Title: Regulatory framework for the safe and responsible self-driving vehicles in Great Britain

IA No: **DfT00448**

RPC Reference No: RPC-DCfT-5208(1)

Lead department or agency: Department for Transport

Other departments or agencies:

Impact Assessment (IA)

Date: 29 July 2022

Stage: Final

Source of intervention: Domestic

Type of measure: Primary Legislation

Contact for enquiries:
enquiries@ccav.gov.uk

Summary: Intervention and Options

RPC Opinion: Green

Cost of Preferred (or more likely) Option (in 2019 prices)			
Total Net Present Social Value	**Business Net Present Value**	**Net cost to business per year**	**Business Impact Target Status**
£NQm	£NQm	£NQm	Qualifying Provision

What is the problem under consideration? Why is government intervention necessary?

Self-driving vehicle refers to a road-based vehicle that is designed to "drive itself". Self-driving vehicles offer other considerable benefits in relation to the way people and goods are moved, including the possibility to improve access to transport, on Britain's existing road network. However, current legislation does not provide a suitable framework to assure their safety or to determine responsibilities in their use. There is fundamental uncertainty over who is responsible for their safe operation under the current legal framework. This uncertainty poses a barrier to their deployment. Government intervention is required to enact primary legislation to ensure the safety of self-driving vehicles. Without further legislation we risk preventing a nascent, £42 billion industry[1] from developing and saving more lives on our roads.

[1] "Connected And Automated Vehicles: Market Forecast 2020". 2022. *GOV.UK*. https://www.gov.uk/government/publications/connected-and-automated-vehicles-market-forecast-2020.

What are the policy objectives and the intended effects?

- Ensure the safe use and responsible deployment of Self-driving vehicles and minimise their risk to the public;
- Provide a clear allocation of responsibility to parties developing and using self-driving vehicles;
- Enable the benefits from driving automation, through expected improvements in road safety, mobility and productivity;
- Remove regulatory barriers to enable the commercial deployment of self-driving vehicles;
- Articulate clear laws governing self-driving vehicle use, which will support the uptake of the technology by the public and investment in the UK self-driving vehicle sector; and
- Position the UK as a global thought-leader on the regulation of self-driving vehicles, shaping discussions at international fora.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

Option 0 – Do nothing; Government would retain the existing Code of Practice without any update and direct developers to ensure compliance with the law.

Option 1 – Government does not introduce any further legislation, but instead updates the existing Code of Practice For Automated Vehicle Trialling ('The Code of Practice', see https://www.gov.uk/government/publications/trialling-automated-vehicle-technologies-in-public/code-of-practice-automated-vehicle-trialling), highlighting that UK legislation requires no human driver within the vehicle and it is up to individual Automated Driving System (ADS) developers to assure themselves that their vehicles remain lawful.

Option 2 (preferred) – Create a comprehensive regulatory framework for self-driving vehicles to clearly define the legal responsibilities of all key market participants and users and establish a clear process for vehicle assurance and monitoring. This would also remove regulatory barriers and/or uncertainty currently hindering commercial deployment.

Option 3 – Create a regulatory framework as proposed in Option 2 but without several proposals that do not form a core part of the safety assurance process.

Will the policy be reviewed? No, however, we will review secondary legislation when developed and commenced. **If applicable, set review date:** Month/Year

Is this measure likely to impact on international trade and investment?		Yes		
Are any of these organisations in scope?	**Micro x** Yes/No	**Small x** Yes/No	**Mediu m x** Yes/No	**Large x** Yes/No
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)		**Traded:** 0	**Non-traded:** 0	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits, and impact of the leading options.

Signed by the responsible SELECT SIGNATORY: ..... Date: .....

Summary: Analysis & Evidence

Policy Option 1

Description: **Updated Code of Practice**

FULL ECONOMIC ASSESSMENT

Price Base Year	PV Base Year	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: Optional	**High:** Optional	**Best Estimate:** **NQ**

COSTS (£m)	**Total Transition** (Constant Price) Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Cost** (Present Value)
Low	Optional	Optional	**Optional**
High	Optional	Optional	**Optional**
Best Estimate	NQ	NQ	**NQ**

Description and scale of key monetised costs by 'main affected groups'

Beyond minor familiarisation costs, the updated Code of Practice only seeks to clarify the existing legal situation, and as such, there are no significant costs to business.

Other key non-monetised costs by 'main affected groups'

There will be some minor familiarisation costs to understand the new Code of Practice.

BENEFITS (£m)	**Total Transition** (Constant Price) Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Benefit** (Present Value)
Low	Optional	Optional	**Optional**
High	Optional	Optional	**Optional**
Best Estimate	NQ	NQ	**NQ**

Description and scale of key monetised benefits by 'main affected groups'

Beyond minor familiarisation costs, the updated Code of Practice only seeks to clarify the existing legal situation, and as such, there are no significant benefits to business.

Other key non-monetised benefits by 'main affected groups'

As the Code of Practice is for trialling vehicles and is not designed to support commercial deployment it is unlikely widespread self-driving vehicle use would follow from undertaking Option 1. We would therefore forego any of the social and economic benefits associated with self-driving vehicle use.

Key assumptions/sensitivities/risks **Discount rate (%)**

Assumptions: The nascent self-driving vehicle industry is unwilling to commercialise until they have legal clarity on responsibilities. Similarly, international investment will not materialise in the UK without clarity. The law is currently not fit for purpose to enable the deployment of self-driving vehicles with a clear delineation of responsibility because driving legislation has evolved historically over 100 years and assumes a human driver is responsible for a vehicle's behaviour. Industry are beginning to ask for greater clarity on responsibilities when there is no human driver, which are not made explicit in existing statute.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:	Score for Business Impact Target (qualifying provisions only) £m: NQ
Costs: NQ | **Benefits: NQ** | **Net: NQ**	

Summary: Analysis & Evidence

Policy Option 2

Description: **Full regulatory framework for self-driving**

FULL ECONOMIC ASSESSMENT

Price Base Year	PV Base Year	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: Optional	**High:** Optional	**Best Estimate:** **NQ**

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	Optional	Optional	**Optional**
High	Optional	Optional	**Optional**
Best Estimate	NQ	NQ	**NQ**

Description and scale of key monetised costs by 'main affected groups'

As these provisions provide powers to create secondary legislation we have not monetised costs at this stage. We will conduct a full assessment when detailed proposals are developed under secondary legislation, but given the provisions are permissive by nature we are confident the net benefits are positive.

Other key non-monetised costs by 'main affected groups'

Whilst a quantitative assessment will be done at secondary legislation stage, we have provided some narrative of potential costs. These cover familiarisation costs and the costs of: Authorisation; Licensing of a Category 2 Automated Driving System (ADS) feature; Data collection, retention, and reporting; Criminal sanctions; Civil sanctions; Criminal offence of misleading marketing; and a permitting scheme for passenger-only AVs.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	Optional	Optional	**Optional**
High	Optional	Optional	**Optional**
Best Estimate	NQ	NQ	**NQ**

Description and scale of key monetised benefits by 'main affected groups'

As these provisions provide powers to create secondary legislation, we have not monetised benefits at this stage. We will conduct a full assessment when detailed proposals are developed under secondary legislation, but given the provisions are permissive by nature we are confident the net benefits are positive.

Other key non-monetised benefits by 'main affected groups'

The ultimate result of this comprehensive regulatory framework will be to enable commercialised self-driving vehicle services, which could not occur without the regulatory framework due to legal and safety uncertainties. This will bring benefits for the public (as users), corporations developing self-driving vehicles and providing self-driving vehicle services, and the wider UK economy in fostering a nascent market.

Key assumptions/sensitivities/risks	Discount rate	

- Assumptions: the self-driving vehicle industry is and will remain an attractive prospect for investors; a flexible regulatory framework will respond to evolving innovation; data will be forthcoming to inform regulatory response; an appropriate regulatory framework is implemented ahead of the competing economies.
- Risks: businesses are not incentivised to invest in self-driving vehicles; the regulatory framework does not deliver on-going benefits; transition costs are greater than anticipated.

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) £m:			**Score for Business Impact Target (qualifying provisions only) £m:**
Costs:	**Benefits:**	**Net:**	

Summary: Analysis & Evidence

Policy Option 3

Description: **Reduced regulatory framework for self-driving**

FULL ECONOMIC ASSESSMENT

Price Base Year	**PV Base Year**	**Time Period Years 10**	**Net Benefit (Present Value (PV)) (£m)**		
			Low: Optional	**High:** Optional	**Best Estimate: NQ**

COSTS (£m)	**Total Transition** (Constant Price) Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Cost** (Present Value)
Low	Optional	Optional	**Optional**
High	Optional	Optional	**Optional**
Best Estimate	NQ	NQ	**NQ**

Description and scale of key monetised costs by 'main affected groups'

As these provisions provide powers to create secondary legislation we have not monetised costs at this stage. We will conduct a full assessment when detailed proposals are developed under secondary legislation, but given the provisions are permissive by nature we are confident the net benefits are positive.

Other key non-monetised costs by 'main affected groups'

Whilst a quantitative assessment will be done at secondary legislation stage, we have provided some narrative of potential costs. These cover familiarisation costs and the costs of; Authorisation; Licensing of a Category 2 Automated Driving System (ADS) feature; Data collection, retention, and reporting; Criminal sanctions; and Civil sanctions.

BENEFITS (£m)	**Total Transition** (Constant Price) Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Benefit** (Present Value)
Low	Optional	Optional	**Optional**
High	Optional	Optional	**Optional**
Best Estimate	NQ	NQ	**NQ**

Description and scale of key monetised benefits by 'main affected groups'

As these provisions provide powers to create secondary legislation we have not monetised benefits at this stage. We will conduct a full assessment when detailed proposals are developed under secondary legislation, but given the provisions are permissive by nature we are confident the net benefits are positive.

Other key non-monetised benefits by 'main affected groups'

As per Option 2, this option will bring benefits for the public (as users), corporations developing self-driving vehicles and providing self-driving vehicle services, and the wider UK economy in fostering a nascent market but likely at a reduced scale as businesses will not easily be able to offer a commercial passenger service using a vehicle with no driver inside; uncertainty will remain on what is lawful.

Key assumptions/sensitivities/risks **Discount rate (%)**

- Assumptions: the self-driving vehicle industry is and will remain an attractive prospect for investors; a flexible regulatory framework will respond to evolving innovation; data will be forthcoming to inform regulation response; an appropriate regulatory framework is implemented ahead of the competing economies.
- Risk: businesses avoid seeking authorisation as it is easier to missell products to customers; businesses are unable to commercialise passenger services using vehicles with no driver inside or do not want to take the risk in the UK.

BUSINESS ASSESSMENT (Option 3)

Direct impact on business (Equivalent Annual) £m:			**Score for Business Impact Target (qualifying provisions only) £m:**
Costs:	**Benefits:**	**Net:**	

1.0 Policy Rationale

1.1 Policy background

1. The regulation of self-driving vehicles is a challenge many countries across the world are grappling with. Self-driving vehicles strike at the heart of road traffic legislation by removing the driver, who has historically been the accountable entity when things go wrong. The framework proposed below by the Law Commission of England & Wales and the Scottish Law Commission (the Law Commissions) is a significant shift from over 100 years of road traffic legislation. Whilst road traffic legislation has evolved piecemeal across those 100 years, this framework attempts to create a fully comprehensive regulatory system from the very beginning, ensuring maximum safety and accountability.

2. It removes many responsibilities from the driver (now mostly a passenger) and proposes a new legal actor take on responsibility for how the vehicle drives instead. This is a world-leading proposal with a level of detail not found in any other jurisdiction. This impact assessment attempts to identify the costs and benefits and overall impacts of this new scheme. However, such a fundamental shift in the regulation of driving in advance of widespread use of the technology presents a challenge in properly estimating those impacts. It is therefore crucial that this scheme remains flexible; able to adapt as the technology develops and new challenges emerge that could not have been predicted.

3. To that end, the primary legislation under consideration here establishes the broad principles and foundations of this new scheme, making sure to remain flexible and future proof as the technology enters wider deployment and commercialisation. This leaves space for more detailed, and more easily adapted, secondary legislation to fill in the detail as our understanding of the technology improves over time. Developing secondary legislation will require a consideration of the technology available at the time and in so doing clarify the costs and benefits of regulating that technology at that point in time, compared to regulating a technology that we cannot yet envision.

4. Between 2018 and 2022, the Law Commissions conducted a review of legislation to understand how best to regulate self-driving, or automated, vehicles (AV). They were commissioned by the UK Government's Centre for Connected & Automated Vehicles (CCAV). In January 2022 they made formal recommendations for legislative change which are supported by Government and will be implemented through the new regulatory framework for self-driving vehicles detailed below. Their paper here: Automated-vehicles-joint-report-cvr-03-02-22.pdf.

5. Driving automation refers to a broad range of vehicle technologies and uses. Examples range from widely used driver assistance technologies (such as cruise control or lane changing features which assist the driver with the dynamic driving task), to highly automated vehicles that drive themselves with no human intervention.

6. The Commissions' terms of reference describe a self-driving vehicle as a road-based vehicle. It must be capable of "driving itself" rather than merely assisting a human driver. In other words, it can operate in an automated mode, in which it is not being controlled and does not need to be monitored by an individual, for at least part of a journey. The review also focussed on passenger transport as opposed to goods deliveries and does not extend to airborne craft or vehicles that might travel on pavements, footways, and footpaths.

