



Department for Business, Energy and Industrial Strategy UK connected and automated mobility

Response from AXA UK

1. AXA UK (AXA) is part of AXA Group, a worldwide leader in financial services operating in 54 countries with over 153,000 employees and 104 million customers worldwide. In the UK, AXA operates through a number of business units including, AXA Insurance and AXA Health, and employs around 8,000 employees. AXA is one of the UK's largest motor insurers and has been involved in the automated vehicles space since 2014 and has partnered five Government-backed projects – FLOURISH, Capri, UK Autodrive, Robopilot and VENTURER.

Executive Summary

2. As a leading insurer supporting the development of Connected and Automated Mobility, AXA welcomes this opportunity to submit our feedback to this Call for Evidence on *The Future of Connected and Automated Mobility in the UK*. AXA is committed to finding and developing ways to make our roads safer, more efficient and more accessible for those currently unable to drive. We firmly believe assisted driving technology and automated driving technology are transport innovations that can provide these societal benefits for the UK road network provided it is supported by a clear legal and regulatory framework.
3. AXA has been involved in the automated vehicles space since 2014 and has partnered five Government-backed projects, focusing on different aspects of testing and development. Our role in these consortiums is to provide advice on safety, regulation, liability and data. As a partner of these consortiums, AXA has published a number of reports on various aspects of self-driving, including several Insurance & Legal Reports for the FLOURISH Consortium, focused on [Cyber Security, Data and Connectivity](#) and the VENTURER Consortium focused on [liability frameworks](#) and the [handover](#) between vehicle and driver.
4. Furthermore, AXA has consistently worked to support government in progressing legislation and actions that enables the UK to progress further towards deployment of automated vehicles, including through AXA's previous role as Chair of the Autonomous Driving Group at the Association of British Insurers (ABI). For example, AXA gave evidence to the Public Bill Committee on the Automated and Electric Vehicles Act 2018, a crucial world-leading piece of legislation supporting the roll-out of automated vehicles on UK roads.
5. In recent months, AXA has been focusing on increasing collaboration between industry and Parliament. In partnership with the legal firm, Burges Salmon, AXA has been engaging with Parliament, Government and the Law Commission through a new All-Party Parliamentary Group on Connected and Automated Mobility which aims to support the safe and effective deployment of self-driving technologies across the UK.
6. In the response below, AXA has highlighted a number of priorities for the Government to ensure the UK can realise the potential societal benefits of Connected and Automated Mobility, including prioritising the implementation of a robust regulatory framework, developing the infrastructure required to support a network of automated and electric vehicle services, ensuring regulation remains in step with the level of technology in development and ensuring there is adequate provision of in-vehicle data for insurers in the event of an incident.



Questions

Strength of CAM in the UK, here and now

Question 1

Are there any areas where the UK has strong capabilities in the CAM Sector and its supply chain? Please provide specific evidence to demonstrate these strengths. If you wish, you can also upload and attach any supporting documents using the upload option below.

7. The work of government and industry in the last seven years has enabled the UK to build strong foundations for the commercial roll-out of Connected and Automated Mobility (CAM). The UK placed ninth in KPMG's 2020 [Autonomous Vehicles Readiness Index](#) (AVRI) which uses 28 different measures, organised into four pillars: policy and legislation, technology and innovation, infrastructure and consumer acceptance. The strength of the UK in terms of readiness of technology and infrastructure, where it scores ninth and sixteenth respectively, has come about through the work of government and industry in developing a healthy ecosystem for the early stages of CAM development, particularly around the trials and testing. This has been driven by the £440 million invested by government and industry in recent years to fund over 80 CAV projects involving more than 200 partners across academia and business. The trials, led by the Centre for Connected and Autonomous Vehicles (CCAV), are extremely diverse across the CAM space and have encouraged strong collaboration between manufacturers, insurers, academia, research bodies and cyber experts.
8. AXA has been involved in the automated vehicles space since 2014 and has partnered five Government-backed projects, focusing on different aspects of CAV testing and development. Our role in these consortiums is to provide advice on safety, regulation, liability and data. Through these consortiums AXA has seen first-hand the diversity of projects happening across the UK and the progress being made in developing the UK's capabilities to roll-out automated vehicles for a variety of uses. AXA's projects include:
 - [VENTURER](#) – The first government backed project, focused on the handover of control from driver to car in semi-autonomous vehicles. The VENTURER trials were also heavily focused on understanding insurance and legal implications of increased autonomy.
 - [UK Autodrive](#) – The project staged a number of trials examining technologies and the integration of driverless vehicles into existing urban environments. UK Autodrive carried out on-road vehicle and passenger pod trials in Milton Keynes and Coventry.
 - [FLOURISH](#) – FLOURISH identified and assessed potential vulnerabilities in the technology powering automated vehicles, with a focus on cyber security and wireless communications. It aimed to develop products and services that will maximise the benefits of connected and autonomous vehicles for both users and transport authorities.
 - [Capri](#) – The first UK project to trial autonomous pods with passengers in busy pedestrian areas and on private roads. Capri designed, developed and tested autonomous pods, gaining a wealth of knowledge on their viability, potential future uses and the safety and regulatory context surrounding the new technology.
 - Robopilot – The Robopilot project will develop & demonstrate level 4 autonomous driving functionality for a courier vehicle. Navigating complex traffic scenarios, the autonomous driving of a delivery vehicle will take place over a 10-mile route on mixed public roads in South Gloucestershire.
9. AXA and the insurance sector have been consistently engaged in the development of the CAM sector to ensure it stands ready to act as an enabler when various forms of the technology are ready to be rolled out. AXA has become intensely involved in trial projects because the better



we understand new technology, the more versatile we can be to assess, mitigate and price new risks. Through engaging with these trials, AXA has seen the importance of collaboration between manufacturers, insurers, academics and government agencies to develop CAM ecosystems across the UK. To that end, AXA has worked with legal firm, Burges Salmon, to launch a new CAM All-Party Parliamentary Group to support the safe and effective deployment of self-driving technologies across the UK. While the UK is on strong footing with its uniquely collaborative approach, greater collaboration will be necessary to support the UK in unlocking the potential of CAM technology.

