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Self-Driving
Vehicles

The economic, environmental, and safety benefits of self-driving vehicles



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Foreword



The All-Party Parliamentary Group (APPG) for Self-Driving Vehicles was launched in April 2023, having grown out of the previous APPG for Connected and Automated Mobility. There’s never been a more important time to be championing this exciting and growing UK industry. I’ve heard from businesses at the forefront of this new technology about the huge potential for autonomous vehicles to transform the UK. I want to thank them, and in particular the sponsors of the APPG - AXA, Burges Salmon, Wayve, and WSP - for their help in promoting this exciting new sector.

In my home town of Milton Keynes, self-driving vehicles have become commonplace in the streets, with Starship trialling robots that deliver goods to residents. Indeed this summer, Milton Keynes Museum even exhibited one of the earlier self-driving pods, trialled in Milton Keynes years ago. Excitingly, we’re continuing to build on the constituency’s appetite for

self-driving, as the government has recently provided £2m funding for Milton Keynes to deliver a new state-of-the-art self-driving shuttle service into the city.

This is why the APPG for Self-Driving Vehicles launched a consultation on the economic, environmental, and safety benefits of self-driving vehicles. Through the consultation, we collected evidence from academics, insurance experts, and legal voices working in the sector, and the subsequent findings have been used to inform this policy paper. We hope that the paper and its recommendations provide a useful source of information about this growing sector, and illustrate the importance of the Government introducing legislation in the King’s Speech later this year to make the commercial rollout of self-driving vehicles a reality.

What the consultation has highlighted in particular for me is that self-driving vehicles represent a huge investment opportunity for the UK. If the Government introduces self-driving vehicle legislation, investor confidence in British businesses would be strengthened and the UK will remain competitive against other countries that are moving ahead with this agenda at pace. Beyond the benefits to our economy, self-driving vehicles could also make our roads safer, reconnect people and communities who find it hard to travel currently, and help us to reach Net Zero.

As the Prime Minister said earlier this year, the UK has true potential to be a force for good in the development of future technologies that will change the world - and that starts with smart regulation. Self-driving is an example of a sector where the UK has shown huge technical leadership, and our cutting-edge research will help make sure that this is a technology that can really benefit everyone. Now is the time to make sure we can compete on the world stage with our peers in the age of frontier technologies.



Ben Everitt MP
Chair of the APPG for Self-Driving Vehicles

About the Self-Driving APPG

The APPG provides a forum for parliamentarians, industry, and academics to promote the economic, environmental, and safety benefits of self-driving vehicles for a variety of use cases across all parts of the UK. In collaboration with sponsors AXA, Burges Salmon, Wayve and WSP, it acts as the voice of the self-driving vehicle (SDV) sector in Parliament.

Please direct any enquiries to self-drivingappg@hanburystrategy.com.

Scope of the consultation

The consultation included two evidence workshops with contributors from across industry, parliament, and other relevant organisations, as well as a call for evidence. It sought to gather evidence from a wide range of sources in order to raise awareness of self-driving, highlight the barriers to commercial deployment in the UK, and identify what actions can be taken to address these.

This paper presents the findings of that consultation and examines the issues that were discussed by contributors in greater detail. It aims to provide Government, industry, and stakeholders with useful recommendations on how the UK can deliver the rollout of self-driving vehicles to the benefit of all.

Executive summary

The UK has an opportunity to harness the revolutionary capabilities of AI and create a new world-leading sector by implementing the legislative proposals for a new self-driving vehicle regulatory regime made by the Law Commission in 2022.

In August 2022, the UK Government outlined its vision for self-driving vehicles (SDVs) and committed to initiating deployments by 2025, accompanied by a comprehensive regulatory framework to ignite a transportation revolution. The Self-Driving Vehicles APPG supports this vision but believes that subsequent Government announcements and funding, including £18.5 million for the connected and automated mobility supply chain and advanced trialling plans, are insufficient. The next crucial step is to establish legislation that will provide a strategic roadmap to accelerate the rollout of SDVs. The consultation found that the benefits of the adoption of SDVs on UK roads were numerous.

There is a unique opportunity for the UK to lead an industry that could be worth £750 billion globally by 2035. The UK is already home to several innovative SDV companies that are trialling their vehicles on UK roads, and the Government's analysis of the sector showed that it could potentially generate £42 billion and 35,000 jobs for the UK economy by 2035. A recent study by the Society of Motor Manufacturers and Traders (SMMT) suggested the connected and automated mobility (CAM) sector as a whole could be worth £66 billion by 2040.