7. The terms of reference considered where there may be gaps or uncertainty in the law, and what reforms may be necessary to ensure that the regulatory framework is fit for purpose. That is to say, a regulatory framework that allows the safe and effective deployment of self-driving vehicles on Britain's roads. This includes but is not limited to the following issues:
    - who the "driver" or responsible person is, as appropriate;
    - how to allocate civil and criminal responsibility where control switches between the automated driving system and a human user;
    - the role of self-driving vehicles within public transport networks and emerging platforms for on-demand passenger transport, car sharing and new business models providing mobility as a service;
    - whether there is a need for new criminal offences to deal with possible interference with self-driving vehicles and other novel types of behaviour; and
    - the impact on other road users and how they can be protected from risk.
8. The proposed legislative framework for self-driving vehicles creates a number of new powers for the flexible regulation of self-driving vehicles. Self-driving vehicle technology is still developing so setting prescriptive requirements now, in primary rather than secondary legislation, could hamper their future deployment and lead to a negative impact. The framework therefore can only be realised through future secondary legislation, which will set the detail of expectations on corporations wishing to deploy AVs. Primary legislation will establish only the principles and structure of the new framework. Our intention is to create a dynamic, future-proof framework that can be updated as the technology develops and Government's understanding of appropriate regulation of the technology improves.

9. The provisions have been subject to extensive consultation across nearly four years as part of the Commissions' review. Support was strong for the proposals overall, with respondents expressing a strong need for a new safety assurance process and a set of new legal actors to deal with the change in responsibility inherent to self-driving. The two-stage process of vehicle approval and authorisation can be seen in the diagram of Annex A produced by the Law Commission.

10. Other countries and regions have started to introduce legislation for automated vehicles. However, their focus has been on removing regulatory barriers to trialling and enabling commercial deployment – France, Germany, Japan, and California all require trials to be licensed based on approval of a safety case. They have also set requirements for data reporting to the regulators and access to data e.g., for insurance purposes, but in the case of European Countries this was facilitated by EU legislation on data recorded by road vehicles rather than specifically for AVs. Germany and France have also introduced legislation to enable deployment of vehicles on public roads without a driver which sets out roles and, for France, qualifications required for performing remote supervision. France has also introduced an obligation on anyone providing access to self-driving vehicles to explain how they are operated.

11. However, no country has so far introduced a comprehensive regulatory framework which allows safe delegation of the dynamic driving task to the vehicle and removes criminal responsibilities associated with this task from the occupant(s). Indeed, other countries still leave some residual liability with the driver or remote operator, such as responding to emergency and enforcement vehicles, or even to 'obvious circumstances,' which creates legal risks to self-driving vehicle users and potential barriers to fully realising the benefits of self-driving vehicles. It is difficult to see how a passenger could make full use of their 'free time' in a vehicle to be productive if they also need to watch out for enforcement vehicles. The Law Commissions considered legislation in other countries and made their recommendations after extensive consultation on the proposed approach.

1.2 Problem under consideration

Safety assurance

12. At present, road vehicles are subject to a complex system of regulatory approval before they are placed on the market. New vehicles for a mass market are subject to a system of type approval of their systems and components, which relies largely on technical regulations set by the United Nations Economic Commission for Europe (UNECE), a United Nations agency. Once vehicles have been certified as conforming to these standards, they must then be registered with the Driver and Vehicle Licensing Agency (DVLA) for use on roads. However, UNECE standards do not cover driving behaviour or drivers' liabilities.

13. The current legal framework for vehicle approval is inadequate to assure the safe operation of AVs, which relies not only on satisfactory design and manufacture of the vehicle and its components but also on the driving behaviour of its automated driving system (ADS). Few technical regulations exist for such systems and self-driving vehicles will need to undergo a robust approval process before being approved for use on public roads. Unlike conventional vehicles, the driver will no longer take care of the driving task once the vehicle is approved and being used. This means that, as part of the approval process, regulators will need to ensure that self-driving vehicles can safely drive themselves on public roads and interact appropriately with other vehicles and road users.

14. The current framework for approval will need to be significantly adapted for the changes to testing that will be required. Any such changes will however still need to account for and sit besides, international systems of vehicle regulation and road safety in which the UK is a partner.

15. The safety assurance of self-driving vehicles once they are deployed on roads also raises crucial problems which do not exist for conventional vehicles. Self-driving vehicles are expected to require "in-service" updates and systems checks to ensure they continue to drive themselves safely and in accordance with road rules over the entirety of their lifecycle. Changes to road infrastructure and to traffic laws occur regularly and AVs' automated driving systems will need to be updated to account for such changes. Specific regulatory mechanisms for assessing the driving behaviour of a vehicle and its adherence to road traffic laws will be needed to assure safety on an ongoing basis.

Criminal liability

16. Currently the human driver is responsible for the driving task when a vehicle is being used. Legal frameworks for criminal liability in relation to driving are predicated on this assumption. Who is "responsible" when a self-driving vehicle is driving itself is a key and undetermined question under current legislation. There are differing views as to the extent to which criminal responsibility for the driving behaviours of an automated driving system should be reallocated to its manufacturer or software developer while it is engaged. This question will need to be answered so that legal certainty can be achieved. Leaving any uncertainty in this regard could result in incidents and fatalities occurring with no clear responsibility. This in turn would lead to a loss of public confidence in self-driving vehicles as a whole. Unfair attribution of liability to drivers has also been cited as a concern in relation to this.

Civil liability

17. How injured parties would be compensated in the event of an incident caused by a self-driving vehicle is a key question. The Automated and Electric Vehicles Act (AEVA) 2018 introduced reforms to smooth the path to compensation for those injured by self-driving vehicles. Broadly speaking, AEVA requires the insurer to pay a victim for any damage caused by a vehicle when driving itself. The insurer may then bring a secondary claim against anyone else responsible for the incident.

18. The Law Commissions' provisional view was that AEVA provides the necessary statutory basis for compensating victims where self-driving vehicles cause damage and requires no amendment in this regard.

1.3 Rationale for intervention

19. The rationale for intervention is a two-part problem:
    a. The rationale for having any government intervention in the self-driving vehicle market,
    b. The rationale for further intervening beyond existing vehicle regulations.

Rationale for having government intervene in the self-driving vehicle market.

Market failure: Information Failure

20. Consumers are likely to know far less about the technology they are buying/using than the manufacturers.

21. This creates an imbalance of power in the market that, without intervention, could lead to sub-optimal outcomes as vehicle manufacturers can exploit the lack of consumer understanding to deliver sub-standard products at the market price. This means consumers may make purchases that they would not have done if they had been in possession of the full set of information.

22. Conversely, these information failures may also mean that consumers may not make purchases that they would if they had the full set of information. Evidence in support of this includes the fact that while 75% of respondents to the DfT public attitudes survey[7] reported safety concerns when asked about the disadvantages of AVs*, reports from SMMT estimate that AVs* could reduce the deaths on road by an estimated 3,900 by 2030[1].

Market failure: negative externalities

23. Should something go wrong with an AV, the full costs are not faced by the economic agent responsible for the safety (the vehicle manufacturer).

24. This creates an environment whereby the vehicle manufacturers incentives are not aligned with wider society. For example, foregoing an additional month of testing in order to get a product to market. Similarly, a vehicle manufacturer may prioritise the safety of their

*These studies look at ***connected*** and autonomous vehicles (CAVs) – in which the connected element of these new vehicles may have some responsibility in the impact calculated.

[1] 2022. *Smmt.Co.Uk*. https://www.smmt.co.uk/wp-content/uploads/sites/2/SMMT-Motor-Industry-Facts-Nov-2020.pdf.

occupants and customers over the wider population, so their clients have confidence to use the technology.

25. This creates an environment where the manufacturers' incentives do not exactly align with wider society, which leaves room for intervention by government to improve the market outcome that would naturally occur if government did not intervene.

Rationale for these changes being brought forward

Government failure: outdated legislation

26. Current legislation is not fit for purpose to permit the safe deployment of self-driving vehicles with a clear delineation of responsibility. This is because driving legislation has evolved historically over 100 years with the assumption that a human driver is accountable for a vehicle's behaviour. Industry have been asking for greater clarification on the legal responsibilities around the use of self-driving vehicles before taking the risk of commercial deployment. 70% of interviewed executives from automotive, transportation and software companies working on automated driving across Europe stated that regulation was seen as the largest bottleneck to the adoption of autonomous driving[2]; only Government can provide this legislation. It is currently unclear who is responsible in the event of a collision involving a self-driving vehicle and in the face of legal ambiguity a court may find unfavourably for a passenger who had no control of the vehicle. The existing legislation (the Automated and Electric Vehicle Act 2018) is designed only to ensure self-driving vehicles are properly insured. It does not clarify legal responsibilities and it cannot be used to hold the manufacturer to account if something goes wrong, nor does it vest the Secretary of State with powers to perform further self-driving specific safety checks on vehicles.

Regulatory certainty, real options and driving innovation

27. Business knows that there will be government intervention in the self-driving vehicle market. However, at present, they do not know exactly what that intervention will be.

28. This means that for a business making investment decisions today, there is uncertainty as to whether that investment will be wasted if tomorrow's regulatory regime is different to what they anticipated, or if indeed they are not able to start recouping their investment for a number of years.

29. This future uncertainty increases the value of waiting until tomorrow before deciding whether or not to invest, therefore companies are more likely to hold-on to the option of investing at a later date instead of investing today.

30. This means that if government intervention provides more certainty on (a) when business can begin to recover their investment and (b) what business should be working towards we can bring forward companies' investment decisions that will deliver benefits sooner.

[2] 2022. *What's Next For Autonomous Vehicles?*. https://www.mckinsey.com/features/mckinsey-center-for-future-mobility/our-insights/whats-next-for-autonomous-vehicles.

31. Additionally, businesses have options on where they base their development and investment. This regulatory certainty may increase the attractiveness of the UK as a place to invest in self-driving vehicle technology and infrastructure.

1.4 Policy objectives

32. In creating a new legislative and regulatory framework for self-driving vehicles, Governments aims to:
    - Ensure the safe use and responsible deployment of self-driving vehicles and minimise their risk to the public;
    - Provide a clear allocation of responsibility for parties developing and using self-driving vehicles;
    - Enable the benefits from driving automation, through expected improvements in road safety, mobility and productivity;
    - Remove regulatory barriers to enable the commercial deployment of self-driving vehicles;
    - Articulate clear laws governing self-driving vehicle use, supporting the uptake of the technology by the public and investment in the UK self-driving vehicle sector; and
    - Position the UK as a global thought-leader on the regulation of self-driving vehicles, shaping discussions at international fora.

33. With all novel technology, there remains uncertainty in how it will develop over time. Our intention is to create a dynamic, future-proof framework that can be updated as the technology develops and Government's understanding of appropriate regulation of the technology improves. The framework is designed to enable safety assurance of the new technologies and provide confidence to developers and users.

1.5 Options considered

34. The follow options have been considered against the policy objectives.

    - Option 0 – Do nothing; Government would retain the existing Code of Practice without any update and direct developers to ensure compliance with the law.

    - Option 1 – Government does not introduce any further legislation, but instead updates the existing Code of Practice, highlighting that UK legislation requires no human driver within the vehicle and it is up to individual ADS developers to assure themselves that their vehicles remain lawful.

    - Option 2 (preferred) – Create a comprehensive regulatory framework for self-driving vehicles to clearly define the legal responsibilities of all key market participants and users and establish a clear process for vehicle approvals and monitoring. This would also remove regulatory barriers and/or uncertainty hindering commercial deployment.

    - Option 3 – Create a regulatory framework as proposed in Option 2 but without several proposals that do not form a core part of the safety assurance process.

35. Option 2 is preferred because it reduces uncertainty and provides legal clarity. Legal clarity, in turn, enables development, potentially at a faster pace. Giving legal certainty should encourage commercial deployment, which improves the prospect for improved safety, increased mobility and reduced social exclusion.

2.0 Costs and Benefits

36. This impact assessment covers the primary legislation to take powers that in and of itself will not impose costs to business or society, nor directly lead to benefits without further secondary legislation. The secondary legislation that creates those impacts is not yet determined, with many elements at pre-consultation stage. Although this impact assessment would ideally include the costs and benefits of the secondary legislation, this is not currently possible given the large differences in likely costs and benefits which are highly dependent on policy decisions yet to be made and how the market may develop. We have therefore qualitatively described the potential impacts of secondary legislation but have not made unfounded forecasts on the total impacts. Rigorous analysis with quantification of benefits and costs will be carried out when secondary legislation is created using the powers set out in the Automated Vehicles Bill.

37. In presenting a qualitative assessment of costs and benefits we are following the same approach as the Law Commissions' Impact Assessment[3]. First published in July 2021 in order to invite public comments, the Law Commissions' Impact Assessment received no feedback. This was taken to be seen in part as general agreement for the pragmatic approach to the IA and in part due to the uncertainty in the sector as to how the market for self-driving vehicles might develop.

38. The evidence we present has been informed by conversations with organisations currently involved in the regulation of conventional vehicles, such as the Vehicle Certification Agency (VCA), part of the Department for Transport, and informed by qualitative assessments in the Law Commissions' own impact assessment. The costs and benefits in this IA should be taken as illustrative.

39. The current regulatory framework is commercially impractical due to the ambiguous legal position that self-driving vehicle developers would have to engage with, and companies have been asking us to implement legislation, which they cite as a key blocker. Therefore, these regulations open up the market.

40. Despite the market being in a nascent stage, multiple incumbent vehicle manufacturers and new market entrants are either actively developing self-driving technology or are looking at the market. The current regulatory framework is a significant barrier to entry into the market. This could be demonstrated in the response to the Commissions' first consultation paper with 84% of respondents agreeing with the Commissions' proposals on safety assurance before self-driving vehicles are allowed onto UK roads for use by the general public[4].

41. As per the Regulatory Policy Committee's guidance on assessing the impacts of permissive regulation[5], this means any costs or benefits of the regulation would be counted as direct impacts to business. However, due to the early stage of policy development and only creating broad powers, as explained above, we are unable to assess the specific impact on business at this stage.

[3] Law Commissions Final Impact Assessment – Automated Vehicle, https://s3-eu-west-2.amazonaws.com/lawcom-prod-storage-11jsxou24uy7q/uploads/2022/01/AV-Impact-assessment-25-01-22-2.pdf

[4] 2019. Law Commissions. Automated Vehicles: Analysis of Responses to the Preliminary Consultation Paper.