10. For AXA, road safety is the number one priority, therefore AXA has been consistently engaging with legislators and the Law Commission to feed into its regulatory review. AXA considers the UK's primary competitive advantage over other countries is in terms of Policy and Legislation, evidence by its second place ranking for this measure within the AVRI. The UK's strength in this area derives from government work on the Automated and Electric Vehicles Act (AEVA) alongside the activity underway via the Law Commission's regulatory review. AEVA 2018 is a crucial piece of legislation for enabling the roll-out of CAM on UK roads. As AXA outlined when giving evidence to the Public Bill Committee, while the legislation will need to evolve as the technology becomes more common place and further work is required on areas such as data accessibility, it provides a clear and simple avenue for motorists involved in road traffic accidents involving automated vehicles to receive the compensation they require. The next milestone is the completion of the Law Commission's review of the regulatory framework and we would urge the Government to prioritise assessing the recommendations outlined by the Law Commission when the outputs of their review become available. In addition to Law Commission's activity, the CAVPASS project developing a safety and security assurance process for self-driving driving vehicles, alongside the continued work of the British Standards Institute and industry partners on Publicly Available Specifications (PAS1880 and PAS1881) are supporting the UK to put in place consistent safety standards for the trialling, testing and deployment of self-driving vehicles.
11. A further strength of the UK is in its capabilities on cyber security, which will be fundamental for the commercial roll out of CAM. For connected technologies to be safe, it will be critical for robust infrastructure which can classify, manage and mitigate cybersecurity risks for intelligent transport systems. The UK has been recognised in this area having been placed first in the World Economic Forum's Global Cybersecurity Index 2018 (2020 edition released on 29th June). Within the field of automated vehicles, the UK has been growing cyber clusters around leading UK universities to provide expert advice and services to mobility businesses worldwide. The establishment of TestBedUK by Zenzic in September 2019 and the launch of several cyber specific research competitions from CCAV and Innovate UK highlights a continued commitment from the UK to be ready to identify and manage the cyber security challenges that comes from a data-driven innovation. AXA was a partner of the FLOURISH project which had a particular focus on developing cyber secure and trustworthy communication to support future CAM deployment. One of the key outcomes of the project was the development of an Incident Response Framework to protect the integrity of wireless communications. Within the framework was an AI based Intrusion Detection System, able to detect different types of cyber-attack against vehicle to vehicle communications in platooning environments. There have been numerous projects similar to FLOURISH which are moving the UK forward on cyber security within CAM ecosystems, further focus on this area will be necessary as technology becomes more sophisticated.



Question 2

What factors could impact the UK's ability to maintain these strong capabilities? Please provide specific evidence to support your response.

12. AXA considers the following factors to be potential inhibitors to the UK's ability to maintain strong CAM capabilities:

Inward investment

13. The UK has created a vibrant and collaborative ecosystem comprising SMEs, corporates, local authorities, academic institutions and technology start-ups. However, the UK remains largely within the trial phase of this technology whereas other international counterparts are moving towards commercial deployment. The UK's next step will involve the move from trials and testing to the deployment of services but there remains a number of obstacles in terms of technology, infrastructure, public acceptance and regulation to overcome before the UK is in a position to cement the UK's competitiveness on a global scale. Continued Government investment will need to focus on accelerating the development, scale-up and commercialisation of these technologies and services, while putting in place the necessary physical and digital infrastructure that enables these vehicles to be ready for UK roads.
14. Co-investment by government and industry in a balanced and co-ordinated programme of R&D across infrastructure, vehicles, delivery models and people skills will be necessary to drive confidence in new market opportunities and will ensure the best return on each component of the investment. AXA is aware of previous funding proposals highlighted by Zenzic and other industry leaders which outline a rapid return on investment in the next decade. Should the UK Government place CAM at the centre of its future of mobility and net-zero agenda, the UK will not only accelerate its pathway to a safer, more efficient and cleaner transport system but global companies will choose the UK to base centres of excellence driving new investment into the UK's growing CAM supply chain. To drive forward the gains already made in the UK's supply chain, Government could place greater focus on cross-sector co-ordination by establishing a central group of industry players, central and local government stakeholders and academia.
15. None of the potential CAM benefits will be realised anywhere in the world without confidence that the technology is safe and secure. Therefore, in addition to scaling-up technology investment, AXA urges the Government to continue its pioneering work on CAM safety and security, taking a global leadership role as this technology approaches widespread deployment by connecting domestic and global regulatory frameworks. The ongoing commitment of Government to initiatives such as the Law Commission's review into UK regulations and CAVPASS, alongside new initiatives to support the embedding of a new regulatory framework, will be essential to the success of this work over the coming years.
16. Any slowing of investment now will likely lead the UK to fall behind international competitors and having to import this technology as a technology taker rather than a technology maker.

Regulation

17. AXA has consistently worked to support government in progressing legislation and actions that enables the UK to progress further towards deployment of automated vehicles, including giving evidence to the Public Bill Committee on the Automated and Electric Vehicles Act 2018. AXA has consistently stated that the legal & regulatory framework must promote a safety-first culture and clearly define, with little room for interpretation, the



responsibilities of the users of CAVs and any changes to the current road safety regime. The UK has put itself in a strong position on regulation and legislation, however, we must push ahead with establishing a world-leading regulatory framework. To this end, we urge government to prioritise assessing the outputs from the Law Commission's regulatory review when published.

