AUTONOMOUS VEHICLE REPORT

GOWLING WLG

UKAutodrive

CAVS – DRIVING SOCIAL CHANGE

JUNE 2019

CONTENTS

ABOUT UK AUTODRIVE

UK Autodrive was the largest of three UK consortia launched to support the introduction of self-driving vehicles in the UK. The aim of the consortium was to establish the UK as a global hub for the development of autonomous vehicle technologies and to integrate connected and autonomous vehicle technologies into urban environments.

UK Autodrive brought together leading technology and automotive businesses, forward-thinking local authorities and academic institutions to deliver a major three-year UK trial of autonomous and connected vehicle technologies. In late 2018, the UK Autodrive project successfully concluded, with the world's first multi-modal journey featuring connected and autonomous road- and pavement-based vehicles.

Consortium members included Arup, AXA, Coventry City Council, Ford, Gowling WLG, Horiba Mira, Jaguar Land Rover, Milton Keynes Council, RDM Group, Tata Motors European Technical Centre, Thales, The Open University, Transport Systems Catapult, the University of Cambridge and the University of Oxford.

ABOUT GOWLING WLG

Gowling WLG is a Global 100 legal practice, with more than 1,400 legal professionals across 18 cities in the UK, Canada, Europe, Asia and the Middle East. Focused on key global sectors including automotive, tech, energy, infrastructure and real estate, they can provide clients with deep sector expertise.

Led by Stuart Young, the market-leading automotive industry group brings together technical excellence in regulatory, corporate, employment, dispute resolution, real estate, commercial and competition law.

It is the only law firm to have played a significant role in the £19 million UK Autodrive connected and autonomous vehicles programme, part of the UK government's driverless cars initiative.

METHODOLOGY AND OBJECTIVES

This is the sixth in a series of thought leadership reports about autonomous vehicles produced by Gowling WLG on behalf of UK Autodrive.

Our previous reports ask:

- What are the data protection risks when it comes to driverless vehicles?
- Is there enough regulation around the moral algorithms of driverless vehicles?
- Is it possible, or even feasible, to make these new vehicles cyber resilient?
- What challenges lie ahead in creating an effective road transport network which will allow CAVs to work to their full potential?
- What is the impact of intellectual property on the future of mobility?

You can access all the reports at www.gowlingwlg.com/CAVs.

This report focuses on the potential social impacts of automation and how both local and national government policy may need to alter to accommodate them. We also focus on how and when UK policies may need to change so as to maximise the social benefits of Connected Autonomous Vehicles (CAVs).

The research was conducted by BizWord Ltd (www.bizword.co.uk), an independent business consultancy.

Specific sources have been listed in the body of the report. To compile the report, we hosted a round-table event for a panel of experts from academia, government and industry in early 2019 and conducted subsequent qualitative interviews. We also conducted desktop research and analysis of publicly-available information, industry studies and forecasts.

Many thanks to our contributors for giving their time and sharing their expertise. They include:

- Professor David Bailey, Professor of Business Economics, Birmingham Business School.
- Susan Claris, Associate Director at Arup and a Trustee of Living Streets, the UK charity for everyday walking.
- Brian Matthews, Head of Transport Innovation, Milton Keynes Council.
- Professor Nick Reed, Head of Mobility R&D at Bosch.
- Mike Waters, Director of Policy, Strategy and Innovation, Transport for West Midlands (TfWM).
- A policy official who works in connected and self-driving vehicles.
- A senior official who works in connected and self-driving vehicles.

DEFINITIONS

AUTONOMOUS VEHICLE (AV)

A vehicle which can fulfil the operational functions of a traditional vehicle without a human operator.

CONNECTED VEHICLE (CV)

A vehicle which has technology enabling it to connect to devices within the vehicle, as well as external networks like the internet, allowing it to "talk" to its surrounding infrastructure and other vehicles.

CONNECTED AND AUTONOMOUS VEHICLE (CAV)

A connected and autonomous vehicle combines both sets of technologies' capabilities.

INTRODUCTION

IN ITS BROADEST TERMS, SOCIAL POLICY DEALS WITH HOW THE STATE MEETS THE NEEDS OF ITS POPULATION.

A good social policy is perceived to be one that reduces inequality and provides uniform access to services and support.

Recent technological developments, particularly the growth of artificial intelligence (AI), mean there are mounting expectations that fully autonomous driving may not be a preserve of the distant future. Much of the technology needed to make it happen is in use today – it "just" needs piecing together to make a safe vehicle.

