collaboration with the regulator. A dedicated project sponsor from the regulator should be assigned for each innovator and support them through the design and testing phases. This close collaboration will allow the regulator to understand what regulation and policies are required for new services and technologies. It also can assure the tests are carried out in compliance with all sandbox requirements and sufficient safeguards are in place to mitigate risks during and after testing.

3.33 Regulators work closely with eligible innovators to design the testing space, which is done on a case-by-case basis and can include the following:

- secure any necessary licences;
- develop an exit strategy and plan to ensure the test can be closed down at any point with consequences for customers minimised;
- develop KPIs which can be used as indicators of success/failure of the test;
- design testing parameters;
- set up data collection and sharing requirements;
- identify measures for customer safeguards;
- agree on the timing for testing; and
- agree on disclosure requirements and risk management measures.

3.34 Specific restrictions can be applied depending on the type of service to ensure that risk will not be transferred from innovators to customers.

Testing Phase

3.35 A test and learn approach should be adopted for the testing phase, which is a continuous improvement process for the innovation or service to test, monitor and evaluate, iterate, capture lessons learnt and test again. Customer safeguards should be adhered to throughout the testing process.

3.36 Innovators are expected to communicate and share data with a regulator based on the parameters agreed in the design phase and escalate any key issues if they occur.

3.37 Once the testing phase is completed, innovators should prepare a final report summarising key findings and their proposed next steps, which should be independently evaluated.

Validation Phase

3.38 After successfully completing the testing phase, the following can happen:

- Update of a current regulation or introduction of a new regulation;

- Product launch to the market; or
- Innovator to stop its service if it has failed to pass agreed criteria defined at the start.

3. Sandbox evaluation

3.39 A regulator should assess the performance of a sandbox after a certain time period, identify how successful the processes are and whether the desired outcomes have been achieved. The process will include ongoing monitoring and assessment of the results. Based on this assessment, changes to the sandbox set up can be introduced.

E-scooters

In the case of e-scooters, it will be beneficial to collate lessons learnt on the trials implemented around the world and emerging trials of shared e-scooters in the UK.

The questions which can be tested via a sandbox include:

- *How do we define an e-scooter?*
- *At what speed do we want them to operate at?*
- *Which infrastructures do we want to allow them to operate on? And where should their use be restricted?*
- *Are there any other requirements (helmets, parking and public nuisance issues) which are part of an assessment?*
- *What type of journeys are e-scooters used for?*

The design phase should look at which of these variables might be varied over time - if any, and what the success criteria and monitoring/evaluation process will be.

Evaluation might include mode share impacts, safety impacts and public realm impacts.

Challenges and limitations of anticipatory regulation

3.40 Anticipatory regulation has not been widely applied in the transport sector and there are certain challenges and limitations which should be considered:

- **Cost implications**: testbeds and sandboxes require high resource costs in terms of time and money, which is often underestimated by the regulators.
- **Success beyond the trial**: innovators are commercially run businesses interested in attracting future investment in their products and services, as such they want an ability to operate after the sandbox, which may require the change in national legislation.
- **Representative testing**: another challenge might be local conditions and/or preferences; any localised sandbox needs to be tested in more than one location concurrently to address the concern about what works in one geographical area may not work in another.
- **Disproportionate market advantage**: another concern is the potential advantage gained by innovators in a sandbox, which benefit from close cooperation and direct support from the regulator.
- **Skills:** the regulator must be competent, resourced and skilled.

- **Legitimacy label:** there is a danger that the sandbox (or testbed or living lab) participation may signal to the end users and customers and the wider industry, that the regulator 'approves' of a certain product or service, whereas the organisation has only been allowed a temporary exemption to test the quality and regulatory compliance of an innovation. Appropriate disclosures to consumers should be required, as well as creating clarity on the issue that the regulator bears no legal responsibility as it is merely monitoring the testing. A legitimate outcome of a sandbox could be in extremis that the technology or service is not fit for further public testing and should not be tested further in a public arena.

Conclusion

3.41 The government should explore opportunities for the introduction of anticipatory regulation in the transport sector, which can be established to test new services or those which are not allowed at the moment.

3.42 One of the potential issues in the transport sector is the absence of a regulator in key areas. In order to establish anticipatory regulation, a regulatory body should exist. For example, FCA, CAA and Ofgem are regulators, who have the power to flex the existing regulation and allow testing of new services and technologies. The government should assess the process for establishing sandboxes and opportunities for transport and city authorities to become a regulator for services operating specifically in their areas.

3.43 It should be noted, that a regulator should have the right level of skills and knowledge to perform its functions and be accountable for the development of sandboxes and test beds.

3.44 A set of draft principles which could underpin the development of sandboxes and trials as well as any other changes to the legal and regulatory framework for smart mobility is presented in the following Chapter.

4 Draft principles

Introduction

4.1 The final Chapter of this report identifies a set of draft principles which could underpin the legislative and regulatory frameworks for smart transport technology developments.

4.2 The principles can be used to determine whether the government's proposals for reform will facilitate the achievement of wider economic, social and environmental objectives.

Draft Principles

4.3 A set of draft principles that can be used to assess the suitability of any proposed changes to the legal and regulatory framework governing existing and new mobility services is presented below.

1. **Support agile and devolved governance:** the legal and regulatory framework should offer cities and transport authorities sufficient agility to manage the potential impact of new transport innovations, providing them with opportunities to encourage these where they support wider goals for people and place but also set limits should new services be detrimental to these goals.

2. **Enable flexibility and futureproofing:** as far as possible, the legal and regulatory framework should be agile and flexible to consider evolving new transport services and ensure they support the achievement of local government policy objectives. The legal and regulatory framework should be technology neutral where possible and seek to avoid lock-in to one particular service or innovation. Updates to legal and regulatory frameworks must acknowledge where differences continue to exist, but also recognise and harmonise areas where technologies have removed the boundaries between services.

3. **National minimum standards and locally appropriate requirements:** the legal framework that sets national threshold standards should provide local authorities with the powers to set more stringent requirements that go beyond national minimums. For example, national standards might include safety, accessibility, data sharing and environmental requirements. At the city region level, stricter standards could be set, such as requirements for a low emissions zone.

4. **Ensure consistent requirements**: proposed changes to legal and regulatory frameworks to accommodate new transport technologies and services should not place undue burden on new services, in excess of the precedents set for 'legacy modes' (e.g. conventional bus services). In the case of new requirements, such as data collection, these should be applicable across all transport modes, not only on new transport services.

5. **Facilitate data sharing**: the legal and regulatory framework should enable sharing of data where this best serves the interests of travellers; efficient and effective operation of transport systems; and wider goals for people and places whilst respecting privacy of individuals and personal data.

6. **Support an integrated transport system:** the legal and regulatory framework should be designed to support an integrated transport system which prioritises walking, cycling and

public transport and enables the provision of a seamless travel experience for the customer when making multi-modal trips.

7. **Enable efficient use of road and kerb space:** the legal and regulatory framework should support local authorities to efficiently manage the use of road and kerb space allowing them to quickly respond to new transport solutions and assign their priority in the transport hierarchy based on how they support the local transport vision and strategy.

8. **Enhance road safety**: the legal and regulatory framework for new transport solutions must improve road safety.

9. **Support the transition to a zero-emission transport system:** the legal and regulatory framework for new transport technologies and services must contribute to the transition to a zero-emission transport system.

10. **Support improvements in inclusive transport:** the legal and regulatory framework for new transport technologies and services should support inclusion and accessibility for all.

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