18. While AXA recognises the transformative impact CAM technologies can have, it is imperative we consider all the challenges related to new transport innovation becoming commercially available and ensure that regulation remains in step with the capabilities of CAM. AXA is concerned around the UK Government's plans for interim transport technologies such as Automated Lane Keeping Systems (ALKS), which are unlikely to be readied to undertake all the functions of a competent, attentive driver. For example, vehicles with ALKS technology are not currently required in legislation to be capable of changing lanes or seeking safe harbour, as opposed to stopping in a live traffic lane. Any approach to deploying ALKS vehicles needs to happen at the right pace and recognise that they are, in their current form, a form of driver assistance. Failing to do so will impact on public acceptance of new technologies and could deride the Government's Future Mobility project.

Lapse in consumer confidence

19. For the roll-out of new technology to be successful, it is important to instil public trust in its safety by ensuring that end users understand the system's level of automation and its limitations. Without consumer confidence there will not be the level of demand necessary to make CAM a viable alternative to current modes of transport. Government, road safety agencies and industry must provide sufficient levels of information to educate consumers on the limitations of the new technology and their responsibilities as a user. For example, motorists may need further training before they can get behind the wheels of semi-autonomous cars (equipped with ALKS or collision detection). A study by the University of Nottingham found that drivers using Advanced Driver Assistance Systems (ADAS) needed to be taught how to hand over control from the vehicle to the human. Moreover, it is particularly critical that marketing material provided by manufacturers clearly states the limitations of the technology and how the user will need to interact with the technology to use it safely.

Data

20. CAM is fuelled by data, therefore the provisions around data access, storage and retention must be clear and equitable for all stakeholders. A critical element will be ensuring insurers and enforcement authorities have access to specific data in the event of an incident to enable liability to be established. If an agreement is not reached between manufacturers and insurers on data sharing in the event of incidents involving automated vehicles, insurers will be unable to establish liability and settle claims quickly in line with their obligations under AEVA.
21. There have been a number of papers constructed on minimum standards for data-sharing, privacy and provision in the automated vehicles environment that look to address valid concerns around data, such as the *Insurance & Legal Report* published by AXA UK and Burges Salmon LLP for the FLOURISH consortium and *Defining Safe Automated Driving* by Thatcham Research and the Association of British Insurers. In the former, AXA and Burges Salmon outlined a list of best practice principles for protecting data in the CAV sector including ensuring there is accountability at board-level, identifying a lawful basis of processing, building privacy by design and following best practice guidance on cyber security. Developing clear frameworks and guidance on the management of data will be essential as automated technology becomes commercially available on UK roads.



Question 3

In your opinion, what are the relative strengths of the UK CAM sector and its supply chain compared to international counterparts? Where relevant please highlight if these capabilities are world leading and provide specific evidence to support your response.

22. As outlined elsewhere in this consultation, the UK placed ninth in KPMG's [AVRI 2020](#). The UK's primary strengths, compared to international counterparts, lie in its progress and continued focus on developing a regulatory framework, the collaborative approach taken by those within the UK's ecosystem and the UK's expertise on areas such as cyber security. Furthermore, the UK has a world-leading insurance industry that is highly skilled, adaptable and supportive of new transport innovations that have the potential to make the UK's roads safer.
23. Co-investment since 2014 has developed a healthy ecosystem for the early stages of CAM development, particularly around the trials and testing. This has been driven by the £440 million invested by government and industry to fund over 80 CAV projects involving more than 200 partners across academia and business. AXA has seen first-hand through its partnership of five CCAV-backed trials, that trials have led to the development of a maturing ecosystem of world-class SMEs and corporates collaborating effectively with regional authorities and central government. While the UK may not be able to outspend other countries also leading the way in this space, such as the United States and China, the UK CAM sector is well placed to work smarter, building on strong foundations of technology skills, academia and legislation.
24. An additional area where the UK excels is in its cyber security capabilities where it is recognised as the leading country by the World Economic Forum. The UK's expertise in cyber security alongside its work developing a regulatory framework which considers safety and assurance, puts the UK in a strong position to roll-out CAM technology.

Question 4

In your opinion, what are the relative weaknesses of the UK CAM sector compared to international counterparts, including important gaps in the UK CAM sector supply chain? Please provide specific evidence to support your response.

25. While AXA believes the UK has strong capabilities in the provision of testbeds and the expertise in testing, trialling and manufacturing CAM, further work is needed to ensure that funding is going into the right areas and there is stronger development of the basic infrastructure needed for the commercial roll-out of CAM in different sectors. KPMG's AVRI 2020 places the UK ninth in terms of technology and innovation and sixteenth in terms of infrastructure. AXA would agree with the analysis featured in that report that the UK has a healthy ecosystem for early stage work but "there are challenges in scaling up such work, as well as the quality of telecoms infrastructure". In addition, the UK's road network is reliant on the use of petrol and diesel as fuels. Self-driving vehicles will be primarily electric vehicles, therefore the same challenges the UK faces in the roll-out of the infrastructure for electric vehicles apply here, for instance, the accessibility of charging points could be a serious roadblock.

Question 5

What, if any, are the current barriers for your organisation in relation to the to scale-up, commercialisation and deployment of CAM in the UK? Please provide up to 5 barriers ranked from most to least impactful.

26. AXA has become intensely involved in self-driving trial projects because the better we understand new technology, the more versatile we can be to assess, mitigate and price new



risks. AXA is well positioned to engage with CAM technology when deployed in the UK. However, an insurer's ability to provide cover in this area will be dependent on the following areas.

Clear regulation

27. The legal & regulatory framework must promote a safety-first culture and clearly define, with little room for interpretation, the responsibilities of the users of CAVs and any changes to the current road safety regime. A robust regulatory framework, including safety assurance, will be necessary to provide confidence that vehicles approved and deployed on UK roads are safe.

