



Smart  
Mobility  
Living Lab  
London

ANTICIPATING AUTONOMOUS:

# THE UK'S DRIVERLESS FUTURE



An industry report on attitudes of business decision makers to the future of Connected Autonomous Vehicles (CAVs) in the UK



# FOREWORD

As humans, we have been developing new forms of transport to improve the way we travel and work since Mesopotamian times and the earliest recorded use of horse-drawn carts in 1900 BC.

Fast-forward almost 4,000 years and there are 38.2 million vehicles licensed for use on the roads in Great Britain alone, 31.5 million of which are cars<sup>1</sup>. We are truly a nation of journey makers.

In the last 150 years, the pace of change in transport has accelerated beyond belief. From the 1885 invention of the first ever automobile to now where driverless car technology promises to usher in the next transport revolution.

Driverless cars or connected autonomous vehicles (CAVs), as this report refers to them, will bring seismic changes to the UK as a whole.

CAVs are set to play a crucial role in the future of the UK's society and economy. From improving the safety of British roads for passengers and pedestrians to liberating those who are less able to travel.

The Department for Transport is aiming for the first deployments of CAVs in the UK by 2021<sup>2</sup> and major car manufacturers and technology companies have begun trialling driverless prototype cars. There is both a public and private sector appetite for making this autonomous future a reality.

So, what are the next steps for making CAVs commercially available in the UK? When will road-users be able to buy one? What benefits can the UK public expect?

This report, commissioned by the [Smart Mobility Living Lab: London \(SMLL\)](#), sets out to tackle these key questions, based on research which surveyed 250 senior decision makers from across the transporting, technology and automotive industries.

---

<sup>1</sup> <https://www.racfoundation.org/motoring-faqs/mobility#a1>

<sup>2</sup> <https://www.gov.uk/government/news/self-parking-cars-could-be-on-a-street-near-you-by-2021>



# EXECUTIVE SUMMARY

Connected autonomous vehicles (CAVs) and the anticipated societal benefits they will bring will become a reality within the next decade.

That's the over-riding feeling amongst the transport and technology industry leaders we surveyed as part of this study of opinions about CAVs in the UK.

Of the decision makers surveyed, almost two-thirds (65%) are confident that CAVs will be made available on UK roads in the next five years. This isn't to say that those respondents think all cars will be driverless within this timescale, but it is a vote of confidence in the UK's ability to take CAVs from their formative stages to a commercially viable method of transport and convince enough early adopters to use them.

Building on this expectation, a perception exists that progress has been slower than initially anticipated. Almost half (49%) said that they expected CAVs to already be available for use in the UK, suggesting that while many do not consider the barriers to progress to be impassable, further work must be done to achieve this. This may also be indicative of a general lack of appreciation about the amount of time it takes to bring new technologies to market.

Industry leaders are also clear that the benefits that CAVs will bring to the UK are well worth pursuing. The principal benefit driving CAVs forward is safety. Two-thirds (67%) of respondents believe CAVs will make British roads safer, and almost half (46%) cited safety as the main benefit that CAVs will bring when they are effectively rolled out.

Beyond safety, they will deliver a future of mobility that is intelligent, joined-up and positively affects the lives of British people and businesses in many ways. Almost half (49%) agreed that CAVs will make elderly and disabled people more mobile. This is a welcome development considering that people are living longer, with many finding it increasingly difficult to get around as they age. For people with physical disabilities, CAVs could open doors to lifestyle and career choices from an earlier age which would previously have been challenging for them to pursue.

These broader societal benefits also translate into commercial opportunities. More than seven in ten (72%) of respondents were unconcerned about a lack of market need holding back the rollout of CAVs. In economic terms, 62% agreed that CAVs would have a positive impact on UK GDP.

These findings point towards anticipation and expectation rather than confusion and trepidation. There is a clear mandate for making CAVs commercially available in the UK over the next five years and willingness from transport, automotive and technology organisations to set about the task.

---

62%

AGREED THAT CAVS  
WOULD HAVE A  
POSITIVE IMPACT ON  
UK GDP.