[5] 2020. Regulatory Policy Committee. Permissive_legislation_-_February_2020.pdf (publishing.service.gov.uk)

42. However, we can assume that the Business Net Present Value would be positive. Businesses will be able to assess the market before deciding to enter, meaning they will only enter if they are confident, they are able to be better off in the market than out. Whilst this makes it fundamentally different to a market where businesses are already operating, regulations will continually be designed and assessed to ensure the policy objectives are met in the least burdensome way possible as they are developed at secondary legislation stage.

2.1 Option 0 – Do Nothing

Summary

43. In this baseline scenario, government takes no further action to give self-driving vehicle developers certainty on the deployment of self-driving vehicles. Instead, developers are pointed towards the existing Code of Practice, which highlights the importance of compliance with the current law but requires them to assure themselves that they are compliant.

44. Developers would continue to seek type-approval for their vehicles and may benefit from AV-specific regulations developed at the United Nations Economic Committee for Europe (UNECE). Vehicles that met the existing definition of an 'automated vehicle' under the Automated and Electric Vehicles Act (AEVA) 2018 may be listed, which would require them to be insured with AV-specific insurance. This would not, however, require the vehicle to be further assured as an AV, nor change the driver's liability, nor explicitly hold the manufacturer responsible for how the vehicle drives itself.

Costs and Benefits

45. It is not straightforward to work out the precise implications of "doing nothing". The development of self-driving vehicle technology and the market for it is evolving. Regulation itself also changes and is updated in the ordinary course of events. In time, many of the international regulatory frameworks which are currently used to approve vehicles will be adapted and changed to account for new automated technologies.

46. However, there are two likely issues with this approach:
    - on-going uncertainty over issues of legal liability; and
    - delayed development of a market for AVs.

47. Firstly, even if current approval frameworks are adapted and create new technical regulations and safety specifications for AVs, this does not solve the issue of legal liability, which is an area of domestic legislative competence. Users of these vehicles and their manufacturers would still be unclear as to their legal positions and who is criminally liable in the event of an incident or a collision. Users may claim that they should not be guilty for the behaviour of a vehicle "driving itself" (which may also result in the unsafe use of vehicles). Manufacturers having gained approval for their vehicles under technical regulations may feel that the users of such vehicles should bear at least some liability for their use.

48. Secondly, in the absence of clear legal responsibilities the development of the self-driving vehicle market is likely to be slowed. Manufacturers and developers are less likely to invest in researching and deploying such vehicles if potential purchasers and users of such vehicles are deterred from using them because of their potential criminal liability. Similarly, those wishing to purchase and use self-driving vehicles may be less likely to do so if they are unclear as to their legal liability in the event of a supposedly self-driving vehicle causing or being involved in a collision or incident on the road.

49. Both issues would thus potentially prevent or hinder the economic, social and safety benefits of self-driving vehicles to the UK from being realised.

2.2 Option 1 – Updated Code of Practice

Summary

50. In lieu of primary legislation, we considered the option of updating the Code of Practice to highlight the uncertainty in law about the need for a human driver inside the vehicle.

51. In their first consultation paper[6], the Law Commissions highlighted that '[I]n theory, it might be possible for a suitably audacious operator to press ahead [without a driver in the vehicle] provided that operator is careful to comply with the provisions of the Road Vehicles (Constructions and Use) Regulations 1986. This would include, for example, not leaving a vehicle "unattended", and not causing a danger... The law in this area is uncertain.' (p72).

52. An updated Code of Practice could clarify how self-driving vehicle developers could mitigate the legal risks associated with the uncertainty in current law in order to move the safety driver to a remote location (or nowhere at all, arguing the automated driving system (ADS) is the driver).

53. Whilst we believe this is a viable proposal, it is not the preferrable option of those presented here. It does not provide the same level of legal certainty as the full regulatory framework for self-driving and still carries risks for drivers, who may be held unfairly responsible, and for developers, who may decide to deploy overseas where legislation may have been updated to incorporate self-driving vehicles.

Costs and Benefits

54. There would be some minor familiarisation costs as manufacturers or prospective market entrants read and consider the updated Code of Practice. These costs would be much less than those associated with complying (and familiarising oneself with) an entirely new regulatory framework. Additionally, it is unlikely that there would be compliance costs associated with a Code of Practice (unlike the new framework) except minor costs following further updates or clarifications.

55. We know from both the Law Commissions' self-driving vehicle review and deliberative research[7] that stakeholders see further legislation and regulation as a key requirement for enabling the safe and widespread deployment of AVs. In response to the Commissions' first consultation paper, 84% of respondents agreed that a new safety assurance process was needed for self-driving vehicles[9], which would require further legislation and could not be delivered by a Code of Practice. Deliberative research has suggested that further legislation and regulation would give the public greater confidence that self-driving vehicles were safe, which the Code of Practice would likely be unable to deliver because it would be a non-binding legal document.

56. There is a danger that the first serious incident in the UK involving a self-driving vehicle could derail the entire industry in this country. Providing assurance to the public will be crucial in

[6] 2018. Law Commissions Fina Impact Assessment – Automated Vehicle, https://s3-eu-west-2.amazonaws.com/lawcom-prod-storage-11jsxou24uy7q/uploads/2018/11/6.5066_LC_AV-Consultation-Paper-5-November_061118_WEB-1.pdf

[7] 2021. Gov.UK Future of transport: deliberative research. https://www.gov.uk/government/publications/future-of-transport-deliberative-research

assuaging their concerns. A Code of Practice that gives license to audacious operators to exploit existing legal ambiguities is unlikely to provide that assurance.

57. The core challenge that needs tackling for self-driving vehicles is the clear delineation of responsibilities for users and manufacturers. Since this touches on a plethora of existing legislation, only new, primary legislation could change these responsibilities in such a way that supports a nascent industry but also protects non-experts from unfair prosecution. Whilst a Code of Practice may help give direction to courts in how they should interpret the law, this still carries a lot of risk for members of the public, who may be unaware of the risks they are taking by using technology they may not fully understand.

58. Furthermore, as the existing Code of Practice, which would be the basis for an updated version, is for vehicle trials and is not designed to support commercial deployment it is unlikely widespread self-driving vehicle use would follow from undertaking Option 1. We would therefore forego any of the social and economic benefits associated with self-driving vehicle use.

59. Overall, a revised Code of Practice could not give the legal certainty possible with new primary legislation to support the commercial deployment of self-driving vehicles.

2.3 Option 2 – Full regulatory framework for self-driving

Summary

60. Vehicles that are designed to be able to drive themselves prompt questions of safety - because driving is now performed by a machine rather than a trained human - and liability – because the occupant may no longer have a full understanding of what the vehicle is doing.

61. Option 2 would seek to regulate how vehicles drive themselves on Great British Roads. Under the new framework, a vehicle will be permitted to drive itself when it is safe enough for an individual to no longer monitor the vehicle and/or the driving environment, giving assurance that it will drive itself at least as well as a careful and competent driver. The entire framework is geared towards making this assessment of 'safe enough' both at the initial 'authorisation' stage and throughout the vehicle's life. The Commissions discuss this in more detail in Chapter 3 of their final report ('Self-driving and monitoring')[8].

62. We intend to establish a procedure whereby a vehicle is authorised to drive itself in at least some circumstances. In the situation of a vehicle driving itself, the occupant(s) is no longer responsible for how it drives, with responsibility moving to another legal actor. This will enable the occupant(s) to perform activities other than driving.

63. For this purpose, we aim to create new legal actors to take on responsibility for the driving task and other associated responsibilities; confer new powers and duties on the Secretary of State for Transport to regulate self-driving vehicles; and establish new offences to sanction legal actors standing behind unsafe vehicles. We also seek to create new offences to penalise the misleading disclosure or non-disclosure of safety-critical information to Government by organisations that vouch for the safety of self-driving vehicles. We propose to confer powers on the Secretary of State for Transport to make subordinate legislation for the

[8] 2022. Law Commission. Automated-vehicles-joint-report-cvr-03-02-22.pdf

regulation of self-driving vehicles in recognition of the nascence and developing nature of the technology, introduce new processes to investigate incidents involving self-driving vehicles to ensure lessons are identified and fed back into the safety framework, require local authorities to send legal orders they make to a central publication platform and introduce measures to address the shortcomings of the current GB type approval and construction and use frameworks to facilitate the introduction of Automated and self-driving vehicles**.**

64. The Commissions' proposals are broad and wide-reaching. For the purposes of this impact assessment, we have considered only those elements that we believe will incur specific costs and/or benefits. For a more comprehensive overview of the Commissions' proposals and the self-driving vehicle provisions please see the Commissions' final report and the provisions' explanatory memorandum, as appropriate. We give an overview of the relevant areas below before considering costs and benefits.

65. We consider the anticipated costs of each element of the framework in further detail below, summarised in Annex A. The proposed post-approval regulatory process is represented in Annex D.

Authorisation to permit a vehicle to drive itself

66. Since road traffic legislation expects the presence of a human driver, we propose a new domestic decision that assures government that an automated vehicle will drive itself safely and legally if permitted to do so. This requires evidence that the vehicle will drive itself at least as safely as a careful and competent human driver even if the occupant of the vehicle is not monitoring the vehicle or the road environment. Where a vehicle has been authorised, the occupant will be given an immunity from driving offences whilst the vehicle is driving itself. The authorisation decision follows type approval (Stage 1 in Annex B). The authorisation decision will identify which of the vehicle's Automated Driving System (ADS) features (if more than one) can drive the vehicle safely and legally. If the features are able to drive the vehicle such that it requires no monitoring, then the vehicle will be permitted to drive itself (by means of a self-driving feature).

67. Authorisation requires the applicant Authorised Self-Driving Entity (ASDE) - likely the manufacturer – to present evidence that the vehicle no longer requires monitoring as well as evidence that they are a suitable entity to bear responsibility for how the vehicle drives itself (since the occupant no longer bears that responsibility). The ASDE will be the recipient of sanctions in the event that the vehicle commits a traffic infraction (such as driving in a bus lane) and/or there is a breach of its authorisation more generally.

68. As part of the authorisation decision, an ASDE will need to demonstrate sufficient financial standing to bear the burden of regulatory sanctions and ensure their vehicles continue to drive safely and responsibly.

69. Though an automated vehicle will have received type-approval, the authorisation decision is needed to assure government that the vehicle will conduct itself at least as well as a careful and competent driver on GB roads both in terms of how safely it drives but also how law-abiding it is. Type-approval is likely to supply much of the evidence for this decision, but it cannot enable a change in responsibilities for the driver or the manufacturer. Without authorisation, there is no threshold for the rest of the scheme and no way to identify which vehicles require further regulation than that which already applies to conventional vehicles.

The licensing of an operator for a Category 2 ADS feature

70. Authorisation will identify which Automated Driving System (ADS) features in the vehicle enable the vehicle to drive itself and under which circumstances. A Category 1 ADS feature retains the need for a user-in-charge (UiC), an individual who is a driver until the vehicle begins driving itself. A Category 2 feature requires no UiC and must instead be overseen by a No-User-in-Charge (NUiC) Operator, who must demonstrate that they can safely remotely oversee the vehicle. This may include evidence that they have sufficient processes in place such that should the vehicle encounter a problem that requires direction or intervention by the operator, a dedicated remote overseer can take appropriate action (such as direction on how to navigate around an unexpected obstacle).

71. Though the vehicle may seek direction from the overseer this does not invalidate its ability to drive itself. Whereas a Category 1 feature requires a UiC to intervene and thereby that feature disengages, a Category 2 feature should only require prompts from the overseer as to how it should proceed itself. The operator must also show evidence that it can properly assume responsibility for responsibilities beyond the vehicle's behaviour such as insurance and passenger safety, much like a bus operator today.

72. In order for the ASDE to have obtained authorisation for the vehicle's Category 2 feature they must have presented requirements on how that feature will be safely overseen. The operator then must present evidence to demonstrate they can meet these requirements. Where an applicant operator makes a convincing argument to the regulator, they will be licensed as a NUiC Operator. The ASDE and NUIC operator may be the same corporation or separate legal entities. This is covered in Chapter 9 of the Law Commissions' final report. Where they are combined, we refer to them as a Combined Authorised Self-Driving Operator (CASDO).

73. This additional licensing step is needed, in addition to authorisation, to assure government that the vehicle is still driving safely and legally in accordance with its authorisation.

Data collection, retention, and sharing

74. ASDEs will need to collect, retain, and share data for the purposes of meeting regulatory requirements. Primary legislation will require that, at minimum, ASDEs are able to supply the Data Storage System for Automated Driving (DSSAD) data to demonstrate whether a vehicle was driving itself at the time and place of an incident to help assess responsibility and to enable insurers to meet their existing duties under the Automated and Electric Vehicles Act 2018. This DSSAD data must record time and location. The Commissions consider this requirement in Chapter 13 of their final report, sections 'Data retention' and 'Data sharing'.

75. We also expect that ASDEs will need to collect, retain, and share data in order to comply with any authorisation they have received for vehicles. For example, if an ASDE provides convincing evidence that the vehicle will comply with road traffic rules relevant to where the vehicle will be deployed then they will need to collect data that demonstrates that this remains true once the vehicle is deployed, and then share that with government when requested. Where data suggests that the authorisation is no longer valid, government will have a range of options available to it to take action, such as issuing a compliance order to fix the problem or even suspension of authorisation, preventing it from driving itself without human monitoring. This is covered in Chapter 5 of the Commissions' final report.

76. Likewise, upon obtaining a NUiC license, an operator will be required to collect and retain further data for the purposes of confirming that they are meeting the conditions of their license. We have yet to determine what that data may be and will conduct a fuller analysis

once secondary legislation is developed. This is covered in Chapter 9 of the Commissions' final report.