But the technology cannot make the vision of an automated transport future happen on its own. We also need to look in-depth at our current laws, regulations and social need to make sure they are fit-for-purpose.

In this report we concentrate on key themes including how CAVs can deliver real benefits such as increased travel options for the elderly, disabled, and youth populations, for example, while potentially reducing congestion and improving our urban environment.

Importantly, we also look at the roles that national and local governments must adopt to ensure a CAV future delivers on these positives, while reducing the potential negative impacts of technological advancement for its own sake.

We hope you find the following pages thought-provoking, and that they are a useful addition to the current debate in terms of how this new technology can benefit society.

If you have any comments or ideas that you would like to discuss, then please contact me using the details below.

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SUMMARY OF KEY FINDINGS

IN MARCH OF THIS YEAR, THE UK DEPARTMENT FOR TRANSPORT (DFT) PUBLISHED ITS "FUTURE OF MOBILITY: URBAN STRATEGY" REPORT. IT STATES: "WE WANT THE UK TO BE A GLOBAL LEADER IN TRANSPORT INNOVATION.....

..... We will create a fertile environment for innovation and investment, enabled by a flexible, responsive regulatory system, and work with cities to give them the tools to innovate."

Our experts agree that we are at a significant moment in the development of the automotive industry and personal mobility. The traditional manufacturers are increasingly collaborating with their peers in the technology sector to focus on mobility solutions.

In this report, our experts highlight the key challenges and opportunities faced by industry and government in their quest to make CAVs a reality on our roads.

THEIR KEY POINTS ARE:

- The government needs to take a proactive approach to social policy.
- New regulation will be needed, and it needs to arrive before we get swept in one direction or another by technological developments.
- While there is an urgency to setting the social policy, the government also needs to re-visit some of the big questions around CAVs to ensure they are focusing on broader economic and social outcomes, rather than just what the technology is capable of.
- It is important that the right messages are attached to the development of CAVs. They must position these new vehicles as a solution for certain transport situations. They must not lead to a decline in "active travel" for example. We all still need to keep walking and cycling.
- CAVs will help certain, less mobile parts of the population – this includes those who are less physically mobile and those who have less social mobility.
- CAVs could contribute hugely to 'UK plc' but the government needs to take a lead to ensure all impacts are positive.
- CAVs will change the way our country looks. This needs to happen in a controlled way to ensure the change is positive.

CAVS – DRIVING SOCIAL CHANGE • SUMMARY OF KEY FINDINGS

THE OPPORTUNITY

MOBILITY IS AT A CROSS-ROADS. COMPANIES ARE INVESTING BILLIONS IN THE DEVELOPMENT OF CAVS, AND GOVERNMENTS AROUND THE WORLD ARE INCREASINGLY DISCUSSING WHAT THE FUTURE OF TRAVEL – BOTH PERSONAL AND COMMERCIAL – MAY LOOK LIKE.

The DfT's "Future of Mobility: Urban Strategy" report states:

"This is the moment to reflect on what we as a society want these changes to deliver and what we want our urban spaces to be like. If successfully channelled, they have the potential to deliver step-change advances for society, the environment and the economy. They could boost productivity and investment, increase export opportunities for UK companies and create high-quality jobs. However, if technological changes are not effectively managed, they could have undesired effects, such as increasing congestion or reducing sustainable travel."

Our experts echo this sentiment and recognise that decisions made now will have a significant impact on all our futures. It is widely recognised that following a transition phase of semi-autonomous vehicles, AVs and CAVs should be on our roads by around 2030.

BENEFITS OF CAVS

The most obvious, and often quoted, benefits of automation include:

- **Safer streets –** CAVs are "better" at driving than humans – they don't get weary or absent-minded and therefore, don't have as many accidents.
- **Less congestion –** connectivity will help people plan their journeys to avoid bottlenecks, making their travels smoother and cars will increasingly be shared.
- **Reductions in emissions –** electrification goes hand-in-hand with CAV development, giving us all cleaner air to breathe and a quieter urban environment.

But there are other significant advantages that could be delivered by these intelligent vehicles.

CAVS – DRIVING SOCIAL CHANGE • THE OPPORTUNITY

Professor Nick Reed, Head of Mobility R&D at Bosch said:

"CAVs have the potential to offer greater access to transportation for those who have fewer options at present – the elderly, disabled, those on low incomes for example. Managed correctly, CAVs could help these groups achieve better social, health, educational and economic outcomes."