Ensuring regulation remains in step with the capabilities of CAM technology

28. While AXA recognises the transformative impact CAM technologies can have, it is imperative we consider all the challenges related to the types of transport innovation becoming commercially available. AXA is concerned that CAM technology may become commercially available before the UK has put in place regulation that can sufficiently establish safety and public trust. A clear example is the UK Government's plans for interim technologies such as ALKS, which are currently unlikely to be capable of undertaking all the functions of a competent, attentive driver. Current ALKS regulation does not enforce manufacturers to ensure their vehicles can meet minimum requirements for safe driving such as the ability to change lane and the ability to bring the vehicle to a safe harbour in the event of an incident, rather than stopping in a live lane.
29. AXA has been working closely with the ABI and Thatcham Research to highlight potential regulatory gaps which could reduce the safety of UK roads. AXA is in support of the ABI and Thatcham's joint report entitled "[Defining Safe Automated Driving](#)" which sets the scene for the adoption of automated vehicles and highlights the industry's commitment to automated driving technologies. In the report, there are 12 identified principles of safe automated driving, including lane change ability, safe harbour provision, access to data from a neutral server and recording and retaining data to ensure low-impact collisions are captured – current ALKS technology and regulation would only see two of those principles being met.
30. ALKS technology is currently a sophisticated form of assisted driving, therefore the Government must be very clear in how it applies regulation. The early classification of ALKS systems as 'automated' could damage consumer and insurer confidence before automated technology aligned with Levels 4 and 5 has become approved and commercially available on UK roads. Not only would this impact the UK's Future of Mobility project it could undermine trust in the potential of similarly advanced technologies and damage the potential of this as an emerging industry.

Data

31. There are many remaining questions surrounding data that need to be addressed to ensure there is a clear and effective way for liability to be determined. Future legislation needs to protect the consumer so that in the event of an accident, responsibility for the accident and who pays can be quickly established. CAM is fueled by data, therefore the provisions around data access, storage and retention must be clear and equitable for all stakeholders. A critical element will be ensuring insurers and enforcement authorities have access to specific data in the event of an incident to enable liability to be established. Insurers will be unable to meet their obligations under the AEVA if an arrangement for adequate data sharing between manufacturers and insurers is not implemented.



Question 6

What role should government have, if any, in reducing and/or removing these barriers, and why?

32. AXA has consistently worked to support government in progressing legislation and actions that enables the UK to progress further towards deployment of automated vehicles, including through AXA's previous role as Chair of the ABI's Autonomous Driving Group. Through our engagement and understanding of the wider CAM sector, AXA strongly believes Government can play a leading role in reducing the barriers laid out in response to Question 5.
33. With regard to the regulatory framework underpinning CAM, the Government will be responsible for ensuring that the deployment of this technology is in step with a regulatory framework that promotes a safety-first culture. We commend the work already completed by the Law Commission and urge government to prioritise assessing the outputs from their regulatory review when published later this year.
34. In addition, as the UK continues advancing the level of public trials AXA believes government departments such as CCAV need to be clearer and more supportive of the basic regulations for pilot schemes. For automated vehicles trials, a more structured approach from CCAV on the support it can provide trial bodies and pilot schemes, will increase the likelihood end users will be willing to adapt to try out the new mobility options. CCAV could consider creating an advisory role within the CCAV structure to support with communicating regulatory requirements for pilot schemes and supporting trial bodies.
35. The Government has a clear responsibility to ensure that regulation remains in step with new transport innovations that are close to being made available to the UK market. As outlined elsewhere in this consultation, there remain technological and regulatory challenges for ALKS technology. Unless the technological challenges can be addressed, the Government's intentions to classify ALKS as 'automated' under the AEVA leads to clear safety risks and could damage consumer confidence. The Department for Transport should work with industry to consider all safety challenges related to deployment to ensure road safety and public trust has been efficiently established.
36. Ensuring there are the correct provisions in place to manage the flow of data is integral to the safe deployment of CAM. As discussed in the ABI/Thatcham Research report *Defining Safe Automated Driving*, there are eight data points needed as well as an agreed upon definition for a detectable collision. The data requested would include variables such as a GPS-event time stamp, activation status of each automated driving feature, a record of driver intervention of steering, braking, accelerator or gearshift and whether a Minimum Risk Manoeuvre has been triggered. There currently remains no consensus about how data is collected, stored, and accessed, nor have there been concrete plans to establish a neutral server. AXA has continually urged government to place greater focus on the data and connected element of automated technology, including work with manufacturers and insurers to define the terms of a data sharing agreement. One approach that could support further collaboration in this area is the creation of a 'data map' to identify clearly who needs to access data, what type of data and when.



Why is CAM important to the UK?

Question 7

Will CAM support the decarbonisation of transport so as to meet Government's Net Zero ambitions? If yes, how will CAM support the decarbonisation of transport? Please provide specific evidence to support this.

37. Climate change has never been more firmly on the agenda and innovative technology via automation can go a long way to reducing carbon emission on our roads network. Emissions from motor vehicles are some of the biggest contributors to climate change with greenhouse gas emissions from road transport making up around a fifth of the UK's total greenhouse gas emissions ([ONS 2017](#)). Reducing emissions from road transport is a significant challenge and the UK Government's ban on the sale of new petrol and diesel cars from 2035 highlights the need to support electric vehicles. The benefits of automated vehicles and electric vehicles are inextricably linked. Not only will most automated vehicles be electric, there are inherent advantages of automated systems in that they can, in the long-term, increase vehicle sharing, reduce vehicle numbers on the road and produce an intelligent connected network that can reduce traffic and free up space.
38. Reducing tailpipe emissions alone will not deliver net zero carbon. As outlined in a UK Petroleum Industry Association March 2021 [report](#) on *The Future of Mobility in the UK*, CAM technology can play a role in reducing energy demand per km travelled by deploying more efficient operational patterns, enabling vehicle 'right-sizing', shared mobility services, minimising vehicle downtime and improving operational efficiency in logistics, such as through HGV platooning. However, as the report rightly identifies, in-use energy reductions through CAM technology will need to be balanced with the increased energy demands such as through increased data processing. Nonetheless, CAM technology offers a potential enabler of transport decarbonisation and therefore, should be a key consideration in the Government's Net Zero strategy.