77. Data collection, retention, and sharing by both ASDE and operator is fundamental to the new regulatory framework. Government must have access to data to assure itself that regulated entities (the ASDE and NUiC operator) continue to abide by their authorisation(s) and license(s), as appropriate. Without this data being collected and shared with government there is a risk that these entities could diverge from their requirements with no ability to assess this divergence, threatening road safety. There is likely to be, especially early on, a severe asymmetry of knowledge between these entities and government given the nascence and sophistication of the technology. Government must have the necessary powers to fulfil its regulatory duties.

78. Furthermore, DSSAD data must be shared with insurers to enable them to meet their requirements under the Automated and Electric Vehicles Act 2018. The Act is designed to ensure prompt compensation to the victim of a self-driving vehicle incident. If insurers cannot determine whether the vehicle was driving itself at the time of an incident then this compensation is likely to be delayed, thereby undermining the Act.

79. It is also worth noting that self-driving vehicle developers/manufacturers are not currently required to collect, retain, or share any data at a domestic level. This is a serious gap in legislation and our proposals address this, ensuring a robust overall framework.

Civil sanctions on the ASDE and NUiC Operator

80. Since self-driving vehicles cannot, in and of themselves, be guilty of a criminal offence, the Commissions have proposed a new enforcement regime to penalise ASDEs and NUiC operators when the vehicles behave unsafely or irresponsibly, and/or breach their authorisation or NUiC license. This falls under the broader regime of 'in-use regulation' (detailed in Chapter 6 of their final report).

81. Government will have jurisdiction to apply sanctions to ASDEs/operators. These will include civil penalties that sit roughly in the middle of a broader scale of regulatory sanctions from informal warnings to suspension of authorisation or delicensing. These fines may apply even in the event of criminal fines for a breach of the duty of candour (detailed below).
82. It is important that government can take action against ASDEs or operators who fall below expectations. It is illogical to apply criminal sanctions to an organisation, except in specific circumstances (detailed below). A civil sanctions framework, however, provides a flexible set of tools for penalising wrong-doing. Ultimately, as the Commissions discuss, the in-use regulatory scheme seeks to emulate the aviation industry where a no-blame culture has been fostered and where competitors learn from one another to improve overall safety outcomes. We aim to move the in-use regulatory scheme in that direction, but we recognise that, especially early on, the public will expect to see businesses punished, especially where their vehicle(s) causes harm.

83. The inability to deploy civil sanctions will leave the entire framework toothless; only able to authorise a vehicle and monitor their behaviour but unable to take action where they fall below standards.

Criminal sanctions on the ASDE and NUiC Operator

84. Though civil sanctions will form the backbone of enforcement against ASDEs and operators, it is important that government reserves a set of criminal sanctions for specific transgressions. The Commissions detail in Chapter 11 a new set of criminal offences that relate to an entity's

'duty of candour'. This refers to the requirement that ASDEs/operators disclose all information relevant to the vehicle's safety whether at the initial authorisation, as part of in-use regulation, or at any point that information is requested by regulators. Failure to disclose necessary information will be an offence, as will false or misleading disclosure of the information.

85. The offences will primarily fall on the 'nominated manager', who has signed off the safety case. However, where other senior managers have consented or connived in the breach of the duty of candour, they will also be guilty of an offence. The nominated manager will have a due diligence defence available to them.

86. Where this breach of duty of candour leads to a death and/or serious injury, the offence will be aggravated with a more serious jail term for the nominated manager as well as the senior managers (if guilty of consent or connivance).

87. Civil sanctions will be the best means by which to regulate self-driving vehicles. Nonetheless, conventional driving offences carry serious penalties, particularly where they relate to death or serious injury. The Commissions considered this and proposed the criminal offences detailed above. Given the serious asymmetry of information between government and ASDEs/operators it would seem crucial to strongly penalise a failure to disclose important information or mislead when disclosing that information. We also expect that the public will want to see serious penalties applied where a business has behaved immorally.

Criminal offence for the misleading marketing of an unauthorised self-driving vehicle

88. There is already a lot of confusion as to when a vehicle can drive itself and when it cannot. As of yet no vehicle has been identified as self-driving by UK legislation. There is a risk that the new regulatory framework could be undermined if businesses are able to claim their vehicle is self-driving without ever getting the vehicle authorised. Misleading claims that the driver needn't pay attention to the vehicle or the road, when the vehicle is not in fact sophisticated enough to do so safely, risks worsening road safety as more and more manufacturers offer high-end driver assistance.

89. The Commissions received strong support for banning unauthorised self-driving vehicles, but there was little consensus on how this could be done. The Commissions therefore proposed a misleading marketing offence that would apply to any business that led end-users to believe that their vehicle could drive itself (whether by using specific terms or not) when the vehicle has not in fact been authorised to do so.

90. Importantly, this offence is designed to prevent the confusion of end-users, not another business looking to purchase a 'component' that they will then install into a vehicle and put forward for authorisation. For example, an ADS developer may not wish to seek authorisation because they do not build vehicles and do not wish to remain responsible for their technology. Therefore, they sell their ADS to a large manufacturer, who in turn installs the ADS in a vehicle that they then put forward for authorisation. The ADS developer could legitimately sell their ADS as self-driving, providing it caused no confusion for an end-user. They would also be permitted to market their activities as designing an ADS for later authorisation (emphasising that no authorisation had yet been obtained). Nonetheless, a condition of authorisation will be sufficient involvement in the safety assurance of the vehicle, which may be difficult for the manufacturer who played no part in the design of the ADS.

Permitting scheme for passenger-only automated vehicles

91. Existing licensing regimes for the carriage of passengers are not suited to vehicles operating under a category 2 feature where no driver or UiC is required. This is because they put great

emphasis on the presence of a 'driver', who is generally understood to be performing duties relating to the passengers rather than driving the vehicle. The Law Commissions therefore proposed an 'interim' permitting scheme to understand how passenger services in these vehicles can be safely and inclusively licensed ahead of wider reform to passenger licensing. They called this the 'Automated Vehicle Interim Passenger Permit', though we have taken the decision to move away from the terminology of 'interim' as no plans have yet been drawn up to revise wider passenger licensing.

92. The scheme will not apply to vehicles operating under a category 1 feature, but it could apply to a trial with a safety driver where the intention was to run a service without a 'driver' for the purposes of passenger legislation.

93. This interim scheme will culminate in a decision by the SoS for Transport, or relevant Minister in the Devolved Administrations, to exempt a service from an existing licensing regime in order to apply more relevant conditions on the service that operates without a driver.

94. The applicant looking to receive a permit will need to show that the vehicle is suitably licensed, if operating a category 2 feature, as well as present evidence of consent by the local authority in which the service is due to operate and how their service meets accessibility requirements. These requirements have yet to be developed and will be done so prior to relevant secondary legislation being laid in Parliament, subject to consultation.

95. Without the new scheme it is likely that businesses wishing to run commercial passenger services using automated vehicles without a user-in-charge, or trials without a safety driver, will struggle to demonstrate that the service can be operated safely. We also recognise licensing authorities' reluctance to license these vehicles since they diverge so noticeably from conventional services. This new scheme will allow timely commercialisation of passenger services whilst ensuring their safe operation without being hampered by unsuitable passenger licensing regimes developed for conventional vehicles.

Costs and Benefits

96. Option 2 creates a number of new legal entities which makes forecasting the numbers of impacted groups difficult. In considering the potential impacts, we have considered the following as potential proxies for the scale of impacted groups.

Group / Entity	Proxy for potential size of group
ASDE	1,180 As an upper estimate we could consider the number of enterprises listed on the Inter-Departmental Business Register[9] as a 'Manufacturer of motor vehicles' (995) and 'Manufacture of electrical and electronic equipment for motor vehicles' (185). This is highly likely to overestimate the number of potential ASDEs, as not all of these entities will be producing passenger vehicles and only a proportion will look to produce self-driving vehicles in the future.
	241

[9] 2021 edition of UK business: activity, size and location dataset: https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/ukbusinessactivitysizeandlocation

	Likely a subset of those entities covered above, there were 241 unique 'makes' of vehicle registered with the DVLA within the last 4 years of available data[10]. This is likely to be closer to the true number, although again likely to be an overestimate as many vehicle makers share parent companies, and again we do not know how many of these will look to produce self-driving vehicles in the future.
	''More than 30'' Is the estimate of number of manufacturers given by the SMMT for the size of the UK automotive industry[11]
UiC	35.9 million The number of driving licence holders according to the 2020 National Travel Survey[12]
NUiC Operator	This is impossible to predict as this role has no contemporary in the current automotive market. In the short term we expect ASDEs are likely to take on this role (forming a CASDO), and that as the task becomes more distinct a new industry will emerge to service this demand.

97. As the figures above show, there is considerable uncertainty even in the absolute scale of impacted groups which makes forecasting the rate at which these groups will engage with the self-driving vehicle market highly uncertain.

98. Through engagement with stakeholders, we know that large OEMs will likely seek authorisation for existing vehicles models fitted with automated motorway pilot technology, which could number in the 10s of thousands. Simultaneously, smaller developers, generally UK-based, will offer more novel vehicles in smaller numbers for more specific purposes. These vehicles are more likely to be offered in a public capacity, for carrying passengers or to carry light freight.

99. Assuming businesses do choose to enter the self-driving vehicle market the following section sets out an estimation of the costs they might face. The data points are summarised in Annex A.

Familiarisation costs

100. The regulatory framework is likely to be complex, so managers of potential and existing firms will need to spend time familiarising themselves with the rules and requirements. These costs are driven by the number of people that need to familiarise themselves with the regulations, their wage rates and the complexity of the regulations.

101. Regulators and enforcers beyond those specifically empowered by this framework may also face familiarisation costs once secondary legislation is commenced. Driving schools may also need to familiarise themselves with any changes to the Highway Code that apply to users-in-charge relevant to driver training.

[10] Vehicle licencing statistics July to September 2021, veh0106, https://www.gov.uk/government/statistics/vehicle-licensing-statistics-july-to-september-2021

[11] SMMT Industry Topics, UK Automotive, https://www.smmt.co.uk/industry-topics/uk-automotive/

[12] DfTs National Travel Survey, England 2020 Main Results, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1019462/nts-factsheet-2020.pdf

102. Potential ASDEs will need to familiarise themselves with the new legislation in order to ensure they can apply for a vehicle to be approved and authorised. This is especially relevant for manufacturers who may already have had a vehicle 'listed' under the Automated and Electric Vehicles Act (AEVA) 2018, such as those fitted with Automated Lane Keeping Systems (ALKS). These vehicles will need to be authorised 'in retrospect' once authorisation replaces listing. AEVA already provides for the listing of automated vehicles, which are safe enough to safely and lawfully drive themselves, though this only has implications for the vehicle's insurance. The new regulatory framework will absorb the insurance provisions of AEVA and replace listing with authorisation. Since listing is much narrower in scope than authorisation (it does not identify a responsible manufacturer or give immunity to the driver) it will be necessary to authorise these vehicles even though they had originally been listed.

103. There is too much uncertainty around the uptake, year of self-driving vehicle availability and number of organisations that will likely need to familiarise themselves with the legislation to robustly estimate familiarisation costs at this stage. Key manufacturers have already been engaged by DfT and the Law Commissions in the development of these policy recommendations. This will ensure that the familiarisation cost associated with the already published Law Commission final report and earlier consultations will be less significant as firms have likely already been aware of the proposed legislation.

104. We will make a fuller analysis as part of developing secondary legislation.

The benefits of firms familiarising themselves with new legislation:

105. The legislation would provide the legal clarity that industry is beginning to ask for on their responsibilities, which are not explicitly defined in the current statute. The proposed legislation will help address the insurance and liability issues that firms do not have clear regulations on. Familiarisation with the legislation will help firms investing in the self-driving vehicle sector to have a greater understanding and clarity of the regulations in the self-driving vehicle space, providing the legal information for firms to make better informed investment decisions.

Cost of the authorisation decision

106. Whilst the specific details (and therefore costs) of the authorisation decision-making process will be developed in secondary legislation we envision three key potential costs arising from the new framework:
    - The fees associated with making an application,
    - The cost of developing a safety case and supporting documentation for consideration by the regulator (which we have factored into overall process costs),
    - The cost of demonstrating sufficient financial standing, such as bringing together the relevant documentation and presenting this to government.

107. We would expect the first two costs to be comparable to those faced under the existing process of whole vehicle type-approval (WVTA). Manufacturers currently face costs of between £100 and 150,000 to obtain approval for a new type of passenger car[13]. These costs

[13] These broad figures are based on internal estimates obtained from Vehicle Certification Agency and could vary depending on an array of factors.

are charged on a cost-recovery basis by the Vehicle Certification Agency (VCA)[14] and includes all witnessed testing for every system approval, administration, and certification costs but no test equipment / facility costs. The cost of vehicle type approval varies significantly depending on whether the vehicle is relatively similar to previously approved models or whether it is a more novel vehicle that would need an array of thorough tests to become approved.

108. The closest comparison for the third cost is the financial standing requirements on Public Service Vehicle (PSV) operators, who must have a financial standing of £8,000 for the first license and £4,500 for every license following that[15]. Whilst this may provide a useful lower threshold for ASDE financial standing, we think it could be significantly more and the Commissions propose that standing tracks the number of vehicles authorised against an ASDE. Setting future financial standing requirements will need to follow best practice in developing financial standing requirements today and assess, from the costs on businesses to be implemented through secondary legislation, what a reasonable financial standing is depending on number of vehicles authorised.

109. The costs of compliance with the authorisation process will be assessed when secondary legislation is developed.

Benefits of the authorisation decision:

110. The authorisation decision will clearly delineate responsibilities for a self-driving vehicle. This will benefit future ASDEs, who can more accurately develop business models; enabling them to judge the burden of operating as an ASDE, and future users of self-driving vehicles, who will be clear on what their responsibilities are when a vehicle is driving itself. Clarity in these two areas will help catalyse a successful market that can commercialise this rapidly developing technology without risk of uncertainty and sudden, unexpected penalties.