Mike Waters, Director of Policy, Strategy and Innovation at TfWM agrees:

"In the West Midlands we have some really quite affluent areas, and then some where there is a lot of deprivation. If we look at the slightly more deprived communities where people don't have qualifications and lack opportunity, they are adopting something like the Uber model, because they can afford to share rather than own."

But Mike adds a note of caution:

"They are not necessarily using this model because they want to. It is because it offers them something they cannot get elsewhere. I really don't think we understand what CAVs can offer in this area yet. There is a gap in the research. We need to fully understand how these developments can support equality and social changes, particularly where lack of affordable public transport is currently a barrier to opportunity."

It is easy to see how some of the biggest beneficiaries of CAVs could be older people. Analysis undertaken in 2017 by the insurer Direct Line showed that about 560,000 older people (aged 75 and over) who no longer drive or never did, would welcome technology that would get them from A to B with no licence required. A further 640,000 would also stand to benefit.

The number of older people losing their licences for medical reasons annually has more than doubled in the past five years. The introduction of level-five autonomous vehicles, capable of handling any road or weather condition without driver intervention, could allow many of these people to travel again and boost their quality of life.

It is easy to see that these benefits could apply equally to others with mobility problems.

However, Susan Claris, Associate Director at Arup and a Trustee of Living Streets, highlights some practical problems with this, saying:

"Accessibility will depend on the nature of the person's disability – will the vehicle be suited to that individual? If a person can't drive themselves, it may well be that they need assistance getting in and out of the vehicle. They would get this from a taxi driver, but not from an AV. So, it's not as simple as saying that the elderly or those who can't drive due to disability will suddenly be able to use AVs."

As Professor David Bailey noted,

"CAVs have the potential to improve mobility for many groups in society but we need to be inclusive from the outset in researching and designing the technology for maximum uptake and social benefit."

Stuart Young, Partner at Gowling WLG, agrees:

"Good regulation not only enables and accelerates the commercial development of CAVs, it also ensures that they develop in a way that's healthy for the whole of society. Getting ahead of the technology and thoughtfully guiding the way in which it develops is key to long-term success for everyone. In the same way that privacy should be designed into data systems, mobility access ought to be designed into the transport system and CAVs from the start."

BENEFITS TO THE UK ECONOMY

A 2017 report by Transport Systems Catapult for the Centre for Connected and Autonomous Vehicles estimated that the global market for connected and self-driving vehicles would be worth £907 billion by 2035.

Professor Nick Reed at Bosch adds a UK angle: "There is potential for automated vehicles to cause radical changes in the production and use of vehicles and wider changes in the transportation system. If the UK can take a lead in the development and deployment of CAVs, we can gain from the jobs and economic growth associated with the industry."

Other panel members agree and believe the age-old concern about new technology replacing jobs does not necessarily apply.

Brian Matthews, Head of Transport Innovation at Milton Keynes Council cites a positive role model from Asia:

"In Singapore, one of the major reasons for getting behind self-driving vehicles was that they could not employ bus drivers, nobody wanted the job. For them, autonomy solves an employment problem, and this may be a useful example for our society in the future."

The policy official, who works in connected and self-driving vehicles, believes that this would be a useful example for our logistics industry.

"There aren't enough HGV drivers in the UK," she said, "and CAV technology could help us make-up this shortfall. Furthermore, we know that innovation can lead to new industries and ventures.. If we compare CAVs to Airbnb for example, it spawned new jobs. Potentially, fleets of CAVs could do the same – there could be new cleaning and maintenance services required, for example."

Brian adds another example:

"The windscreen of a CAV is very different from the piece of glass in today's cars. A CAV windscreen contains cameras/sensors and a lot of technology so couldn't be replaced at the roadside. So, a new highly skilled job has been created."

The DfT's mobility report highlights other key areas including:

- Better productivity by improving the flow of people and goods around the country and freeing up travel time for work or leisure. The average driver in England currently spends a staggering 236 hours behind the wheel annually.
- Attracting investment and creating jobs by ensuring the UK is an attractive place to develop CAV technology.
- And this developing expertise and investment, will, in turn, boost our exports and enable the further development of the UK's established automotive sector.

As Professor David Bailey points out:

"The UK auto industry is currently struggling with the challenges of diesel's demise, a downturn in China affecting exports and Brexit uncertainty as well. Developing CAV technology in the UK could help boost the sector and position it for the future."