Question 8

Will CAM support economic growth and the creation of jobs across the country as set out in Government's plans to level up the UK? If yes, how will CAM support economic growth and the creation of jobs across the UK? Please provide evidence to support this.

39. Yes, the UK is a world leading location for mass-market potential of CAVs, with the UK Department for Transport [estimating](#) the UK CAV market could be worth £41.7bn by 2035 creating 40,000 skilled jobs. AXA strongly believes that CAM can promote economic growth in a number of ways by unlocking productivity, stimulating new mobility services, better connecting rural and urban areas, supporting the needs of those currently disconnected from the road network and creating a more mobile workforce.
40. Zenzic's [CAM Roadmap 2030](#) highlights how large swathes of manufacturers are based outside London and the South East with testbeds and trial locations with areas such as the West Midlands, the North East and Scotland heavily involved in the development of the CAM sector. This suggests that CAM technology is an area which aligns with the Government's aims to level-up opportunities across the UK. For example, in the West Midlands, local government and industry has invested in world-class testing infrastructure for CAM which in turn has led to investment from leading 5G providers in the region. Furthermore, the West of England through projects such as VENTURER, Capri and FLOURISH has developed leading expertise in CAM. The area is a 5G connectivity test bed, has the UK's largest academic centre for multidisciplinary



robotics research at the Bristol Robotics Laboratory and has SME clusters with significant CAM experience. Areas such as the West Midlands and the West of England are showcasing where CAM can bring high value job creation and facilitate collaboration between academics, manufacturers, insurers, legal experts and SMEs to compete globally.

Question 9

Will CAM support new trade and investment opportunities for the UK as set out in Government's vision for Global Britain? If yes, how will CAM support new trade and investment opportunities for the UK? Please provide evidence to support this.

41. As outlined by Zenzic, the global industry of self-driving technology will be around £907 billion by 2035. The UK is in a strong position to lead the way and to forge new partnerships in the future mobility space. The Department for International Trade has already begun to showcase UK's capabilities in auto-engineering to help to drive green transport and digital transformation, for example the [recent delegations](#) that have been building relationships with South Korea.
42. However, these trade and investment opportunities can only be realised by continued co-investment in the CAM sector. There remains uncertainty about how market opportunities will develop in the UK and globally, particularly due to the impacts of Covid-19. The developing ecosystem highlights the support in industry for this technology, however further support from government will send powerful signals to globally mobile investors that the UK is serious about leading the way in this sector. By investing now, the UK has the opportunity to claim sovereignty in this space, particularly with the UK's policy and legislation being in a stronger position than many international counterparts.

Question 10

Will the deployment of CAM have a substantial impact on the automotive industry and its supply chain? If yes, in what way will the deployment of CAM impact the automotive industry and its supply chain? Please provide specific evidence to support this.

43. AXA believes that the automotive industry and its supply chain will adapt for CAM. The current involvement of leading vehicle manufacturers in UK CCAV projects indicates an impetus to consider CAM as an opportunity rather than a challenging disruptor. It will be important for UK vehicle manufacturers to lead the charge on the deployment of CAM and develop the UK's engineering base. Provided the automotive industry continues to accelerate its focus on the new technology, there should be strong expansion into the CAM sector providing an opportunity for new businesses and new supply chains. However, this will be reliant on a clear regulatory framework, a long-term strategic agenda supplemented by continued investment in the CAM sector from industry and government and a concerted effort to raise awareness of this technology as a safe alternative form of transport.
44. Furthermore, the UK Government will need to assess the areas related to data, cybersecurity and engineering where skills gaps need to be plugged to enable the ecosystem to call upon the skills it needs to deploy and maintain a flourishing CAM sector.



Question 11

Will the deployment of CAM have a substantial impact on the logistics industry and its supply chain? If yes, in what way will the deployment of CAM impact the logistics industry and its supply chain? Please provide specific evidence to support this.

45. AXA believes CAM can have a substantial impact on the logistics industry and its supply chain by addressing challenges related to productivity and long-term worker shortages.
46. In recent years, AXA has been a partner of the Robopilot CCAV project which is led by Arrival and aims to develop and trial a UPS Level 4 (as defined by Society of Automotive Engineers) courier vehicle on a public route in around South Gloucestershire and within a UPS depot. Our involvement in this project has shown to us how there are potential efficiency gains to be made in the processes of the logistics industry. The Robopilot project is highlighting the potential for automation to improve the productivity of last-mile delivery, the most expensive part of the delivery chain, by enabling current drivers to take on additional non-driving tasks. Considering transportation costs are the largest part of costs across the supply chain, automated electric vehicles provide a cheaper and cleaner alternative to petrol and diesel. In addition, the prospects of strategies such as 'platooning' could allow automation to improve fuel and traffic efficiency to deliver larger amounts of goods.
47. An endemic challenge in the automated freight sector is driver shortage which could put a halt to the tonnes of goods transported in the UK each year. The [Freight Transport Association](#) has previously outlined that the industry is struggling to recruit younger people to replace an ageing workforce of drivers, where the average age of an HGV driver in the UK is 48. Automated technology can play a role in assisting new drivers on the road initially, before providing a possible new solution to worker shortages in the form of full automation, albeit at a gradual pace.
48. Automated technology can therefore play a dual role by providing a potential solution for worker shortage as well as assisting current drivers to execute other non-driving tasks such as processing documentation while on the move, improving the productivity of each fulfilled route. Furthermore, the Robopilot project is assessing the benefits of utilising automation to improve the productivity the elements of the delivery process that take place within the warehouse. Automated vehicles can support with the unloading and loading process, which is a manual and time-consuming process. This has been seen in other forms of CAM with Automated Guided Vehicles and Robotic technology, where automation can improve the safety, efficiency and precision of logistics management.