111. Authorisation will also draw a clear dividing line between driver assistance and self-driving technology, avoiding confusing non-experts, and enable consumers to make more informed decisions when looking to purchase a new vehicle or purchase access to a service.

Cost of Licensing Operators of vehicles with Category 2 ADS features

112. Like authorisation, we expect the licensing decision to involve a process with associated costs. Currently, the closest comparator is the licensing of operators wishing to run Public Service Vehicles (PSV). The cost of obtaining a PSV license is £209[16].

113. We expect however that the cost may be higher for obtaining a NUiC operator license due to the level of sophistication of the technology, increasing the necessary weight of evidence that an applicant needs to submit to demonstrate competence to perform the role. Indeed, it may be closer to the costs associated with authorisation if the level of scrutiny is equal in detail. We will conduct a more in-depth analysis once we have developed secondary legislation.

[14] The cost-recovery fees are charged based on the rates that come from the Motor Vehicles (Type Approval and Approval Marks) (Fees) Regulations 1999. There are different fees charged for various services and certifications with the majority of the cost of type approval programs being the 'examination' fee at £89 per hour stated in Regulation 4(1) of the 1999 regulations (originally £82) amended by the 2006 regulation.

[15] 2022. Senior Traffic Commissioner. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1047743/Stat_Doc_2_Finance_-_Version_16.0.pdf

[16] 2014. Legislation.gov.uk. The Public Service Vehicles (Operators' Licences) (Fees) (Amendment) Regulations 2014 (legislation.gov.uk)

114. We expect that the necessary financial standing for a NUiC Operator may also be similar to that necessary for an ASDE but will only be able to properly assess this upon development of the secondary legislation that establishes figures for civil penalties.

Benefits of licensing Operators of Vehicles with Category 2 ADS features

115. Vehicles with Category 2 ADS features can drive themselves without a responsible person in the vehicle, which has the potential to considerably reduce costs associated with professional drivers for the transport of passengers, freight or vehicles themselves. However, these vehicles still require insurance, maintenance and repairs, and remote oversight to ensure vehicles are able to seek strategic direction when needed – which will all need to be performed by NUIC operators. By securing a licence with clear operating conditions, NUIC operators will have legal clarity on their role, responsibilities, and be able to demonstrate to their clients that they can safely operate vehicles for the provision of services to clients who will not have any responsibilities for the vehicles or how they drive.

116. Without the ability to license NUIC operators, operators of 'NUiC vehicles' (a self-driving vehicle with only a Category 2 feature) would face legal uncertainty about their responsibilities. They would also not be able to demonstrate that they can provide a safe service to users of the vehicles, without the need for users to take any responsibility for the vehicles or how they drive. Without this, users would require the relevant driver licence and would not be able to undertake other tasks such as using infotainment devices, limiting the benefits to users and to the NUIC as a service provider. To enable use of NUiC vehicles on UK roads, this legislation is essential to provide information for users, insurers, manufacturers, develops and lawyers too.

Cost of data collection, retention, and reporting

117. Without knowing the full extent of data, including quantity and formatting, that will be required under secondary legislation, it is difficult to propose a helpful benchmark. However, manufacturers are already subject to 'in-service monitoring' requirements under type-approval. This monitoring helps demonstrate that vehicles remain compliant on a 'dip-testing' basis. The annual cost for a manufacturer to meet these in-service requirements is around £65,000 to £75,000[17]. We therefore propose that meeting future data collection, retention and reporting requirements will cost at least as much. We know that some manufacturers already collect data for their own purposes, but the amount is unknown and may go significantly beyond what the new framework would ever require. The data they likely collect informs technology development, compared to collecting data simply for regulatory compliance. Therefore, we have chosen not to use their current costs as a comparator.

118. Until specific requirements are set via secondary legislation, moving beyond general principle, then it will not be possible to provide an accurate costing. We do not know of any other road vehicle regulatory regime that requires such robust data reporting and the cost of data collection performed by private industry is not publicly accessible.

Benefits of data collection, retention, and reporting

119. The collection and retention of data is essential for legal purposes to evaluate liability and responsibility of the driving task if an incident occurred.

120. Data is also essential to evaluate and assess the safety ad lawful behaviour of AVs. Data collection and reporting could improve the accuracy of reviewing self-driving vehicles risk or

[17] These broad figures are based on internal estimates obtained from Vehicle Certification Agency and could vary depending on an array of factors. The in-service monitoring costs are a combination of the time-based cost recovery fees charged by VCA, plus the cost of the independent facilities required to carry out the testing.

safety concerns which could enable motor insurers to be better informed of associated risks and potentially offer insurance at lower premiums to a wider range of customers. Data could be used to help mitigate the safety concerns by recording situations whereby self-driving vehicle safety risks were the highest. Data on the performance and safety risks of self-driving vehicles could be sold to developers or other software firms required to improve the technology further.

121. Collection and sharing of this data also ensures that vehicles can be effectively regulated by government.

Cost of Civil sanctions on the ASDE and NUiC Operator

122. Drivers are already subject to civil penalties for certain driving offences, particularly moving traffic offences. In their review, the Law Commissions were very clear that a traffic infraction (an offence committed by a self-driving vehicle that if committed by a driver would incur a penalty) should not be penalised in the same way that a driver would be penalised – a corporation has greater financial resource to call upon than individual drivers.

123. Nonetheless, the establishment of fines for traffic infractions will need to be developed for inclusion in secondary legislation. We propose that existing civil penalties provide a useful lower threshold for what penalties may be applied to the ASDE/operator. Currently, there is a distinction between London and the rest of the country for moving traffic offences. We propose adopting the current London penalty as the lower threshold owing to the greater financial resource of ASDEs/operators. In the event that a driver commits a moving traffic offence, such as stopping in a box junction, or driving in a bus lane, they are subject to a £130 fine[18]. A self-driving vehicle that commits this offence may have done so on reasonable grounds; swerving to avoid an injured person lying in the road, and so an automatic fine is unhelpful. We expect the regulator to exercise judgement as is exercised by the Courts today. A single instance of a self-driving vehicle driving in a bus lane, even if not reasonable, may only warrant a compliance order. These decisions must be made once secondary legislation is developed and we will conduct a fuller analysis at that time.

124. Where an ASDE/operator is guilty of breaching their authorisation or license, this could also incur civil penalties. However, comparison with moving traffic offences is less informative for judging the cost of these fines. Instead, we propose that civil penalties applied in this instance are more akin to fines issued under the General Product Safety Regulations (GPSR) 2005. GPSR allows for a maximum penalty of £20,000[19] at the discretion of the regulator for an offence under the Regulations. Whilst this is a criminal fine, we believe the same logic applies to a civil penalty on the ASDE.

Benefits of legislation on civil sanctions on the ASDE and NUiC Operator

125. Civil sanctions will enable government to take corrective action against ASDEs and operators who fall below expected standards and penalise them where their actions have incurred a cost. For example, the Commissions include redress orders as one available sanction. In the event a self-driving vehicle has committed a series of moving traffic offences, which has negatively impacted the local authority (the usual recipient of moving traffic offence fines), government may feel it is appropriate that the ASDE pays compensation to the local authority by means of a redress order.

[18] 2022. Law Commission. Automated-vehicles-joint-report-cvr-03-02-22.pdf

[19] 2022. Law Commission. Automated-vehicles-joint-report-cvr-03-02-22.pdf

Cost of criminal sanctions on the ASDE and NUiC Operator

126. The closest comparator to theses offence is that provided for in the Human Medicines Regulations 2012. However, no fine has yet been issued under these regulations making it difficult to determine the likely range of fines. This fine is distinct from the aggravated offence detailed below.

127. The aggravated offence also carries an unlimited fine. However, it is easier to model the potential fine imposed on an ASDE/operator for this offence due to the Corporate Manslaughter and Corporate Homicide Act 2007. This establishes guidelines for fines similar to those exacted by this new aggravated offence. We expect that ASDE turnovers will likely not be large, therefore the court is likely to consider a fine starting at £300,000 but may reduce this to £180,000 subject to evidence that the ASDE/operator tried to mitigate the outcome[20]. Ultimately, the court could decide to impose an unlimited fine.

128. Any costs incurred by a non-compliant business would not be counted as a cost to business under the Better Regulation Framework.

Benefits of criminal sanctions on the ASDE and NUiC Operator

129. ASDEs and operators must be penalised for immoral behaviour, which has been identified as misleading or non-disclosure of safety-relevant information. This is an important penalty regime that prevents businesses with much better knowledge of the technology from avoiding sanctions.

Cost of misleading marketing criminal offence on corporations

130. We compare this offence to that identified in the Gambling Act 2005. This legislation sets a lower limit of £300,000 for misleading marketing and we propose that a court should utilise the same lower threshold for this offence[21].
131. We have no evidence that any company would seek to mislead consumers, meaning the regulations will have no meaningful impact on any business looking to accurately market their products.

132. Any costs incurred by business due to non-compliance with the requirements here would not be considered for Business Impact Target purposes under the Better Regulation Framework.

Benefits of misleading marketing criminal offence on corporations

133. Providing legislation on the potential legal implications on corporations in the case of misleading marketing is essential as a way of reducing the possible burdens on judicial systems in the case of processing complicated legal cases without clearly defined legislation.

134. Clarity of the repercussions on self-driving vehicle manufacturers that partook in misleading marketing could help combat this issue and disincentivise firms from wanting to mislead customers. This is essential in combatting the risk that drivers are misled into believing their vehicle can drive itself by firms aiming to increase sales.

Cost of a permitting scheme for passenger-only AVs

[20] 2016. Sentencing Council. Health and Safety Offences, Corporate Manslaughter and Food Safety and Hygiene Offences, Definitive Guideline (sentencingcouncil.org.uk).
The starting fine and range is the sentencing guidelines for corporate manslaughter.
[21] 2017. CMS Law-Now. https://www.cms-lawnow.com/ealerts/2017/05/gambling-commission-issues-landmark-fine-to-bgo-for-misleading-advertising.

135. It is not yet possible to fully model the cost of applying for a passenger-only permit prior to secondary legislation, but we propose that the current fee for obtaining a PSV license is a useful comparator at £209[22] as a minimal benchmark. Obtaining a PSV license also involves demonstrating an ability to safely carry passengers. This will not change with vehicles receiving a passenger-only permit, especially as the new process will not require consideration of sophisticated technology (being assured earlier on in the regulatory process).

Benefits of a permitting scheme for passenger-only AVs

136. Businesses will struggle to deploy commercial passenger services using vehicles with no driver because existing licencing regimes focus on a driver. The new scheme offers an avenue to providing these services.

137. This new legislation is essential to enable passenger-carrying public services using AVs. The use of shared self-driving vehicles or self-driving vehicles as a service pose huge potential benefits, for example to grant wider access to transport for the 25%[23] of the adult population without a driving license and reducing vehicle ownership by encouraging shared vehicles. The new legislation is necessary to enable firms to charge for the provision of self-driving vehicles without a driver which is essential to attract businesses looking to invest in the UK and set up self-driving vehicle shared service operators with benefits to the UK population by improving access to transport.

138. Passenger-only permits could benefit business by encouraging commercial deployment of self-driving vehicles by providing legal clarity on the process for licensing self-driving vehicles to carry passengers.

Benefits of encouraging the self-driving vehicle market to develop through proposed legislation

139. The key benefit is to remove uncertainty for potential self-driving vehicle operators, allowing them to engage with this emerging market. Development of the self-driving vehicle market will also create wider economic and social value such as:
    - **Safety benefits**, with a reduction in human-related error incidents. SMMT (2019) estimate AVs* to save 3,900 lives and prevent 47,000 serious accidents between 2019 and 2030[24]. Furthermore, a recent simulation study found that, when half of the cars on motorways are self-driving vehicles, motorway traffic conflicts are reduced by 50% – 80% from the baseline[25].
    - **Productivity** and potentially reduced stress since occupants can perform tasks other than driving in the vehicle. Self-driving vehicle technologies could free people from the driving task, giving them time to engage in productive activity. SMMT (2019) estimate that self-driving vehicle* deployment can save every driving commuter nearly 42 hours in travel time, annually[26].
    - **Access to transport**, with services available in historically under-connected areas and designed from the outset with disabled and older people in mind. 25% of adults in

[22] 2022. Traffic Commissioner appeals. Public Service Vehicle Operator Licensing Guide for PSV Operators (theukrules.co.uk)

[23] 2021. Gov.UK. Driving licence holding and vehicle availability - GOV.UK (www.gov.uk)
* This study looks at ***connected*** and autonomous vehicles (CAVs) – in which the connected element of these new vehicles may have some responsibility in the impact calculated.

[24] 2019. Smmt.Co.Uk. SMMT-CONNECTED-REPORT-2019.pdf.

[25] Papadoulis, Quddus, Imprialou. 2019. "Evaluating the safety impact of connected and autonomous vehicles on motorways". ResearchGate. Doi:10/1016/j.aap.2018.12.019.

[26] 2019. Smmt.Co.Uk. SMMT-CONNECTED-REPORT-2019.pdf.

England didn't hold a full car driving license in 2019, self-driving vehicles could enable greater access to transport[27].

- **Better use of infrastructure,** car parks designed for self-driving cars could fit in up to 87% more spaces, freeing up valuable inner-city space for alternative uses[28].
- **Creation of high-quality jobs** based in the UK developing around burgeoning industry. UK jobs in the manufacture and assembly of Connect and Automated Vehicles are estimated to reach 49,000 in 2035[29].
- **Improved ability to attract international investment**, affecting trade. The UK automotive manufacturing industry invested £3.72 billion in research and development and invested £3.1 billion net capital in 2019[30].
- **Easier resource prioritisation for policing as traffic violations and collisions reduce**. SMMT (2019) estimate that the overall benefits accrued from *self-driving vehicles crash avoidance could be over £2 billion by 2030[31].