IMPACT ON URBAN AND RURAL LIFE

CAVs have the potential to be transformative in an urban context where transport is busiest and space most restricted. All commentators agree that this is where many of the changes will occur first.

The CAV policy official comments:

"CAVs could have a huge impact on land use. If, for example, we don't all need parking spaces outside our houses or at work, then it opens up huge commercial and residential opportunities."

Brian adds:

"At Milton Keynes Council we are thinking about how we can make the use of CAVs easier and more efficient. The highway design profession needs to catch up on this. We are very keen to spark an interest in this area and produce proper guidance, so the planners are thinking ahead 15 years. We have 25,000 parking spaces in Milton Keynes – one third of our city is surface-level parking – this is a tremendous asset and we need to work out how we can use it in the future."

Mike of TfWM makes the point that automation technology is not the only advancement associated with CAVs.

"It's about 5G and electrification as well," he says. "They're three independent technologies but it's natural that they will arrive together. This is a joint opportunity and challenge. Could we, for example, create a new asset class where pieces of infrastructure are for sale, for example? We need to think about this as an ecosystem and then how the infrastructure provider, mobility as a service (MAAS) provider and end-user interact."

CAVs could have one potentially less desirable impact on urban life. Stuart Young at Partner at Gowling WLG comments:

"There is the possibility that if you bring CAVs into the city centre you could just end up adding to the congestion."

The DfT's own 2018 Road Traffic Forecasts report showed that changes in travel demand sparked by the introduction of CAVs could lead to significant traffic growth.

And while there is currently very little data available to show the impact of ride-hailing services on UK congestion, evidence from San Francisco shows that services like Uber lead to significantly more vehicle miles travelled in dense urban areas.

Susan at Arup draws a parallel with London taxis:

"If you look around the main stations in London there are always numerous queuing taxis, with their engines idling. We could end up with cities full of CAVs waiting to be used. Supply could very much outstrip demand until it somehow found a balance."

Part of this balance is how CAVs work with existing public transport. This applies both in urban, suburban and rural environments.

The senior official who works in connected and self-driving vehicles, makes an important point:

"Automation technology will need to integrate with public transport. We need to help shape CAV rollout so it extends the benefit of existing systems."

Professor David Bailey adds:

"We need to think how CAVs can complement public transport, not compete with it. Making sure the two work together, and positioning CAVs via appropriate regulation and pricing, will be critical to making mobility work in a joined up way."

Stuart Young agrees:

"And it's not just about the technology driving the hardware. We need to ensure that the whole ecosystem works together. For example, payments will need to be unified so that users are not faced with multiple payment systems in order to complete one journey."

THE PRACTICALITIES

The DfT's Future of Mobility report identifies nine principles that it hopes will facilitate innovation in urban mobility for freight, passengers and services:

1. New modes of transport and new mobility services must be safe and secure by design.
2. The benefits of innovation in mobility must be available to all parts of the UK and all segments of society.
3. Walking, cycling and active travel must remain the best options for short urban journeys.
4. Mass transit must remain fundamental to an efficient transport system.
5. New mobility services must lead the transition to zero emissions.
6. Mobility innovation must help to reduce congestion through more efficient use of limited road space, for example through sharing rides, increasing occupancy or consolidating freight.
7. The marketplace for mobility must be open to stimulate innovation and give the best deal to consumers.
8. New mobility services must be designed to operate as part of an integrated transport system combining public, private and multiple modes for transport users.
9. Data from new mobility services must be shared where appropriate to improve choice and the operation of the transport system.

All the principles sound very positive, but as any successful business knows you can have the best product in the world, but without the correct 'sales pitch' your miracle invention will just sit on the shelf.

ENCOURAGING PUBLIC UPTAKE

Nick Reed at Bosch suggests one approach:

"We should encourage public uptake when this aligns with the objectives of the relevant authorities. For example, if a city wants to reduce congestion, encouraging people to use single occupant CAVs instead of driving their own vehicle may not be the most effective strategy. CAVs need to address specific transportation challenges in ways that are not possible today and in ways that help cities and regions provide a better environment for their residents, visitors and businesses. If this is delivered, I believe public uptake will follow rapidly."

The CAV policy official adds:

"We need to make sure that all the good messages get out there, but we also need to make sure that everything that goes into CAV design is responding to needs. People understand that CAVs could be particularly helpful and valuable to people with disabilities and mobility issues, but to enable these benefits, we need to ensure that the needs of these communities are considered in the design of supporting services, such as apps, as well as vehicle design."