The Government's vision for the sector is bold, but so far it has failed to follow up with the necessary pace of action to make it a reality. This is not a sector that needs significant additional public funding to get to market deployment. Instead, the barriers for self-driving developers in the UK are regulatory, failing to keep pace with technological innovation. As the UK seeks to be a global leader in AI safety policy and monitoring, the SDV sector is a vital early case study of sector-specific regulation that stands to help grow a multi-billion pound industry.

The UK risks falling behind other countries and sectors and losing this potential crown jewel sector by moving too slowly to implement the legislative proposals made by the Law Commission in 2022. It also needs to take action within months to enable advanced trials of SDVs on UK roads.

SDVs have an important role to play in the transition to Net Zero and can help eliminate some of the most emissions-intensive driving-related behaviours. The Climate Change Committee found that surface transport is responsible for 22% of the UK's greenhouse gas emissions, the largest individual sectoral contribution.

As the Government noted in its 2022 strategy, there are a number of important contributions that SDVs stand to make in decarbonising surface transport. These include optimising vehicle speed in response to traffic conditions ('eco driving'), which can potentially reduce sectoral emissions by 7-16%, and maximising of ride-hailing service sizes, which may reduce emissions by 30-35%.

This can be harnessed with increased research and development focus on AI technology to help optimise on-road behaviour, as well as facilitating dialogue between different modes of transport including rail, maritime and aviation about the potential environmental benefits SDV might have in those sectors.

The four leading causes of transport accidents are: driver error; reckless behaviour; disobeying traffic laws; and driver impairment. SDVs promise to be at least as safe as human drivers, if not better, reducing the number of preventable tragedies on UK roads. The Transport Select Committee's recent report also noted this, with several witnesses emphasising the potential safety advantages offered by self-driving vehicles and highlighting the Government's safety goals for this technology. Additionally, contributors highlighted research from the insurance industry that SDVs could save the NHS £2.3 billion annually in medical and ambulance costs by eliminating the 85% of accidents where human error is a contributory factor.

All contributors agreed that the insurance industry's role in the rollout of SDVs was vital. They noted that many insurers have been involved from the early stages of commercial development of SDVs in the UK, working with developers to provide bespoke liability insurance for SDV testing, and with policymakers to develop the regulatory framework. They also agreed that further clarity on the safety controls and competency requirements was needed, and urged the Government to ensure these are proportionate to enable continued innovation in the sector.

Finally, the consultation examined the Department for Transport's recent survey to gauge public attitudes toward SDVs. This revealed that participants expressed a strongly positive view of SDVs, especially when used as shared transportation, and that they recognised the benefits, including safety improvements. However, the survey did acknowledge that most respondents envisioned widespread adoption of SDVs by 2042, which is later than anticipated.

There was an agreement from contributors that the Government has a crucial role to play in increasing the public perception of SDVs and public awareness of the technology. Contributors pointed out that the Government has two roles to play in regard to improving public perception: first, making sure that there are more SDV trials, and second, demonstrating continued and strong public support for the industry.

Summary of Recommendations

Recommendation 1: The Government should introduce legislation to legalise the commercial deployment of SDVs in the UK in this year's King's Speech. This is vital to ensuring the UK does not get left behind by other countries in this rapidly evolving sector.

Recommendation 2: The Government should introduce a regime for advanced driverless trials of SDVs, considering what alternative legislative pathways exist to enable this within the next few months.

Recommendation 3: The Government should demonstrate UK leadership in AI by retaining a sector-specific approach to regulation. It should also consider the skills regulators required by regulators to undertake their duties in relation to AI regulation in their respective sectors.

Recommendation 4: The Government should allocate more research and development funding to examine the potential benefits of communication and smart technology to optimise SDV road use to reduce emissions and increase safety.

Recommendation 5: The Government should encourage cross-sector dialogue to ensure that the potential benefits of SDV technology are understood and harnessed by other modes of transport including the rail, maritime, and aviation sectors.

Recommendation 6: The Government should ensure legislation for SDVs provides clarity for insurers and developers to create robust safety protocols and liability frameworks that encourage a culture of safety across the industry.

Recommendation 7: The Government should clarify the safety controls that developers need to have in place for deployment, and ensure these are balanced, proportionate, and comparable to the safety control in place on today's road network. It should also provide more detail on the carefulness and competency standard, including how it will guide licensing criteria.