2.4 Option 3 – Reduced regulatory framework for self-driving

Summary

140. We have also considered a reduced framework for self-driving as an alternative option to Option 2. Under this option, we would progress with the framework as articulated under Option 2 except for the following sections:
    - The misleading marketing offence
    - The improved tampering offences
    - The permitting scheme for passenger-only self-driving vehicles

141. We have not assessed the tampering offences above as we do not believe they result in explicit costs or benefits other than generally regulating self-driving vehicles. However, removing the misleading marketing offence would give greater flexibility to businesses to market vehicles as self-driving without needing to progress through the authorisation process, which would incur costs on the business. Likewise, the lack of the passenger-only permit would prevent businesses being able to seek a separate permit for vehicles carrying passengers with no driver inside the vehicle beyond a standard taxi, PHV, or PSV license.

142. However, we discount this option as it risks creating a serious gap in a new regulatory scheme for self-driving vehicles. Without the misleading marketing offence, businesses would not be incentivised to seek authorisation; allowing them to defer any risk to their customers who could be unaware that their vehicle is not in fact self-driving and that they are required to pay attention at all times. At best, this is misrepresentative to the customer, who believes they are buying a self-driving vehicle, and at worst, puts the customer and other road users in danger as vehicles are inappropriately used.

* This study looks at ***connected*** and autonomous vehicles (CAVs) – in which the connected element of these new vehicles may have some responsibility in the impact calculated.

[27] 2021. Gov.UK. Driving licence holding and vehicle availability.

[28] Nourinejad, Bahrami, Roorba. 2018. "Designing parking facilities for autonomous vehicles". Sciencedirect.com. doi:10.1016/j.trb.2017.12.017.

[29] 2017. Catapult Transport Systems. Market Forecast – For Connected and Autonomous Vehicles.

[30] 2022. *Smmt.Co.Uk*. https://www.smmt.co.uk/wp-content/uploads/sites/2/SMMT-Motor-Industry-Facts-Nov-2020.pdf.

[31] 2019. Smmt.Co.Uk. SMMT-CONNECTED-REPORT-2019.pdf.

143. The lack of the new passenger permit would also present a barrier to commercial deployment. Though a corporation would be able to obtain a taxi, PHV, or PSV license for their vehicle in theory, it is unlikely that the relevant licensing authorities would feel able to issue a license as existing legislation expects the presence of a driver who plays an important role in ensuring proper safeguarding of passengers and an accessible service for disabled people.

144. We will be consulting on these elements on the regulation and undertaking cost benefit analysis on these as part of developing secondary legislation.

Costs and Benefits

145. The costs under Option 3 are the same as Option 2 but without those associated with the misleading marketing offence and the permitting scheme.

146. The benefits of Option 3 are the same as Option 2, but at a reduced scale as businesses will not be able to offer a commercial passenger service using a vehicle with no driver inside.

3.0 Risks and unintended consequences

147. These proposals follow recommendations made by the Law Commissions following extensive development and consultation over the last three years which give confidence the risk associated with the preferred option is low. Furthermore, the legal framework in primary legislation is designed to be flexible and technical requirements will be set in secondary legislation and guidance.

148. As the specific regulations are developed in secondary legislation we will protect against risks and unintended consequences by consulting and engaging with self-driving vehicle stakeholders.

4.0 Wider impacts

149. Widespread use of self-driving vehicles are likely to create significant wider impacts, but until we know how the technology will develop, and how businesses will choose to offer self-driving vehicles to the market, it is difficult to forecast if these will be positive or negative.

150. The impacts of self-driving vehicles on various sectors of the economy are more nuanced, although again are expected to be overall positive[32]. The table below gives a possible direction of change for a range of industries[33].

[32] Raposo, Maria, Monica Grosso, Jacques Després, and Enrique Macias. 2018. "An Analysis Of Possible Socio-Economic Effects Of A Cooperative, Connected And Automated Mobility (CCAM) In Europe". *EU Commission*. doi:DOI:10.2760/777.

[33] *The below summary is partially based on an EU based publication of the Socio-Economic effects of Cooperative, Connected and Automated Mobility which analyses likely impacts on key groups as well as other publications too.*

Impacted group	Possible influencing factors and direction of change
Automotive sector (vehicle manufacturing)	Manufacturers could benefit through **increased** sale of self-driving vehicles when legislation is clear and enables self-driving vehicles to be legally driven on UK roads, with the market estimated to be worth £41.7bn in 2035[34]. Conversely, depending on the business model self-driving vehicle developers choose to offer (e.g., shared mobility and 'robotaxis' rather than private vehicles) vehicle sales could **decrease.**
Electronics and software	Revenues from this sector are expected to **increase** due to the increased demand for sensors, controllers, actuators, self-driving software, maps, etc. that will be required for automated driving.
Telecommunication	The increased connectivity requirements and data exchanges in a self-driving vehicle will **increase** revenues in this sector.
Data services	New services linked to vehicle automation and connectivity will **increase** revenues from data services.
Digital media	Revenues linked to contents provision could **increase** with greater demand for digital media during commutes. Revenues linked to radio and music could **decrease** if there is a decreased demand for radio and music (preference for visual).
Freight and logistics	Revenues from road transport commercial operations could **increase** as operational hours would no longer be constrained by driver hours. Self-driving vehicles could help address the issue of haulier shortages and lower costs for logistics/transportation companies (even if wages could increase with a more technical role, e.g., monitoring the self-driving vehicle). Possible modal shifts towards road transport (e.g., from rail or sea) could appear as a consequence of the more efficient road operation.
Passenger transport	Taxi driver jobs could **decrease** with fully automated vehicles (with 227,000 Taxi and cab drivers & chauffeurs in the UK in 2019[35]). Possible modal shifts towards road transport (e.g., from rail or air) could appear as a consequence of the more efficient and comfortable road travel.
Insurance	Revenues from motor vehicle insurance policies could **decrease** if accidents decrease. The Bank of England's central forecast expects a contraction of the UK motor insurance market of 21% by 2040[36]. However other insurance products may experience an **increase** with areas such as cyber security, product liability for software and hardware expected to expand.
Maintenance and repair	Revenues from vehicle repair linked to crashes would **decrease** with improved road safety circumstances. Revenue for the maintenance and repair sector may **increase** if self-driving vehicles result in more VKT leading to more frequent repair/replacement of parts. Maintenance may be more complex and expensive thus increasing the current spend per car (estimated at £707.71 on average in the UK[37]).

[34] "Connected And Automated Vehicles: Market Forecast 2020". 2022. *GOV.UK*. https://www.gov.uk/government/publications/connected-and-automated-vehicles-market-forecast-2020.

[35] "Individuals Employed As Road Transport Drivers 2019 Statistic | Statista". 2022. Statista. https://www.statista.com/statistics/780276/individuals-employed-as-road-transport-drivers-in-uk/.

36 2022. Bankofengland.Co.Uk. https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2017/potential-impacts-of-autonomous-vehicles-on-the-uk-insurance-sector.pdf.

37 2022. Smmt.Co.Uk. https://www.smmt.co.uk/wp-content/uploads/sites/2/SMMT-Motor-Industry-Facts-Nov-2020.pdf.

Power	Future self-driving vehicles will likely be electric, leading to **increases** in electricity sales if self-driving vehicles drive higher uptake of EVs. The potential increase in VKT between 3% - 27%[38] could be expected because self-driving vehicles are more comfortable to drive therefore individuals may drive each car further distances without the issue of fatigue. In the scenario of high self-driving vehicle uptake, further kilometres driven per vehicle could increase the electricity (or petrol) demand. Higher demand for power and fuel as a result of self-driving vehicle uptake may somewhat be offset by more efficient driving of self-driving vehicles.
Traffic police	The size of police force needed for traffic surveillance could **decrease** if drunk driving, speeding, and other misbehaviours become less frequent.
Education	Shifts in education programs could be expected as a result of skills and occupations demanded for future mobility technologies and services.
Construction of roads and motorways	If self-driving vehicles lead to additional traffic demand, new roads might be required, leading to an **increase** in this sector revenues. Demand for new roads construction could instead **decrease** if self-driving vehicles lead to a better use of road space. Similarly, future Self-driving vehicles might allow for different parking space requirements, as well as for reduced infrastructure equipment such as signs, guardrails, rumble strips, etc.
Medical	Demand for medical services would **decrease** if self-driving vehicles lead to a smaller number of road accidents. This would benefit the UK National Health Service.
Legal	Revenues from liability claims could **decrease** if self-driving vehicles lead to fewer accidents, reducing as well as the demand for attorneys.
Land development	Revenues in this sector could **increase** with more efficient parking (i.e., knowing free spaces beforehand) but they could also **decrease** with less parking demand if the self-driving vehicle business model is based on sharing and robo-taxis as opposed to private ownership.
Local Authorities	Revenue from fixed penalty revenue from traffic violations could **decrease** as self-driving vehicles could be more obedient to regulations. Local Authorities could benefit from lower requirement for traffic wardens (cost associated for LA's paying their wages) which may mean they have **increased** revenue for spending on other areas. Self-driving vehicles could lower the need for on-street parking which may enable this space to be used for other activities e.g., shops, green space.

[38] Milakis, Dimitris, Bart van Arem, and Bert van Wee. 2017. "Policy And Society Related Implications Of Automated Driving: A Review Of Literature And Directions For Future Research". *Journal Of Intelligent Transportation Systems* 21 (4): 324-348. doi:10.1080/15472450.2017.1291351.

Small and Micro Business Assessments (SaMBA):

150. Small and Micro Businesses are classified as companies with 49 or fewer employees. This proposed legislation will apply to all businesses, regardless of size. It is enabling legislation to cater for the emerging self-driving vehicle market, and any business will be able to enter the market, provided they meet the conditions for vehicle certification and authorisation.

151. As the self-driving vehicle market is yet to develop, it is difficult to assess the impact across business types. Our best proxy is the existing motor vehicle sector which is summarised below.

152. Recent government statistics[39] show that the motor manufacturing sector has a Herfindahl-Hirschman Index (HHI) of 2000[40] suggesting the sector is fairly strongly dominated by a small number of large firms. There are currently high barriers to entry in the vehicle manufacturing sector due to the economies of scale firms benefit from when increasing vehicle production. Legislation would not significantly alter the barriers to entry which would disproportionately affect SMBs.

153. In the UK motor vehicles sector, the vast majority of businesses are Small and Micro-sized e.g., 89.8% of the motor vehicle manufacturing firms have 49 or fewer employees. However, a large proportion 74% of the employees working in the sales of motor vehicles are employed by firms with 50 or more workers[41]. As seen in Figure 1 below, the vast majority of the motor vehicle sub-sectors have a higher proportion of larger firms than the average across all industries in the UK.

Figure 1: Business Population Estimates for the UK and regions 2021[42], Table 7 shows the % of employers by firm size (micro, small, medium, and large):

	Micro (1-9)	Small (10-49)	Medium (50-249)	Large (250+)
291 Manufacture of motor vehicles	78%	12%	6%	4%
292 Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	63%	24%	12%	2%
293 Manufacture of parts and accessories for motor vehicles	57%	23%	14%	6%
451 Sale of motor vehicles	82%	13%	3%	1%
452 Maintenance and repair of motor vehicles	91%	9%	1%	0%
453 Sale of motor vehicle parts and accessories	80%	17 %	3%	1%
771 Renting and leasing of motor vehicles	79%	16%	3%	1%
All industries in the UK	82%	15%	3%	1%

[39] BEIS sectoral indicators of concentration and churn 2018, available online here (source: table 4 line "manufacture of motor vehicles").

[40] The HHI is a measure of market concentration, calculated by assessing the market shares of the largest firms. A HHI value of 2000 falls in the middle of the range considered "moderately concentrated" by the US Department of Justice. For more information on HHI, please see here.

[41] HMG 'Business population estimates', February 2021, available at: https://www.gov.uk/government/collections/business-population-estimates

[42] HMG 'Business population estimates', February 2021, available at: https://www.gov.uk/government/collections/business-population-estimates

154. We do not believe it would be appropriate to exempt small and micro businesses from this framework as this would create confusion (thereby undermining the policy objective), leading to inconsistent application of the law.

155. Throughout the development of this framework the Law Commissions have paid due consideration to the potential impact on small and micro businesses. All consultations have been open to a range of stakeholders to provide feedback and have led to some recommendations being amended. An example of this was that of the requirement to vouch for the safety of a vehicle. The Commissions have therefore proposed that the financial standing requirement to be an ASDE and NUiC Operator should relate to the number of vehicles authorised and/or licensed. Therefore, a business may only have one vehicle authorised and/or licensed and their expected financial standing would reflect this. The requirements set will be risk based, and we will explore if SMBs may use insurance and guarantees rather than financial reserves.

156. The proposed legislation provides broad powers to enable and stimulate the growth of the self-driving vehicle market, which will provide new potential benefits to all businesses, regardless of size, as it is designed to provide greater legal certainty. The specifics of how these powers are implemented, which will determine any disproportionate impacts or barriers felt by SMBs, will be defined through secondary legislation. Any future SaMBA assessments will focus on the fixed costs (i.e., familiarisation costs) and barriers to entry for SMBs e.g., standard rates for certification or legal fees and exemptions to any regulatory requirements will be formally considered as secondary legislation is developed and brought forward.

Equalities Impact Assessment

151. Under the Public Sector Equality Duty, the government must have due regard to eliminating discrimination and advancing equality of opportunity when creating new policies.

152. There are two key types of impact self-driving vehicles could have on people with protected characteristics:
    - Unfair discriminatory behaviour by the vehicle as part of its decision-making. Self-driving vehicles are machines that lack moral autonomy, including a sense of right or wrong. If they are improperly programmed, they could unfairly discriminate against certain groups, which is part of a wider concern for safety.
    - Services that utilise self-driving vehicles, where the driver has been removed, may be more discriminatory than the same service with a human driver. These largely relate to issues of accessing the service but also making use of the service. It is important that, in removing the driver, the services become no less accessible or inclusive.