Some of our other experts are more reticent about encouraging public uptake.

Susan Claris at Arup tells us:

"I think the first question we have to ask is should we be encouraging public uptake? There's inevitably excitement about CAVs as a piece of shiny, new technology. But I don't think that we have properly explored whether people really want them. We're always seeing technologies come and go – 3D televisions are a good example. They've been around for a while now, but very few people have bought them and there is a question around how much we really want them? I think there is a danger that the OEMs are leading this discussion, rather than real public demand."

The senior CAV official comments:

"Public desirability of the new technology is crucial. We need to be able to be clear about why CAVs are a good idea, and how they will benefit both individuals and society as a whole."

Stuart Young agrees:

"We need to be absolutely clear on the benefits of CAVs in their broadest sense, rather than just telling people they can put their feet up instead of driving."

Principles three and four in the government's list – that walking, cycling and active travel must remain the best options for short urban journeys and that mass transit must remain fundamental to an efficient transport system – are potentially at odds with CAVs.

Why, for example, would you want to walk or use public transport if you can simply hop into a CAV which will take you from your front door to the front door of your chosen destination?

Encouraging public uptake of CAVs therefore, could be directly in conflict with local and national public transport policy and encourage inactivity thereby, adding to the current obesity epidemic.

Susan adds an important warning:

"A recent report has shown that inactivity is now causally-linked to 12% of deaths in the UK – that's up to 70,000 deaths a year. If CAVs encourage inactive mobility, then we're heading down a very dangerous path."

David Bailey said:

"Making our priorities clear is critical. At the heart of the Mayor of London's strategy for the new Ultra Clean Air Zone is that the priorities are walking and cycling, then public transport and then low carbon vehicles. We will need to position CAVs in term of priorities."

Mike Waters adds another note of warning:

"It is very important that we get the story right behind these vehicles. But so much then hinges on how we communicate that story. There is a tendency when making social policy for us to do it from a privileged white-collar point of view. We have to be very careful not to introduce unconscious bias into policy making."

Part of the challenge for social policy makers is ensuring they think about the effect CAVs could have on the UK economy. Not only at the macro level, but also the effect they could have on individuals' day-to-day working lives.

Our experts acknowledged that CAVs could have a negative impact on some parts of the workforce that are already under significant economic pressure.

Mike tells us:

"What will the impact of CAVs be on taxi drivers, or self-employed delivery drivers for example? CAVs could have a negative impact on this workforce pool and it is one that is already quite fragile. Potentially many people in this bracket are less able to move into another job, or move areas, so we need to think carefully about how we encourage CAVs and create supportive financial models which enable smaller businesses to continue to prosper."

However, our experts also mention that this potential negative could be an opportunity. For example, when you no longer need a bus driver, perhaps that person can become a conductor.

Mike added:

"Research has shown that people feel safer with another person around on a bus and potentially this new bus conductor could become a salesman. Basically, they're not stuck behind a wheel so they can do something else – perhaps advanced information or bookings for the destinations served."

WHERE? AND WHO?

There is a tendency to think that CAVs are technology of the future. But in reality, much of the automation technology is already on our current cars – particularly those considered to be top-of-the-range vehicles.

There are also several recent examples of new AVs making a real difference to certain communities.

One such example is being run by Coventry-based Aurrigo, part of RDM Group. They are conducting a driverless pods trial in West Sussex with Blind Veterans UK on a six-month programme of testing which started this year.

They have made the pods suitable for people with vision impairments, including improved lighting and prominent colours on rails and seats. The trial will see how the pods operate in a real-life environment and how the veterans use and interact with them. Part of the trial will explore the use of voice-activated controls.

The four-seater pod travels at a maximum speed of 15mph off-road and will run around the Blind Veterans UK training and rehabilitation centre in Ovingdean, near Brighton.

Major General (Rtd) Nick Caplin CB, chief executive of Blind Veterans UK, said:

"So many of the blind veterans we support say that not being able to drive is one of the most significant things that hits you when you lose your sight. Anything we can do to assist and feedback on this new technology will hopefully benefit the lives of our veterans and the wider disabled community in the years to come."

CHANGING OUR COUNTRYSIDE

There is potential for CAVs to increase how far we are prepared to commute. A recent report by the management consultancy Bain & Company called "Spatial Economics: The Declining Cost of Distance" is just one of many to suggest that CAVs will lead to an extension of the urban sprawl as lengthy commutes become painless and workers move back to the suburbs.