Recommendation 8: The Government should work with industry to champion the self-driving sector and boost public awareness about the benefits of SDV technology. As part of this public awareness programme, the Government needs to develop a public-private partnership to develop communications guidance on SDVs. This will help to demystify the technology and prevent confusion amongst the general public.

Introduction

In August 2022, the Government presented its vision for self-driving vehicles (SDVs), pledging to introduce initial deployments in the UK by 2025 alongside a comprehensive regulatory framework with the goal of ‘sparking a transport revolution’.¹

However, despite subsequent Government announcements, including the Centre for Connected and Automated Vehicles (CCAV) announcing £18.5m of funding to strengthen the capabilities of the connected and automated mobility supply chain, the UK has yet to grasp the full opportunity presented by the sector’s growth.

We now need to put legislation in place to enable the commercial deployment of SDVs in the UK.

Without legislation, the UK will fall behind global competitors in this high-growth sector. Advanced manufacturing and digital technology were both flagged by Chancellor Jeremy Hunt as two of his five key growth areas in his vision for long-term prosperity in the UK - SDVs fall within both of these areas. Failure to legislate would mean losing out on potential investment for homegrown automated vehicle manufacturers and technology developers.

“Failure to legislate would mean losing out on potential investment for homegrown automated vehicle manufacturers and technology developers”

This would also run counter to the UK’s efforts to become a world-leading voice in AI, with the UK AI Safety Summit due to take place in early November. In order to stay at the forefront of technological innovation the UK must seize the opportunity of SDVs as an ideal use case of AI.

The need to legislate also has support among policymakers beyond the APPG, with the House of Commons Transport Select Committee recently publishing its report on self-driving vehicles which also calls on the Government to take decisive action on legislation.

With this in mind, in June 2023, this consultation was launched to understand and demonstrate the economic, environmental, and safety benefits of self-driving vehicles and the independent, cross-sector, and cross-party consensus behind accelerating legislative change.

¹ [Connected & Automated Mobility 2025: Realising the benefits of self-driving vehicles in the UK, 2022](#)

² [House of Commons Transport Committee: Self-driving vehicles Seventh Report of Session 2022–23, September 5 2023](#)

Economic impact

The UK has a unique opportunity for leadership in an industry that could be worth £750 billion globally by 2035.³ The UK is already home to several innovative SDV companies that are trialling their vehicles on UK roads, and the Government’s analysis of the sector showed that it could potentially generate £42 billion and 38,000 jobs for the UK economy by 2035. Research by the SMMT suggest the CAM sector as a whole could be worth £66 billion by 2040.⁴ But the UK risks falling behind other countries and losing this potential crown jewel sector by moving too slowly to implement the legislative proposals made by the Law Commission in 2022.

The industry here in the UK is already growing at a considerable pace. A sign of this is the scale of joint industry-government funding to date, with more than 90 projects being funded with more than £400m.⁵ However this is just a fraction of the private capital already being invested in the sector, with UK industry leaders securing hundreds of millions of pounds of investment from across the globe.

Contributors also discussed the impact of AI and the sector’s role in the global acceleration of AI-powered services currently underway. As the UK seeks to be a global leader in AI safety policy and monitoring, the SDV sector is a vital early case study of sector-specific regulation that stands to help grow a multi-billion pound industry.

The Government’s vision for the sector is bold, but so far it has failed to follow up with the necessary pace of action to make it a reality, in large part because no clear regulatory framework for commercial deployment. This is not a sector that needs significant additional public funding to get to market deployment. Instead, the barriers for self-driving developers in the UK are regulatory, with legislation failing to keep with the pace of technological innovation.

This is a symptom of a larger issue, which will become more evident as general purpose AI continues to be deployed at scale. The Government must be more responsive to market needs for updated and reformed legislation, particularly for new and emerging technologies, in order to maximise their potential economic rewards. There is also an important need for regulators’ capabilities to be assessed and increased to meet the needs of this rapidly changing field.

The Government must address barriers to investment

Contributors to the consultation agreed that the way to achieve the most significant economic impact from SDVs in the UK was by attracting more international and private sector investment. The Government has backed its vision for SDVs with a £100m investment,⁶ however more investment is needed for the UK to create the forecasted £42 billion industry.⁷ The consultation looked at the barriers that were blocking investment, with the industry agreeing the most significant barrier being the associated risks with the sector.