153. We discuss these impacts in more detail below.

154. There is a risk that self-driving vehicle technologies could be trained using or rely in service on biased data. Such technologies could unfairly discriminate against certain groups in their decision-making. The proposed accessibility subcommittee of the Committee for Automated Vehicle Ethics and Safety (CAVES) will advise both government and industry on how to avoid discrimination in relation to self-driving vehicles.

155. As part of the self-driving vehicle authorisation process, manufacturers will be required to submit assessments against data bias. These must include how they avoid their vehicles

unfairly discriminating against any particular societal groups, including vulnerable road users. They will also be required to show they have considered the importance of accessibility for those with a variety of disabilities.

156. There is the risk that transition demands – alerts issued by the automated driving system (ADS) to take over the driving task when the vehicle exits its operational context – are designed in a way that unfairly discriminates against deaf/Deaf people. For a self-driving vehicle to be authorised, the transition demand will be required to be non-discriminatory e.g., it must multi-sensory and involve vibrations in addition to audio/visual alerts so that it can be perceived by a hearing-impaired person who is not looking at the dashboard. This will eliminate unfair discrimination between groups with different types of disability.

157. Self-driving vehicles risk harming people at a statistical level, even is everything has been done to make individual self-driving vehicles not unfairly discriminate. It is proposed that the In-Use Regulator will be required to collect fairness data as part of its overall responsibility to compare the safety of automated driving against human driving. This data will enable the regulator to monitor the impact on accessibility and can be used in future to address emerging trends in relation to self-driving vehicles and accessibility.

158. There is also a risk that access to self-driving transport services may be worse for disabled people. The Law Commissions have recommended establishing an Accessibility Advisory Panel, which would be required to give consent before issuing a permit for passenger-only AVs. The Panel will advise on trials and best practice and advise the Secretary of State on developing a set of National Minimum Standards on Accessibility which would apply to all future self-driving vehicle passenger services. The Panel will include representation from older and disabled people, industry and the Equality and Human Rights Commission and will foster greater understanding and positive relationships between self-driving vehicle developers and disabled groups.

Justice Impact Test

159. We have submitted a formal Justice Impact Test.

160. There were 1.38m people prosecuted at UK Magistrates Courts in 2017 related to driving convictions[1]. As self-driving vehicles become available and are used on GB roads, they are expected to make roads safer with 88%[2] of all recorded road accidents involving human driver error[3] as a contributory factor. The Society of Motoring Manufacturers & Traders (SMMT) estimate automated vehicles* could save 3,900 lives and prevent 47,000 serious accidents between 2019 and 2030[43]. With self-driving vehicles projected to improve road safety and reduce the number of road incidents, they have the potential to lower the cost and burden on the GB justice system.

161. It is likely that self-driving vehicles will change the type of cases or offences that occur on roads with some type of road offences falling and other types increases or emerging as new offences. For example, the 85,000 people convicted of drink driving in England and Wales annually will likely fall in the scenario where a high proportion of the UK fleet are self-driving vehicles that do not require a human driver. There may be new types of cases such as Authorised Self-Driving Entities' (ASDE), the developer of the self-driving vehicle, failing to provide information to regulators.

[43] 2022. *Smmt.Co.Uk*. https://www.smmt.co.uk/wp-content/uploads/sites/2/SMMT-Motor-Industry-Facts-Nov-2020.pdf

162. Revenue from liability claims could decrease if self-driving vehicles lead to fewer accidents, reducing demand for attorneys according to an EU based publication in 2018[4]. The impact on the justice system from the legislation to fully safety assure self-driving vehicles on GB roads is uncertain and will depend on multiple factors including the level of autonomy of self-driving vehicles available in GB, the self-driving vehicle deployment in the GB fleet and the ability for individuals to tamper with the ADS technology.

Health Impact Assessment

163. The creation of a self-driving vehicle sector which improves access to transport may enable greater access to healthcare services for those currently without a driving licence.

164. If legislation encourages the development of the self-driving vehicle sector, there could be potential health benefits from lower air and noise pollution which could reduce the cardiovascular defects associated with long-term exposure to road traffic[44].

Human Rights Impact

165. We expect that the authorisation decision will pay close attention to the risk of discrimination and the lawful processing of data by self-driving vehicles, ensuring that human rights are protected.

Rural Proofing

166. This test is not applicable to this framework.

Sustainable Development

167. This test is not applicable to this framework.

Competition Assessment

168. This Bill will not impact on or restrict competition. It is enabling legislation to cater for an emerging new market, and any business will be able to enter the market, provided they meet the conditions for authorisation.

Greenhouse Gases Impact Test/Wider Environmental Impact

169. There are many ways in which self-driving vehicles could increase or decrease greenhouse gases, the magnitude and likelihood of each factor is somewhat uncertain and dependent on other variables. Self-driving vehicle technology could facilitate either dramatic decarbonization of transportation or equally increases in the transportation sector emissions.

170. The initial estimations on greenhouse gas emission reduction for self-driving vehicles can be expected from a minimal impact to 80% reduction by 2050 for light-duty vehicles[45]. Examples of how self-driving vehicles could lower road emissions are by enabling smarter low traffic routes, ride sharing and discouraging people from owning private vehicles by instead using

[44] Farooqi, Zia, Muhammad Sabir, Nukshab Zeeshan, Ghulam Murtaza, Muhammad Mahroz Hussain, and Usman Ghani. 2020. "Vehicular Noise Pollution: Its Environmental Implications and Strategic Control". IntechOpen. Doi:DOI:10.5772/intechopen.85707.

[45] Obaid, Mohammed, Arpad Torok, and Jairo Ortega. 2021. "A Comprehensive Emissions Model Combining Autonomous Vehicles with Park and Ride and Electric Vehicle Transportation Policies" Sustainability 13, no. 9: 4653. https://doi.org/10.3390/su13094653

self-driving vehicles as a service. Examples of how self-driving vehicles could increase emissions are through induced demand for vehicles through serving a wider population, enabling more comfortable travel and increase empty miles travelled as self-driving vehicles drive to their next destination.

5.0 Post implementation review

Rationale for PIR approach:

Rationale for not conducting a PIR:

At this stage it would not be appropriate to attach SMART objectives to the provisions given the level of uncertainty in the specific detail to be developed under secondary legislation, which will be subject to public consultation and parliament scrutiny. Developing appropriate monitoring and evaluation plans at secondary legislation stage will be essential given the nascent nature of the technology and wider uncertainty on how these markets and business models will develop.

We will engage regularly with stakeholders to help develop the secondary legislation and ensure the future framework works for the developing self-driving vehicle industry. Engagement with stakeholders so far has included:

- A roundtable with respondents to the Commissions' review to explain the final recommendations to them,
- Meetings of the Automated Vehicle Driver Responsibility in the Vehicle Education (AV-DRiVE) group,
- Presentations to industry outreach events, like the DVLA's First Registration User Group (FRUG).
- Meetings and presentations to specific stakeholder groups, such as vehicle manufacturers and insurers.

1. **Review status:** Please classify with an 'x' and provide any explanations below.

	Sunset clause		Other review clause		Political commitment		Other reason		No plan to review

framework to come into force, it will require secondary legislation which will require to PIRs.

2. **Expected review date** (month and year, xx/xx):

		/			10 years from when the Regulations come into force

3. Rationale for PIR approach:

Circle the level of evidence and resourcing that will be adopted for this PIR (see Guidance for Conducting PIRs):

Describe the rationale for the evidence that will be sought and the level of resources that will be used to collect it.

- **Will the level of evidence and resourcing be low, medium, or high? (See Guidance for Conducting PIRs)**

The level of evidence and resource applied in the Post Implementation Review of this primary legislation will be low. This is due to the fact that the direct cost to business is likely to be minimal, as this legislation is permissive and does not impose direct cost to businesses to comply with new legislation. Additionally, a more accurate assessment of the impact of legislation on the self-driving vehicle sector will be assessed in the secondary legislation. The secondary legislation PIR will entail a detailed evaluation of the impact of each specific piece of legislation to provide more thorough analysis in collecting evidence.

- **What forms of monitoring data will be collected?**

It will be extremely challenging to monitor the direct impact of this primary legislation however the policy objective to enable and safe and successful development of the self-driving vehicle sector will be analysed using some basic metrics. Variables to monitor impacts could be:

- Number of self-driving vehicle approvals.
- Number of self-driving vehicles authorised/sold.
- Insurance claims from self-driving vehicles compared to non- self-driving vehicles.
- Safety standards of self-driving vehicles compared to non- self-driving vehicles: comparing the number and type of crashes that are occurring with self-driving vehicles on UK roads compared to non- self-driving vehicles.
- Number of licensed NUIC operators and size of NUIC fleets. Market share for public and freight transport.

These metrics could be useful to show context and quantification of how the self-driving vehicle market has developed as a result of this legislation (but this may not show direct impact of the primary legislation).

- **What evaluation approaches will be used? (e.g., impact, process, economic)**

Regular engagement with stakeholders will take place to help develop the secondary legislation and ensure the future framework works for the developing self-driving vehicle industry. Engagement has included/will include:

- A roundtable with respondents to the Commissions' review to explain the final recommendations to them,
- Meetings of the Automated Vehicle Driver Responsibility in the Vehicle Education (AV-DRiVE) group,

Presentations to industry outreach events, like the DVLA's First Registration User Group (FRUG).

Economic, safety and environmental metrics could be measured including the number of self-driving vehicles sold, the amount investment into self-driving vehicle development in the UK and the emissions per self-driving vehicle compared to a non-self-driving vehicle. These metrics would not necessarily show the direct impact of this primary legislation however could be used to monitor the secondary impacts of this legislation. Direct evaluation of the specific secondary legislative measures that are enabled by this primary legislation will be analysed in additional PIRs.

- **How will stakeholder views be collected? (e.g., feedback mechanisms, consultations, research)**

The Centre for Connected and Autonomous Vehicles will maintain strong connection with industry and key stakeholders to monitor the impact of this legislation and has the option to undertake feedback workshops, run surveys to targeted audiences and run public consultations to evaluate the impact of these measures.

Key Objectives, Research Questions and Evidence collection plans			
Key objectives of the regulation(s)	**Key research questions to measure success of objective**	**Existing evidence/data**	**Any plans to collect primary data to answer questions?**
• Ensure the safe use and responsible deployment of self-driving vehicles and minimise their risk to the public; • Provide a clear allocation of responsibility to parties developing and using self-driving vehicles; • Enable the benefits from driving automation, through expected improvements in road safety, mobility and productivity; • Remove regulatory barriers to enable the commercial deployment of AVs.	Are self-driving vehicles being deployed safely on UK roads? Is legislation enabling the deployment of self-driving vehicles on UK roads? Has legislation helped the UK to become a world leader in the self-driving vehicle sector? Are driver responsibilities and liabilities clearly communicated to stakeholders in the self-driving vehicle development? Are users of self-driving vehicles using them correctly/safely? Are self-driving vehicles contributing to improved mobility and productivity? Are they improving transport accessibility?	Investment into the UK self-driving vehicle sector from both firms and grants provided by Government (this is already monitored/ available data). Authorisation and vehicle approval data. Road safety data is collected. Collaboration with DfT statistics teams could be undertaken to ensure that self-driving vehicle safety statistics could be monitored.	Plans to collect primary data could be conducted through surveys, public consultation, workshops with industry or via existing data collection series e.g., vehicle registrations/ authorisations. Surveys and workshops could be undertaken to ascertain whether driver responsibilities have been clearly communicated and understood by self-driving vehicle developers, road users and other stakeholders. IUR data (In Use Regulator). Data on authorisations and NUIC operator licensing. Are there any metrics on mobility or accessibility of transport?

• Articulate clear laws governing self-driving vehicle use, which will support the uptake of the technology by the public and investment in the UK self-driving vehicle sector; and • Position the UK as a global thought-leader on the regulation of self-driving vehicles, shaping discussions at international fora.			

Annex A – Summarisation of costs:

Theme	Sub-theme	Approximate cost comparator	Applies to
Authorisation	Process fees	C. £100-150,000, which is the current cost of applying for type-approval, the process for which will closely resemble authorisation[46].	ASDE
	ASDE financial standing	Lower threshold of £8,000 per vehicle[47].	
Category 2 licensing	Process fees	Upwards from £209[48], which is the current cost of applying for a PSV license from the traffic commissioners, which could closely resemble the licensing process	NUiC Operator

[46] These broad figures are based on internal estimates obtained from Vehicle Certification Agency and could vary depending on an array of factors.
The cost-recovery fees are charged based on the rates that come from the Motor Vehicles (Type Approval and Approval Marks) (Fees) Regulations 1999. There are different fees charged for various services and certifications with the majority of the cost of type approval programs being the 'examination' fee at £89 per hour stated in Regulation 4(1) of the 1999 regulations (originally £82) amended by the 2006 regulation.

[47] 2014. Legislation.gov.uk. The Public Service Vehicles (Operators' Licences) (Fees) (Amendment) Regulations 2014 (legislation.gov.uk)

[48] 2014. Legislation.gov.uk. The Public Service Vehicles (Operators' Licences) (Fees) (Amendment) Regulations 2014 (legislation.gov.uk)

		though is likely to be costlier due to the sophisticated nature of technology under scrutiny.	
	NUiC Operator financial standing	Lower threshold of £8000 per vehicle[49].	
Data collection, retention, and reporting	Collection, retention, and reporting	c. £65-75,000 in line with existing in-service monitoring requirements under type-approval[50].	ASDE/NUiC Operator
Criminal sanctions on the ASDE & NUiC Operator	Aggravated offence by the ASDE/ operator as a corporation (fine)	£300,000 > unlimited, based on a similar offence in the Corporate Manslaughter and Corporate Homicide Act 2007[51]	
	Failure to meet Duty of Candour offence	The fine could be unlimited. The closest comparator is the Human Medicines Regulations 2012, but no fines have yet been issued.	
Civil sanctions on the ASDE & NUiC Operator	Fines on the ASDE for traffic infractions	Bus lane contravention and moving traffic offences £130[52].	
	Civil sanctions on the ASDE for breach of authorisation or NUiC Operator for breach of license	Up to £20,000 as is the maximum penalty under GPSR 2005[53].	
Fines on corporations other than ASDE/NUiC Operator	Misleading marketing criminal fine	£300,000 > unlimited, based on a similar offence in the Gambling Act[54]	Individual corporation

[49] 2020. Traffic Commissioners for Great Britain (Gov.UK). 2020 financial levels confirmed for commercial vehicle operators - GOV.UK (www.gov.uk)

[50] These broad figures are based on internal estimates obtained from Vehicle Certification Agency and could vary depending on an array of factors. The in-service monitoring costs are a combination of the time-based cost recovery fees charged by VCA, plus the cost of the independent facilities required to carry out the testing.