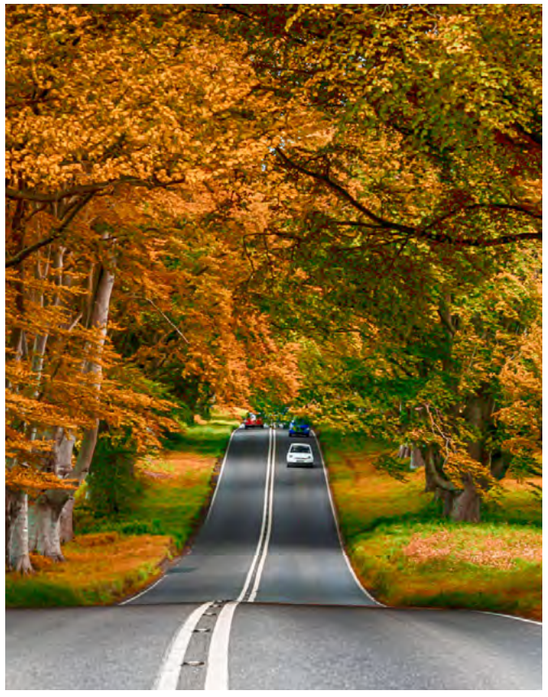
David Bailey commented:

"Faster journey times and the fact that the "driver" can do something other than drive, could increase the incentives to live further away from work. CAVs could therefore, have a massive impact on the spread of suburbia."

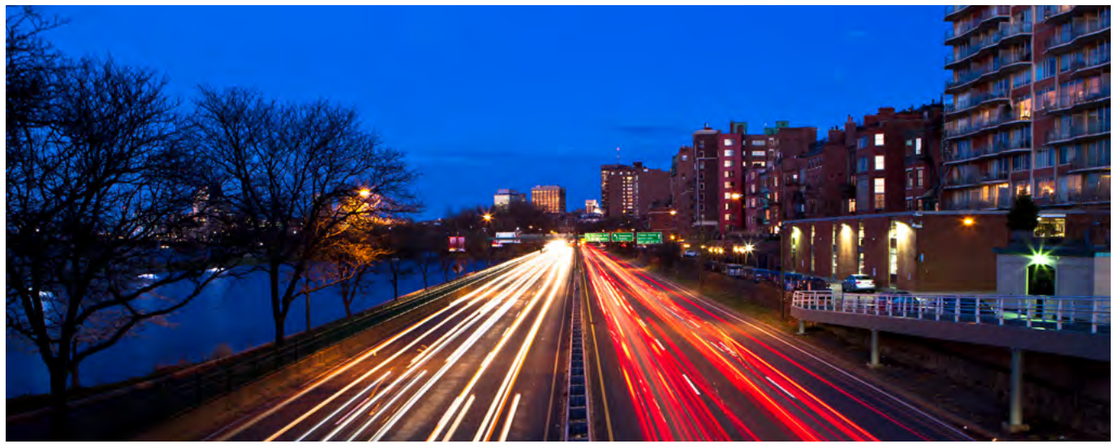
The UK's planning policies are often based around modes of transport and these have remained fundamentally unchanged for decades. Policies on green belt, for example, were developed to reduce urban sprawl.

Vicky Fowler, Partner and Head of Gowling WLG's planning team, said:

"Land use planning remains crucial to determining travel demand. Restrictions on developing on green belt land will not be lifted anytime in the near future and, if anything, as changes to urban mobility emerge there will be an even greater emphasis on freeing up large swathes of car parking in city and urban areas for housing. Joining up the planning for housing, employment and transport will become even more important".



LEADING FROM THE TOP?



Last year's report by the World Economic Forum and The Boston Consulting Group entitled "Reshaping Urban Mobility with Autonomous Vehicles, Lessons from the City of Boston" concluded that there were three main stakeholder groups involved in the development of CAVs, namely:

- Policy makers
- Consumers
- Mobility providers

All have different perspectives, incentives and interests. So, what is needed is a joined-up approach that involves all three and addresses how people and goods move through and around our urban and rural environments. This report goes on to say that policy-makers face a key set of questions including:

- How can trips be distributed more evenly to reduce peak congestion?
- How can the total number of vehicles on roads be reduced?
- How can it be ensured that AVs do not exacerbate the gap between the haves and the have-nots?
- What are the right financial incentives and pricing structures to drive behaviour?
- How much control and regulatory influence is needed?
- Which data sets are needed to make the right investment decisions?