Question 12

Will the deployment of CAM have a substantial impact on mobility services and their supply chain? If yes, in what way will the deployment of CAM impact mobility services and their supply chain? Please provide specific evidence to support this.

49. Beyond the significant improvements in road safety, AXA became involved in government-funded automated vehicles trials such as FLOURISH because they focused specifically on benefits for different user-groups which were set to gain from automation. As the FLOURISH User Needs [Final Report](#) states "the advent of fully-autonomous vehicles may help to address the mobility issues experienced by those most at risk of isolation and exclusion, older women, the older old, and those in areas poorly served by alternatives to the car". AXA strongly believes there will be a positive impact on mobility services and their supply chains because CAM will enable new forms of Highly Autonomy Roads Passenger Services (HARPS). These passenger



vehicles can be specifically targeted towards overcoming the mobility related obstacles for those who cannot drive, increasing independence for the young, elderly and disabled people. [Research](#) from the Society of Motor Manufacturers and Traders, published in March 2017, emphasised the benefits of increased mobility for these groups in terms of broader access to education and employment, calculating the potential from CAM services to be around £8 billion.

50. However, for CAM to facilitate new services for those currently disconnected from the road network, outstanding concerns regarding safety, cost and accessibility will need to be managed through regulation. AXA firmly believes that the new innovation must find ways to cater for all end-users. For example, AXA would welcome a set of national minimum standards to address the challenges regulating an automated vehicle with no “driver” poses. In conventional vehicles drivers play a crucial role in delivering safe and accessible journeys such as boarding vehicle and reassuring passengers when there is disruption, the Law Commission and legislators will need to work together to ensure that the benefits of CAM can be shared by all.

Question 13

Will the deployment of CAM have a substantial impact on the insurance industry and its supply chain? If yes, in what way will the deployment of CAM impact the insurance industry and its supply chain? Please provide specific evidence to support this.

51. Yes, the deployment of CAM will have a large impact on the motor insurance industry and its supply chain. As outlined elsewhere in this consultation, the primary benefit that can be realised through CAM technology is the potential to remove the cause of 90% of road traffic accidents – driver error. For this reason, AXA believes there could be a significant reduction in UK road accidents when this technology becomes common place. A reduction in road accidents should in the long-term have a positive impact on insurance premiums for motorists. Furthermore, motor insurance premiums could also be positively influenced by increased data in the CAM ecosystem making it easier to establish accident causation and to reduce fraudulent claims.
52. These changes will not be instant but will happen gradually over time when technology becomes more sophisticated and repair costs fall. Considering that autonomous software and hardware packages are not widespread, it is likely that the cost of the vehicles will initially represent an increase compared to conventional vehicles, in turn increasing collision repair costs. But as outlined by Transport Systems Catapult, when technology becomes more widespread the cost can be assumed to decrease by up to 55% by 2035. In the long-term, there should be optimism around the potential for reductions to motor insurance premiums, with observers, like [KPMG](#), predicting reductions of around 40% by 2040.
53. The growth of CAM services may also result in a reduction in vehicle ownership. Broadly speaking, the UK is already beginning to see changes in vehicle ownership with the rise of ride hailing, car sharing, and the wider shared economy. There is also increased attention into concepts such as Mobility as a Service (MaaS) and demand responsive transport (DRT). Therefore, there may be a growth of the commercial motor insurance market at the expense of the retail market with travellers choosing to pay for individual rides rather than owning their own vehicle. Furthermore, the UK may be moving towards a system where the single-car policy will need to be supplemented by new products that cater towards covering distance or route travelled.



54. A further change will be how risk is assessed and claims processed. CAM technology will mean responsibility shifting away from the human driver to the vehicle itself, a transition facilitated by AEVA. As CAM becomes more commonplace on UK roads, insurers will need to understand the risks posed by two drivers; one human and one automated. This will ultimately lead to adjustments in risk modelling and the processing of claims. As outlined elsewhere in this response, the impacts on insurers can be minimised by a clear and robust regulatory and safety assurance framework, which enables insurers to access specific data in the event of an incident.
55. AXA and the insurance sector have been consistently engaged in the development of the CAM sector to ensure it stands ready to act as an enabler for when various forms of the technology are ready to be rolled out. AXA has become intensely involved in trial projects, such as VENTURER, Capri and Robopilot because the better we understand new technology and its uses, the more versatile we can be to assess, mitigate and price new risks.

Question 14

Will the deployment of CAM have a substantial impact on the agriculture industry and its supply chain? If yes, in what way will the deployment of CAM impact the agriculture industry and its supply chain? Please provide specific evidence to support this.

56. AXA is not best placed to provide a response to this question.

Question 15

Will the deployment of CAM have a substantial impact on the construction industry and its supply chain? If yes, in what way will the deployment of CAM impact the construction industry and its supply chain? Please provide specific evidence to support this.

57. AXA is not best placed to provide a response to this question.

Question 16

Will the deployment of CAM have a substantial impact on the mining industry and its supply chain? If yes, in what way will the deployment of CAM impact the mining industry and its supply chain? Please provide specific evidence to support this.