[51] 2016. Sentencing Council. Health and Safety Offences, Corporate Manslaughter and Food Safety and Hygiene Offences, Definitive Guideline (sentencingcouncil.org.uk).
The starting fine and range is the sentencing guidelines for corporate manslaughter.

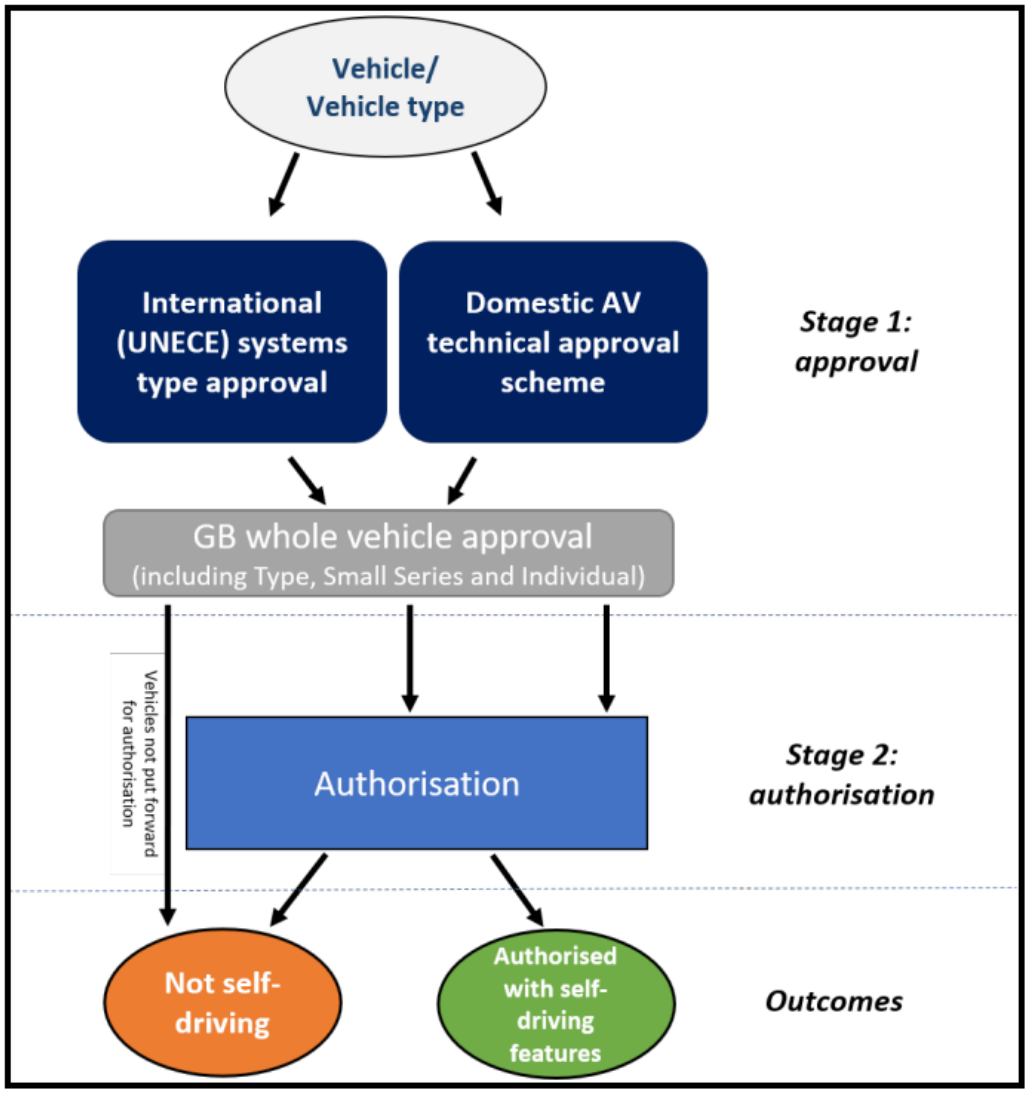
[52] 2019. Be Wiser Insurance. https://www.bewiser.co.uk/news/car-insurance/more-14m-penalties-issued-london-councils-moving-traffic-offences.

[53] 2022. Law Commission. Automated-vehicles-joint-report-cvr-03-02-22.pdf

[54] 2017. CMS Law-Now. https://www.cms-lawnow.com/ealerts/2017/05/gambling-commission-issues-landmark-fine-to-bgo-for-misleading-advertising.

Passenger-only permit	Application	c. £209[55], which is the current cost of applying for a PSV license from the traffic commissioners, which could closely resemble the application process for obtaining a permit.	Permit applicant (likely the NUiC Operator)

Annex B: The proposed two-stage process of approval and authorisation is set out in the following figure produced by the Law Commission[56]:



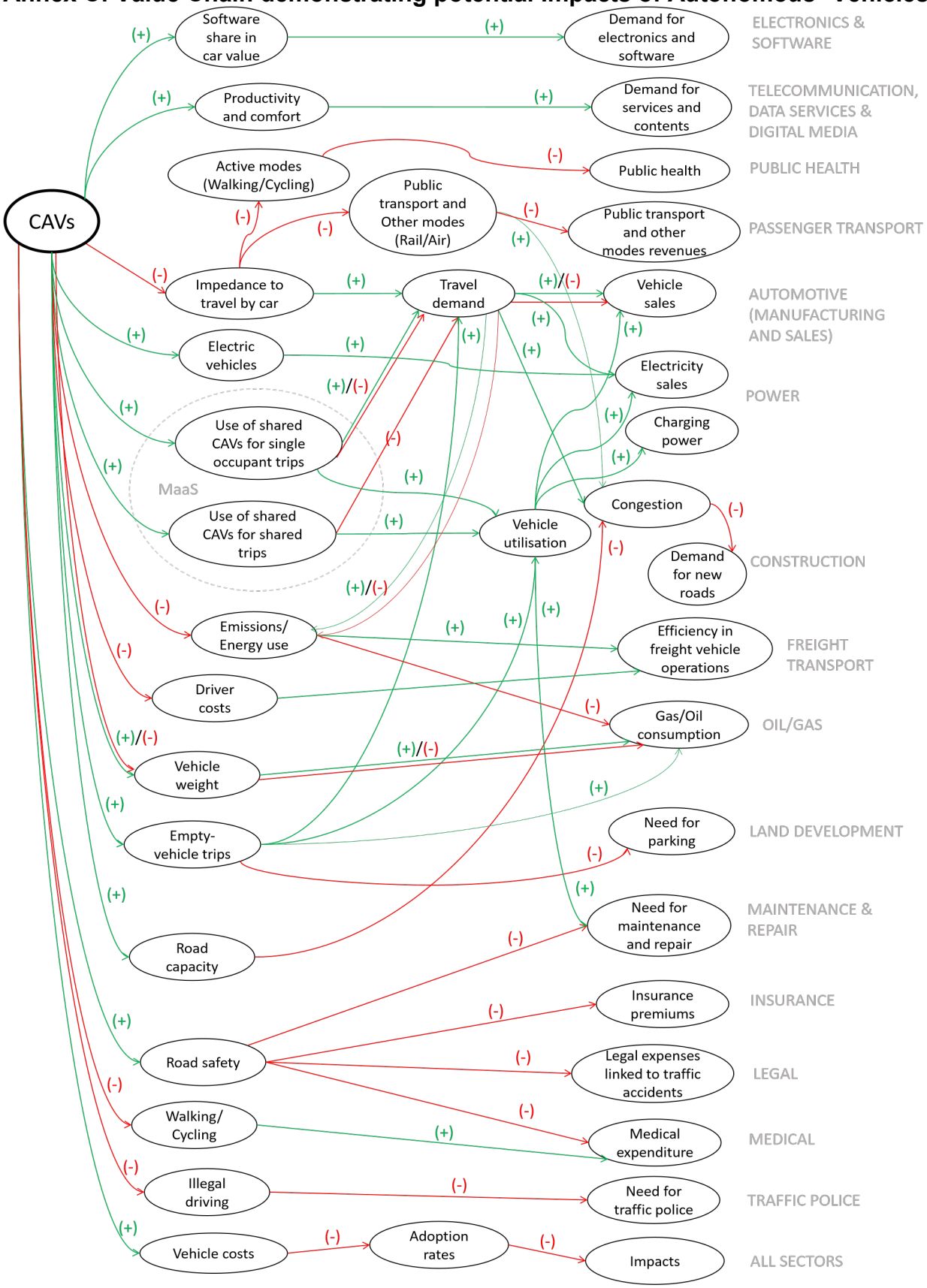
The two-stage process. Vehicles or vehicle types must first go through the approval stage - which may be at international or domestic level. The vehicle or vehicle type will then need to obtain GB whole vehicle approval via the GB Type, small series, or individual vehicle approval schemes. To be authorised with self-driving features the vehicle/ vehicle type would then need to undergo the second

[55] 2014. Legislation.gov.uk. The Public Service Vehicles (Operators' Licences) (Fees) (Amendment) Regulations 2014 (legislation.gov.uk)

[56] "Automated Vehicles: Summary of joint report". 2022. *Law Commission*. https://s3-eu-west-2.amazonaws.com/lawcom-prod-storage-11jsxou24uy7q/uploads/2022/01/AV-Summary-25-01-22.pdf

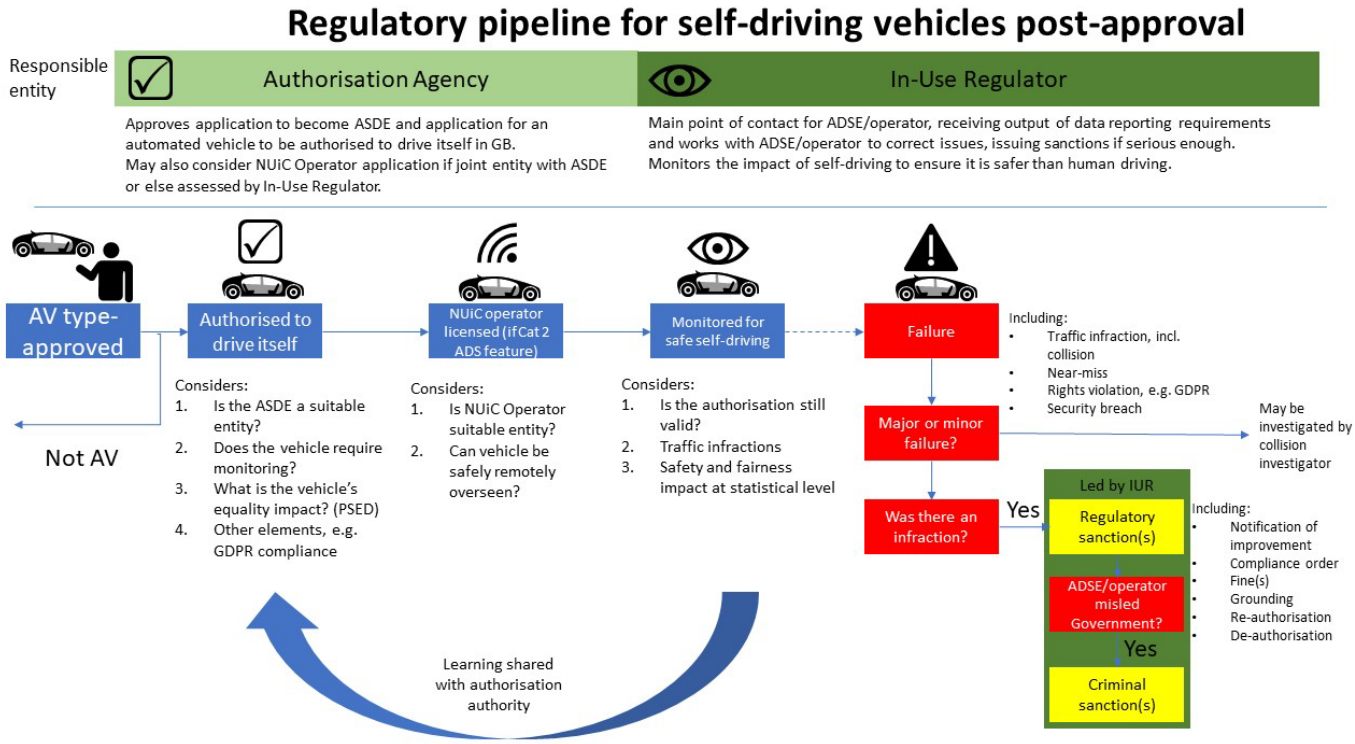
authorisation stage.

Annex C: Value Chain demonstrating potential Impacts of Autonomous* Vehicles[57]



*This study looks at ***connected*** and autonomous vehicles (CAVs) – in which the connected element of these new vehicles may have some responsibility in the impact demonstrated in the diagram.

ANNEX D – Proposed regulatory pipeline for self-driving vehicles post-approval



[57] Raposo, Maria, Monica Grosso, Jacques Després, and Enrique Macias. 2018. "An Analysis Of Possible Socio-Economic Effects Of A Cooperative, Connected And Automated Mobility (CCAM) In Europe". *EU Commission*. doi:DOI:10.2760/777.