THE ROLES OF CENTRAL AND LOCAL GOVERNMENT

Part of the UK government's approach to beginning to answer these questions includes gathering data from government-funded projects using CAVs.

One such project is Project CAV Forth. This will involve the conversion of five manual single-decker buses into autonomous vehicles, to provide a service capable of carrying up to 42 passengers on the 14-mile journey across the Forth Road Bridge to Edinburgh Park interchange.

With buses every minute, the new service could provide an estimated 10,000 weekly journeys, and will project valuable social behavioural data to further explore how AV technology can integrate into society.

CAVS – DRIVING SOCIAL CHANGE • LEADING FROM THE TOP?

The senior CAV official comments:

"A lot of policy-setting is about people having great ideas. And a lot of those great ideas are about starting small. So, in the next five-to-ten years we may not see widespread rural CAV bus services, for example, but we may see CAVs operating in smaller geo-fenced areas, like a business park or a hospital for example. Once they are operating in small environments, it is likely to be easier to scale them up with public trust. And in doing so, we may find interesting ideas that open up innovation."

Many on our expert panel who are involved in local government agree that funding small, innovative projects is a good way forward.

Mike Waters tells us:

"If central government can make available small funds that local authorities can access to test the introduction of CAVs, that really helps build capacity."

Brian Matthews adds:

"We have to drive some things centrally – areas of regulation for example, like how many charging points you need to have in a certain area. But there is a lot that local authorities can do to prove that this technology works."

He continues:

"Central government needs to engage with **all** local authorities, not just the ones who have been involved before. Perhaps central government needs a strategy to engage at a local level, which focuses on the areas which are going to engage the quickest, but then moves through all communities. We need to work within the usual patterns of how new technology spreads – so we look for potential early adopters and then spread developments out."

However, our central and local government representatives do not agree on everything.

Currently, central government is separating connectivity from autonomy. This is mainly because upgrading existing connectivity infrastructure on the road network will require mass infrastructure investment and there is uncertainty about whether the CAV will show markedly better performance that the AV. Central government feels that they complement each other, but they don't necessarily need each other.

However, Brian comments:

"The advantage of connectivity is particularly obvious for those who commute, because they can use the driving time to do something else. They won't all be on their email, but there will be other emergent technologies coming out of connectivity. Therefore, I think connectivity is very important, because what else you can do in the vehicle will be fundamental to a positive experience."

Stuart Young adds:

"Without connectivity you won't have the ability to plan your way around the traffic. This is what will achieve better use of the infrastructure we already have. This is what will improve mobility. Autonomy on its own, plays to the expensive car where one person gets the benefit of sitting in comfort in a traffic jam. It doesn't help everyone get around more easily."

USING REGULATION TO ENCOURAGE INNOVATION

Our experts agree that new regulation is needed to ensure CAVs work and deliver on their potential. But what form could this take? And how pre-emptive do the regulators need to be?

Mike Waters comments:

"We are talking about societal change and I guess the question is whether we are proactive in tackling that head on, or wait, observe and then act."

The senior CAV official agrees:

"Governments everywhere - both local and national - will need to decide how interventionist they want to be in supporting CAV technology."

Susan Claris adds:

"I think regulation must come first because our towns and cities can't be left as a free-for-all when it comes to something like the transport system. It needs to be developed in a holistic way and fit in with other forms of transport and integration. Safety should be absolutely paramount, and it needs coordinating so that CAVs don't just arrive on our streets and take away space from other road users."

However, Susan also adds that regulation is not the solution that will ensure CAVs work:

"I think we do need to ask more difficult questions first," she says. "We need to focus on the role CAVs could play in improving our cities, improving our health, improving the environment as opposed to merely saying 'right, what needs to change to enable CAVs to be here?' We need to look at the outcomes first and be sure that the potential benefits are real."

"Personally, I think the current agenda is being led by the manufacturers and we need to wrap more of a social policy framework around this otherwise there could be a whole range of unintended consequences. You can almost see a parallel with the time when cars first appeared on our roads in the late 19th century. During that time, pedestrian casualties were up in their thousands – very much higher than they are today. This led to the formation of the Pedestrians Association, now Living Streets, who campaigned for the introduction of pedestrian crossings and speed limits. At the time there simply wasn't the regulatory framework or legislative framework to address the problems."