58. AXA is not best placed to provide a response to this question.

Question 17

Will the deployment of CAM have a substantial impact on the defence and security industry and its supply chain? If yes, in what way will the deployment of CAM impact the defence and security industry and its supply chain? Please provide specific evidence to support this.

59. AXA is not best placed to provide a response to this question.

Question 18

Will the deployment of CAM have a substantial impact on the maritime industry and its supply chain? If yes, in what way will the deployment of CAM impact the maritime industry and its supply chain? Please provide specific evidence to support this.

60. AXA is not best placed to provide a response to this question.



Question 19

Will the deployment of CAM have a substantial impact on the aerospace and aeronautical industries and their supply chain? If yes, in what way will the deployment of CAM impact the aerospace and aeronautical industries and their supply chain? Please provide specific evidence to support this.

61. AXA is not best placed to provide a response to this question.

Question 20

Will the deployment of CAM have a substantial impact on connectivity services and their supply chain? If yes, in what way will the deployment of CAM impact on connectivity services and their supply chain? Please provide specific evidence to support this.

62. AXA is not best placed to provide a response to this question.

Question 21

Are there any sectors where CAM technologies, skills and knowledge could have a spill over impact? Please provide specific evidence to support your answer.

63. Yes, AXA strongly believes that many of the principles that underpin the CAM process can be used in other lines of business. AXA considers there to be strong benefits in terms of economic diversification as CAM will bring together expertise in cyber, aerospace, creative, recreational, data, regulatory and advanced engineering to create new supply chain opportunities. Moreover, CAM can provide specific societal benefits which have an economic impact, such as providing mobility services for those currently disconnected from the road network. As outlined elsewhere in this consultation, research from the Society of Motor Manufacturers and Traders calculated the benefits of increased mobility for, young, elderly and disabled groups in terms of broader access to education and employment to be around £8 billion. It is these societal impacts which can spill over into a variety of other economic sectors.

What next?

Question 22

What areas should be priorities for the CAM sector in the UK in the period leading up to 2030 and why? Please provide up to 5 priority areas ranked from highest to lowest priority.

64. AXA considers the following to be priority areas for the CAM sector in the UK leading up to 2030.

Engagement with insurers

65. Government should seek to work collaboratively with insurers at the early stage of the policy development process, particularly on insurance requirements and the implications of these changes for insurers and motorists. Insurers stand ready to support the UK Government in realising the benefits of CAM technology and want to ensure that considerations related to insurance are considered as early as possible.

Robust regulation

66. The UK Government must work towards finalising the initial regulatory framework for automated vehicles by prioritising its assessment of the outputs from the Law Commission's regulatory review. AXA has consistently said that regulation must prioritise safety across the



entire lifecycle of a vehicle, including assessment, approval and assurance of the vehicle, maintenance of the automated driving system, including updating software, and stakeholder duties following a traffic collision. Developing minimum standards must be driven by robust safety cases and a mix of testing methods, including independent third-party testing.

Ensuring regulation remains in step with CAM capabilities while raising consumer confidence

67. While AXA recognises the transformative impact CAM technologies can have, it is imperative we consider all the challenges related to the types of transport innovation becoming commercially available, such as ALKS. For the roll-out of any new technology to be successful, it is important to instil public trust in its safety by ensuring that regulation is in line with the level of technology commercially available and end users understand the system's level of automation and its limitations. Government must place priority on assessing the technological and regulatory challenges for interim forms self-driving technologies before deploying them onto UK roads. As discussed elsewhere in this consultation, AXA considers the early classification of ALKS as 'automated' without further assessment of the safety challenges outlined by the insurance industry could damage consumer confidence before automated technology becomes commercially available. A real concern for the CAM sector would be for the deployment of these vehicles to lead to accidents and injuries on UK roads because safety hasn't been sufficiently established. This could derail consumer confidence and deride the UK's Future Mobility agenda.
68. Public trust will need to be instilled in the regulatory framework and supplemented by sufficient levels of information to educate consumers on the limitations of the new technology and their responsibilities as a user. This will include ensuring that manufacturers market CAM technology in a responsible way.

Data

69. Data is integral to the CAV ecosystem and is estimated to be worth £32 billion per year to the intelligent transport market by 2025 ([Catapult Transport Systems](#)). Therefore, the provisions around data access, storage and retention must be clear and equitable for all stakeholders. A critical element will be ensuring insurers and enforcement authorities have access to specific data in the event of an incident to enable liability to be established. As outlined elsewhere in this response, a specific and limited data set should be accessible for insurers following every incident, without charge, built up via data recording systems that provide sufficient information to assess liability disputes.
70. CAM technology driving on UK roads requires insurance, but if insurers are unable to access data they need, they will be unable to provide quick compensation for motorists involved in road traffic accidents. Coming to a clear agreement on data sharing is a necessary step for the successful roll-out of this technology.
71. AXA has continually urged government to place greater focus on the data and connected element of automated technology, including work with manufacturers and insurers to define the terms of a data sharing agreement. One approach, previously outlined in an *Insurance & Legal Report* published by AXA UK and Burges Salmon LLP, that could support further collaboration in this area is the creation of a 'data map' to identify clearly who needs to access data, what type of data and when.



Continued Investment

72. The UK CAM sector has strong foundations following the growth of trials and testing across the UK, which places the UK in a good position ahead of the commercialisation and deployment of these services. However, to move towards deployment will require a long-term strategic agenda supplemented by continued investment from both government and industry to strengthen the CAM sector's ecosystem. Without further investment, the competitive advantage built-up will be eroded and will likely result in the UK importing this technology as a technology taker rather than a technology maker.

Question 23

Where does CAM fit in your organisation's strategy in the period leading up to 2030?