Currently, SDV trials in the UK are being held at a local level, with the industry needing support from local authorities in order to proceed. During the consultation, we heard from industry that local authorities were often put off by the perceived risk of investing in SDVs. Contributors emphasised the need for the Government to de-risk investment in the industry by signalling its support of the technology and supporting local authorities with guidance and training.

Contributors have also called for the Government to do more to publicise the benefits of SDVs for increased connectivity and access to essential services, particularly in rural areas. They described the scenario as a ‘win, win, win’, as SDV adoption allows for local areas to grow without the implication of that growth leading to more carbon generated by transport, reducing the number of trade-offs needed to meet net zero.

The consultation built on the findings from the recently published Great Self-Driving Exploration report, which found that there was public support for self-driving vehicles in rural settings where local transport connectivity was extremely limited.⁸ One contributor had recently partnered with Solihull Council to demonstrate how SDVs can work in practice, and how rural communities can be reconnected. This highlights the potential use cases in rural settings for self-driving vehicles to meet transport needs that have not been met under current transport systems.

Legislation is needed to attract international investors

The consultation found that in order for the UK to compete internationally for investment, comprehensive legislation for the testing and deployment of self-driving vehicles must be in place. Developers said that the proposed regulatory system in the Connected and Automated Mobility (CAM) 2025 paper intelligently delivers safety while nurturing innovation.⁹ Striking this balance between safety and innovation is fundamental if the UK is to develop a comparative advantage in this sector. However, they warned that in creating a new regulatory system, the UK must be cautious in setting legal thresholds when no such thresholds currently exist in other markets. Nevertheless, a new regulatory regime will be vital for demonstrating the commercial value of the industry.

We heard how industry is working together to support the development of self-driving technology, including through the UK Automotive Council’s CAM Grand Challenge, which is focused on ways in which the UK can take a leading global role and build its self-driving industry to scale.¹⁰ In order to do this, the vision would be for the UK to lead in late-stage development and commercial deployment of SDVs - seamlessly moving people and goods and unlocking a step change in productivity, safety, and energy efficiency for the UK.

Industry needs clarity to be able to invest

A central theme that came from discussions throughout the consultation was the need for greater clarity of and commitment from Government to realise its CAM 2035 ambitions, including a comprehensive timeline of the pathway to self-driving vehicle rollout in the UK. During the consultation, it emerged that organisations across the self-driving industry have different stepping stones in mind, and legislation with a regulatory framework would work to standardise these and ensure expectations are properly managed.

Contributors also raised this as a key issue for investment. Developers in the UK are finding it increasingly challenging to justify further investment when other jurisdictions have more developed frameworks for advanced trialling and deployment in place. For example, the UK lacks a framework for advanced self-driving trials, which is a significant barrier to rapid development of the technology in the UK, and is a key risk for the future of the industry here. The Government needs to address this need urgently and should consider what alternative legislative pathways exist to enable this within the next few months.

Local transport could be more cost effective with SDV technology

“There is an opportunity to incorporate self-driving technology into mass transit systems”

To expand on the theme of best use cases for SDVs and their economic benefit, the consultation examined the commercial business use cases for AVs. We heard from contributors that, if the UK is buying into a vision of what SDVs can do, there needs to be a conversation on underlying business cases, commercial viability, sustainability and scale.

During the consultation, contributors pointed out that many studies have shown that there is an opportunity to incorporate self-driving technology into mass transit systems, which has the potential to deliver benefits to the public more cheaply than upgrading the current system. Industry called for more to be done to bring local authorities on board and think about potential applications for self-driving technology for local transport services.

Conclusions and recommendations

Recommendation 1: The Government should introduce legislation to legalise the commercial deployment of self-driving vehicles in the UK in this year’s King’s Speech. This is vital to ensuring the UK does not get left behind by other countries in this rapidly evolving sector.

Recommendation 2: The Government should introduce a regime for advanced driverless trials of self-driving vehicles, considering what alternative legislative pathways exist to enable this, within the next few months.

Recommendation 3: The Government should demonstrate UK leadership in AI by retaining a sector-specific approach to regulation. It should also consider the skills required by regulators to be able to undertake their duties in relation to AI regulation in their sector.