David Bailey said:

"regulation needs to provide a clear direction of travel that underpins business confidence for investment and hence economic growth. At the same time it needs to encourage safety, societal confidence in the new technologies and foster inclusivity."

So what could the economics of the regulation look like?

Mike Waters thinks:

"We do have options to regulate price through some city models, but many cities will probably not want to work like that, because it can leave them having to take the revenue risk. So, if CAVs simply add to the congestion, then fewer people will want to use them, the price of running them will go up and so vehicle utilisation will be lower and consumer price will be up – resulting in demand down. Mass transit solutions into centres with dedicated infrastructure will remain competitive due to economy of scale and journey time advantage, in future as now – the challenge area will in the sub-urban fringes of the public transport network."

And of course, if CAVs are expensive they will not be inclusive.

Stuart Young believes this is where regulation comes in. He says:

"For example, a condition of holding the licence to run an autonomous fleet in the West Midlands could be that you operate pricing in a certain way. So, there will be a return for the private provider, who operates an inclusive service."

He continues:

"What I haven't seen is local or central government getting ahead and saying how they want to use it and regulate it, so that providers know where they stand. This would be a signal to the commercial providers that would point them in the right direction. So, they don't make the perfect expensive CAV for a wealthy individual and then wait for that to flow down through the fleet – they look at developing smaller vehicles to connect into public transport."

Mike Waters agrees and adds that it is critical to define a universal licensing model in regulation. He says:

"We cannot end up with an equivalent of taxi licensing. There are about 160 models for this across the country and we clearly cannot have that with CAVs. I think this next 18 months could be really interesting in working through that."

David Bailey adds:

"We need to find the burning platform for changing regulation. Potentially some of the positives around CAVs are not big enough for this, because a lot of people think transport is ok. It may not be perfect, but it mostly works."

Part of the DfT's Future of Mobility report is devoted to regulatory review.

It says:

"A thriving mobility sector needs an innovative and flexible regulatory framework. That framework must keep people safe and promote active and accessible travel, while providing certainty for investment and the space for invention and trials."

The DfT is therefore, going to undertake a Future of Mobility Regulatory Review, which, they believe, is highly likely to require new primary legislation.

Stuart Young adds:

"Of course we could sit back and wait for the technology to develop in its own way and at its own speed, but that has its own risks. Recent experience with the unchecked growth in social media and the impact of its abuse on our democratic processes, shows what can happen. We strongly recommend that the regulatory framework for CAVs be laid down as soon as possible so that the social benefits are clearly visible. This will not slow up the commercialisation of CAVs but, rather, will speed up development by offering greater certainty to commercial participants, while increasing public acceptance by clearly demonstrating the wider benefits of CAVs. It will be a true win:win situation."

And it is not just speed which is important. These discussions cannot be limited to the UK only.

Susan Claris comments:

"We have to do this at an international level. There is always a danger with all the conferences and meetings that you only talk to like-minded people. We need to bring multiple different players together for a more honest discussion focusing on the 'what ifs?'".

Whatever the outcome, our experts think it is vital that government is proactive, rather than reactive.

Nick Reed comments:

"This technology is something that could change societies in profound ways, negatively or positively. By taking a proactive approach to social policy we can maximise the likelihood of achieving the most positive outcomes for society. The challenge to this is that in doing so, we may restrict innovation by guiding technological developments along a certain path. This may result in UK companies failing to flourish where others that are less constricted by a social conscience succeed. However, if those paths do not promote social benefit then they are ultimately destined to fail."

CONCLUSION

WHEN CAVS BECOME A REALITY, OUR EXPERTS AGREE THAT THEY WILL BRING FUNDAMENTAL CHANGES TO OUR SOCIETY.

As this reality gets ever closer, positive and clearly thought-through changes to social policy need to be made to ensure the population is ready to accept the benefits of the new technologies.

The technological developments are, unsurprisingly, being led by those who make the vehicles. Our experts believe that these manufacturers should take a back-seat to the regulators when it comes to setting the social norms.

The consensus among our panel is that government needs to take a proactive approach which focuses on desired outcomes, rather than technological capabilities.

This report, and others like it, should act as a wake-up call to policy makers and vehicle manufacturers. CAVs will not be successful unless their potentially very positive benefits are communicated in the right way. The success of this 'transport revolution' is equally dependent on a new, strong social policy which leads the debate.

For CAVs to truly succeed the social policy needs to be as innovative as the technology they are built on.

CAVS – DRIVING SOCIAL CHANGE • CONCLUSION

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