73. AXA expects CAM to be a viable alternative form of transport which can result in societal benefits of safer, cleaner and more accessible roads. Therefore, AXA has become intensely involved in a number of trial consortia in order to build up our understanding of the technology. This will enable AXA, in the short term, to better support trial bodies to conduct safe trials, and in the long term, be prepared to insure new forms of CAM technology when they become commercially available. CAM has therefore fitted into AXA UK's strategic thinking for many years and will continue to do so in the period leading up to 2030.

Question 24

What would be the impact on the UK CAM sector and its supply chain if the UK Government does not intervene further?

74. The UK has the potential to be a global leader in this market. However, to realise this goal the sector needs a long-term strategic agenda supplemented by continued co-investment to prevent a loss of momentum that could see the UK losing sovereignty in this space and importing this technology in the future. A pause in investment during a difficult economic climate risks the UK losing its competitive advantage. Other countries such as the US have already begun to deploy these services, for the UK to follow suit by safely moving from trialling and testing to deployment government focus is required on investment and the implementation of a robust regulatory framework.
75. There could also be additional concerns around taking technology from certain countries given the safety-critical nature of CAM technology and its connected infrastructure. In our view, it is vital the UK incentivises the CAM sector to meet the highest safety and cyber security standards. The best way of ensuring the provision of safe CAM technology within the UK is for the UK to be integral to its development.

Question 25

What societal benefits of CAM would not be realised if the UK government does not intervene further?

76. AXA considers that without further intervention from the UK Government, the UK could miss out on realising the following societal benefits:
- **Safer roads:** CAV technology has the potential to remove the cause of up to [90% of road traffic accidents](#) – driver error. Full vehicle automation therefore has the potential to substantially reduce traffic collisions, casualties and deaths.
 - **Cleaner, more efficient roads:** Fully automated electric systems are predicted to reduce vehicle numbers on the roads and produce an intelligent network that can run [more](#)



[cleanly and efficiently](#), freeing up space and reducing traffic congestion. CAM can be a positive player in the Government's ambition of decarbonising the transport sector.

- **Increased mobility:** CAVs can overcome mobility related obstacles for those who cannot drive e.g. those with disabilities, the elderly and the young, increasing independence and potentially unlocking [£8bn for the UK economy](#)
- **UK Economy:** The UK is a world leading location for mass-market potential of CAVs, with DfT [estimating](#) the UK CAV market could be worth £41.7bn by 2035 creating 40,000 skilled jobs.

Question 26

What key learnings should the UK take from its international counterparts in relation to the development and deployment of CAM? Please specify both the learning and the countries they relate to.

77. There are certainly key learnings the UK should be taking from its international counterparts, particularly when it comes to putting in place CAM infrastructure. Infrastructure is an area where the UK does need to improve in order to realise the potential of CAM technology. The Netherlands ranks top in the KPMG's [AVRI 2020](#) for the infrastructure pillar primarily because it leads on charging stations per capita with three per thousand people, has focused on the quality of its roads and is expanding its use of smart road infrastructure including wirelessly connected traffic lights. Electric vehicle infrastructure is a prerequisite for automated vehicles and therefore, the UK should take learnings from countries with established networks such as the Netherlands, Singapore and Norway.

Question 27

To what extent will your organisation be investing in CAM in the period leading up to 2030?

78. CAM will continue to factor into AXA UK's strategic thinking. As CAM technology develops AXA expects there will be necessary further investment, in both time and resource, to support AXA in preparing for the large-scale deployment of CAM technology.

Question 28

To what extent would government intervention in CAM (e.g. regulatory environment; funding technology development; skills training) impact your investment in CAM in the UK?

79. As outlined elsewhere in this consultation, the priority for insurers is for government to ensure the regulatory environment for CAM prioritises safety and enables insurers to have necessary access to vehicle data following an incident. A robust regulatory framework, including safety assurance, will be necessary to provide confidence that vehicles approved and deployed on UK roads are safe and to enable insurers to provide reasonable cover for them.

Question 29

Under the Equality Act 2010, goods and services, have a duty to make reasonable adjustments so that everyone can access their facilities. Are there any specific considerations that need to be taken into our approach regarding the future of CAM in the UK? Please provide evidence to support this using either the space below or alternatively you can upload and attach any supporting documents using the upload option below.

80. Accessibility is one of the primary benefits of CAM technologies, particularly for automated vehicles which can provide a transport option for those currently disconnected from the road network. AXA believes that the new innovation must find ways to cater for all end-users. As CAM



will likely lead to alternative transport service providers, it is fundamental that there are protections in place against discrimination and the duty to make reasonable adjustment is extended. AXA has previously highlighted that an extension of section 29 of the Equality Act 2010 would be an appropriate course of action. However, AXA would urge legislators to undertake a further operational analysis on this measure to guarantee sufficient safeguards are in place, whilst ensuring the regulatory regime is applicable for this new technology. Automated vehicles have several significant differences compared to conventional vehicles, for which section 29 of the Equality Act 2010 currently applies, these differences will have to be considered going forward to ensure the legislation is appropriately applied.

81. AXA would also welcome a set of national minimum standards to address the challenges regulating an automated vehicle with no “driver” poses. In conventional vehicles drivers play a crucial role in delivering safe and accessible journeys such as boarding vehicle and reassuring passengers when there is disruption, the Law Commission and legislators will need to work together to ensure that the benefits of CAM can be shared by all.
82. The challenges around accessibility highlight the importance of data reporting as a feedback mechanism, especially in the early years of deployment. This will help to identify any unforeseen inclusivity challenges with new technologies and systems.

Question 30

If you have any further comments or suggestions about the future of CAM in the UK, please include them here.

If you need to get in touch regarding the information in this submission, please get in touch with AXA's Public Affairs Team at ukpublicaffairs@axa-uk.co.uk.