³ Connected & Automated Mobility 2025: Realising the benefits of self-driving vehicles in the UK, 2022

⁴ Connected and Automated Mobility: The UK Economic and Market Opportunities, 2023

⁵ Connected & Automated Mobility 2025: Realising the benefits of self-driving vehicles in the UK, 2022

⁶ Connected & Automated Mobility 2025: Realising the benefits of self-driving vehicles in the UK, 2022

⁷ Connected & Automated Mobility 2025: Realising the benefits of self-driving vehicles in the UK, 2022

⁸ The Great Self-Driving Exploration: A citizen view of self-driving technology in future transport systems, 2023

⁹ Connected & Automated Mobility 2025: Realising the benefits of self-driving vehicles in the UK, 2022

¹⁰ Cenex - Presentation by David Skipp, UK Automotive Council (September 2023)

Environmental impact

Self-driving vehicles can help to eliminate some of the most emissions-intensive driving-related behaviours. According to the Climate Change Committee, surface transport accounts for 22% of UK greenhouse gas emissions - the largest individual share of any sector.¹¹ There was a consensus from contributors to the consultation that SDVs have an important role to play in the transition to Net Zero.

As the Government noted in its 2022 strategy, there are a number of important contributions that SDVs stand to make in decarbonising surface transport. These include optimising vehicle speed in response to traffic conditions ('eco driving'), which can potentially reduce sectoral emissions by 7-16%, and maximising ride-hailing service sizes, which could reduce emissions by 30-35%. It also considered potential risks that introducing more SDVs could induce higher demand, and reduce efficiency of powertrains due to the increased computational needs of SDVs.

“SDVs’ potential benefits for the environment far outweighed the risks”

However, contributors to our consultation were in consensus that SDVs’ potential benefits for the environment far outweighed the risks, and were yet another reason why the Government should look to support the growth of the sector more quickly with regulatory certainty.

SDVs will help to reduce carbon emissions

Responses to the consultation from industry pointed to the ways in which SDVs may help address and reduce greenhouse gas emissions. SDVs could be a key driver in reducing energy demand, and will form an important part of a low-carbon future. Research by the University of Leeds found that ‘automation can result in a substantial reduction in energy demand’ through mechanisms such as optimised traffic flow and eco-driving mode programming.¹²

The consultation examined the carbon intensity of self-driving vehicles themselves. Contributors pointed out that most SDVs being developed today are electric, and that future use cases are likely to remain low-carbon alternatives to today’s petrol and diesel internal combustion engine vehicles. SDVs are likely to maximise the benefits of this by increasing efficiency, increasing range and reducing congestion. Some contributors even argued that SDVs can reduce stop-and-start patterns, drive close to one another to create ‘platoons’, thereby reducing aerodynamic drag.¹³ This would mean that the improvement in fuel efficiency in SDVs would be better than your best driver. Additionally, battery electric vehicles already have lower lifecycle emissions than internal combustion engine vehicles and as the grid decarbonises, lifecycle emissions will continue to fall.¹⁴

Consultation contributors highlighted research that suggested that SDVs have lower emissions than conventional petrol and diesel vehicles such as research by the Massachusetts Institute of Technology. MIT research found that if every vehicle on the road is autonomous, their control system can reduce fuel consumption by 18 percent and carbon dioxide emissions by 25%, while boosting travel speeds by 20%.¹⁵ MIT research also highlighted, though, that the computing power required to operate SDVs could generate significant greenhouse gas emissions.¹⁶ However, developments and improvements to hardware efficiency will help to reduce these emissions.

SDVs could be considerably more efficient than human drivers

The consultation examined the impact of SDVs on the network as it is today. As the Government’s own data shows, SDVs have the potential to significantly improve the efficiency of traffic and individual car behaviour, reducing the amount of time spent without passengers and optimising speed to respond to traffic conditions. As more SDVs are on the road, there is also potential for increasing inter-vehicle data sharing, unlocking a new level of on-the-road efficiency and safety which will not only reduce individual vehicle emissions by reducing overall power demand but cut waiting times for passengers, making journeys more enjoyable and faster.

Contributors pointed out that more was needed to improve the connectivity of transport infrastructure in order to achieve the full benefits of SDVs on UK roads. While the APPG welcomes the recent announcement from the Department for Transport outlining how a new £70m fund for traffic signals will be allocated,¹⁷ more can be done to organise the optimisation of smart infrastructure for traffic management, and the process would also be an opportunity for investment. A recent EU study found that connected vehicles on EU city roads could reduce emissions by 18%¹⁸ and a UK study reported that traffic light improvement could also reduce emissions by 17%.¹⁹

Walking and cycling is the most important modal shift to reduce surface transport emissions, but SDVs can play an important role in connecting different modes of transport together. Contributors pointed out the significant opportunity for innovation that upgraded interconnected road technology offers. They also discussed the need to work across transport modes, including rail, maritime and aviation, to promote integrated mobility as a service and frame SDV technology as a key part of the wider transport system.

Conclusions and recommendations

Recommendation 4: The Government should allocate more research and development funding to examine the potential benefits of communication and interconnected technology to optimise SDV road use to reduce emissions and increase safety.

Recommendation 5: The Government should encourage cross-sector dialogue to ensure that the potential benefits of SDV technology are understood and harnessed by other modes of transport including the rail, mining, agriculture, maritime and aviation sectors.

¹¹ [Climate Change Committee, Sixth Carbon Budget: The UK's path to Net Zero, 2020](#)

¹² [Leeds University, Mobility & Energy Futures Series](#)

¹³ [Numerical evaluation of vehicles aerodynamics in platoon using CFD simulation](#)

¹⁴ [The UK: A Low Carbon Location to Manufacture, Drive and Recycle Electric Vehicles](#)

¹⁵ <https://news.mit.edu/2022/ai-autonomous-driving-idle-0517>

¹⁶ <https://news.mit.edu/2022/ai-autonomous-driving-idle-0517>

¹⁷ <https://lcrig.org.uk/news/70m-signals-funding-timescales-announced>

¹⁸ [Accelerating Safe and Sustainable Transportation: Smart Cars Communicating with Smart Roads](#)

¹⁹ [Smart Traffic Management: Market forecasts, use cases & regional analysis 2022-2027](#)

Safety impact

The four leading causes of transport accidents are: driver error; reckless behaviour; disobeying traffic laws; and driver impairment.²⁰ Self-driving vehicles promise to be safer than human drivers, reducing the number of preventable tragedies on UK roads. This factor was also considered in the Transport Select Committee's recent report, with several witnesses stressing the potential safety benefits presented by SDVs, and highlighting the Government's safety ambition for this technology.²¹

The consultation examined the paradoxical evidence that points to removal of human drivers as being a net safety benefit. As we discussed in the environmental benefits section, the safety benefits of SDVs will also be enhanced as more SDVs come into use and are able to communicate with each other and predict behaviour patterns more effectively than humans can. The potential benefits of this are enormous, removing the human factor that so often is the root cause of accidents on the road.

SDV safety benefits could save billions in medical costs

The consultation examined the potential impact of SDV safety benefits. Contributors highlighted research from the insurance industry that SDVs could save the NHS £2.3 billion annually in medical and ambulance costs by eliminating the 85% of accidents where human error is a contributory factor.²² Shared SDV services might also contribute to lowering the cost of patient transport services and reducing the cost impact of non-attendance at appointments. This further demonstrates the need for the Government to prioritise self-driving legislation to unlock these potential savings and enhance road safety while also benefiting the economy.

Contributors also discussed the need for robust processes to be in place for when accidents do occur. Developers said this was vital to enabling scaling at pace. For example, how first-responders should approach SDVs and engineering differences between SDVs and normal vehicles which might pose issues for servicing and recovery. They pointed out that in US states where these vehicles have been deployed, manufacturers have put departments in place for eventualities like this.

The insurance industry has an important role to play

Defining where liability lies with drivers and road users when SDVs are rolled out on UK roads was an important part of the consultation discussion. We heard from insurers who said that they have been looking carefully into how self-driving will be insured, considering factors beyond just loss and damage. All contributors agreed that the insurance industry's role in the rollout of SDVs was vital. It was noted that many insurers have been involved from the early stages of commercial development of SDVs in the UK, working with developers to provide bespoke liability insurance for SDV testing, and working with policymakers to develop the regulatory framework.

There remains broad support for the liability framework set out in the Law Commission's proposals for the future regulatory framework. Giving certainty to the insurance industry so that it can be confident in rolling out liability insurance for SDVs is another reason for the Government to introduce self-driving legislation at the earliest opportunity.

Further clarification on safety controls is needed

“It could result in the industry opting to commercialise in other markets with less restrictive engineering requirements”

The consultation also considered what safety controls should be established by developers of SDVs. We heard from developers that legislators should clarify the level of risk that demands robust safety engineering controls. These clarifications will be needed if the UK wants to avoid self-driving technology that is prohibitively

expensive and impossible to commercialise. If the UK gets this balance wrong, it could result in the industry opting to commercialise in other markets with less restrictive engineering requirements.

Contributors said that in order to create an effective safety framework, the Government must elaborate on the carefulness and competency standard, including how it will guide the development of licensing criteria. The Government should consider how this standard impacts the manufacturing process of SDVs, while also scrutinising the engineering process that developers undertake to ensure consistency and high standards across the industry.

Conclusions and recommendations

Recommendation 6: The Government should ensure legislation for SDVs provides clarity for insurers and developers to create robust safety protocols and liability frameworks that encourage a culture of safety across the industry.

Recommendation 7: The Government should clarify the safety controls that developers need to have in place for deployment, and ensure these are balanced, proportionate and comparable to the safety control in place on today's road network. It should also provide more detail on the carefulness and competency standard, including how it will guide licensing criteria.

²⁰ <https://www.statista.com/statistics/323079/contributing-factors-leading-to-road-accidents-in-great-britain-uk/>

²¹ House of Commons Transport Committee: Self-driving vehicles Seventh Report of Session 2022–23, September 5 2023

²² <https://www.axa.co.uk/newsroom/media-relations/2023/self-driving-vehicles-have-potential-to-save-nhs-up-to-2-point-3bn-every-year/>

Public perceptions impact

Earlier this year, the Department for Transport conducted a survey into the public perceptions of SDVs.²³ Overall, the survey found that participants were overwhelmingly positive towards the development of SDVs, particularly as a form of shared transport, and noted benefits such as safety gains.

However, the survey did acknowledge that most participants envisaged widespread SDV takeup by 2042, much later than forecast. We recognise that there is more to be done by the self-driving industry and Government to increase public awareness toward SDVs in the near-term if we want to achieve the Government's ambitious target for 2035. There is also a significant role for the Government to play in normalising the use and rollout of SDVs across the UK with the public.

SDVs will change the way people understand vehicles

The consultation discussed the relationship between the design of the technology and its appeal to public users. Contributors discussed the need for designs to be as attractive as possible to increase support for SDVs as an AI use case. However, there was an agreement that any decisions in design need to be considered with the end user in mind and with accessibility needs prioritised.

For self-driving cars, some contributors felt that as the role of humans in vehicles transitions from driver and passengers to exclusively passengers, there was an important discussion to take place around the physical design of cars in the future. Some speculated that cars are likely to become bigger as a result of this change, with more space allocated for passenger comfort as a result of not only removing the driving apparatus, but also removing the need for clear lines of sight for a human driver.

Government has an essential role to play in normalising SDV technology

There was an agreement from contributors that the Government has a crucial role to play in increasing the public perception of SDVs and public awareness of the technology. Contributors pointed out that the Government has two roles to play in regard to improving public perception: first, making sure that there are more SDV trials, and second, demonstrating continued and strong Government support for the industry.

The consultation discussed how best to improve the public understanding of what SDVs are and how they will be able to use them. Contributors argued that the best way to make the public understand the technology was to focus on the narrative of use cases and how this benefits people. For example, how SDVs carrying out grocery deliveries in North London will help bring down the price of grocery deliveries for those households.

Conclusions and recommendations

Recommendation 8: The Government should work with industry to champion the self-driving sector and boost public awareness about the benefits of SDV technology. As part of this public awareness programme, the Government needs to develop a public-private partnership to develop communications guidance on SDVs. This will help to demystify the technology and prevent confusion amongst the general public.

²³ [The Great Self-Driving Exploration: A citizen view of self-driving technology in future transport systems, 2023](#)

Acknowledgements

Workshop 1

AXA UK & Ireland
Borges Salmon
Centre for Connected and Autonomous Vehicles
Ford UK
National Highways
Newcastle University
Oxa
SMMT
Starship Technologies
Tesla UK
UK Auto Council CAM Group
Waymo
Wayve
WSP

Workshop 2

BSI Standards
Cars of the Future
Centre for Connected and Autonomous Vehicles
Ford UK
Insurance Post
Midlands Connect
Mlex
National Highways
RAC Foundation
Reed Mobility
Starship Technologies
Tesla UK
The UK Auto Council
University of Warwick
Waymo
Zenzic

Written submissions

ERTICO
George Mason University
MIB
Oxa