---

# BEYOND SAFETY -

## The key benefits and impact of CAVs

Safety is naturally a key concern for CAV users, regulators and manufacturers. For consumers, attitudes towards the safety of CAVs are on a positive trajectory. Deloitte's 2018 Global Automotive Consumer Study found that less than half (49%) believe that self-driving vehicles will be unsafe, down from 73% in 2017.<sup>3</sup>

When it comes to leaders from transport, automotive and technology organisations, attitudes towards the safety of CAVs are more positive: only 17% disagreed that CAVs would make UK roads safer, with two-thirds (67%) agreeing that they will. 16% declared themselves unsure on this issue, potentially due to the lack of real-world deployments available in the UK on which to base this response.

Beyond safety, industry leaders are most excited about the wider role CAVs will play in British society. These included a range of advantages on important societal and economic issues.

Brits already spend more time commuting than people living and working in other countries. According to the ONS, the average commute time in the UK is 54 minutes, while the number of people commuting for more than an hour has risen by 31% since 2011.<sup>4</sup> CAVs promise to reduce congestion on UK roads – 41% of respondents believe this – by improving traffic flows and using more of the available space on the roads by driving closer together.

Over half (51%) of the decision makers surveyed think freeing up more time for commuters due to reduced travel time will be a key benefit. Over a third (37%) agree that CAVs may help commuters achieve a better work/life balance, while the majority are unsure that CAVs will have any impact.

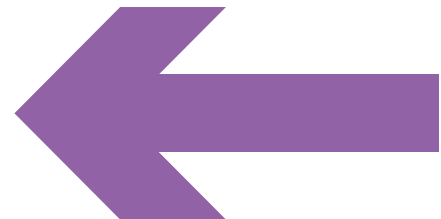
CAVs may well reduce commuting times for some people, but whether or not a shorter commuting time has a positive impact on work/life balance is entirely subjective. Furthermore, there are many factors which affect work/life balance besides length of travel to work, such

as average working hours, holidays and job demands.

One finding which does indicate how CAVs might improve our quality of life is that almost half (49%) of those surveyed highlighted increased mobility for elderly and disabled people as a key benefit. The latest ONS projections show that in 50 years' time, there are likely to be an additional 8.6 million people aged 65 years and over, so the role CAVs play in terms of increasing opportunity and mobility for elderly and disabled people is only likely to increase in importance in years to come.<sup>5</sup>

---

# 49%



**HIGHLIGHTED INCREASED MOBILITY  
FOR ELDERLY AND DISABLED PEOPLE  
AS A KEY BENEFIT.**

---

Giving people access to the world around them will not only allow them to enjoy a better quality of life, it also opens the door to a potentially untapped demographic for local shops, businesses and service providers. This is one of the areas where we can already tangibly see the point at which CAVs moves from technological advancement to economic and social progress.

Those surveyed identified CAVs as having a role to play in helping the UK and local governments hit their various emissions

---

<sup>3</sup> <https://www2.deloitte.com/uk/en/pages/press-releases/articles/fears-about-the-safety-of-driverless-cars-diminishing.html>

<sup>4</sup> <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/labourforcesurvey/qml>

---

<sup>5</sup> <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/ageing/articles/livinglongerhowourpopulationischangingandwhyitmatters/2018-08-13>

targets. In its fifth carbon budget, the UK has committed to reducing carbon emissions by 57% of 1990 levels by 2030. Almost three-quarters (74%) of industry leaders believe CAVs have a role to play in doing so, with 46% of those believing they are fundamental to these goals.

Linking CAVs to reductions in carbon emissions, as 43% of those surveyed do, could be based on the assumption that CAVs will be powered by electricity rather than traditional internal combustion engines (ICE). It's important to note this as an interesting perception, despite the lack of any industry consensus on the predominant power-train that CAVs will use. While studies do exist, which determine CAVs may lead to lower emissions due to 'platooning', this is not sufficient to assume that CAVs will register a positive impact on the environment overall.

Almost a third (30%) of respondents feel the introduction of CAVs will lead to a reduction in vehicle ownership. For example, would a family need multiple vehicles, if the one vehicle could drop one person off and then return home to collect other family members? We cannot directly infer from this finding that people think this will result in a reduction of the total number of vehicles on the road. Instead it simply reflects a belief that the ownership model for change. Would you need to own a vehicle if there are driverless cars constantly available to "taxi" you around? Either way, this is a crucial finding which hints towards a dramatic shift in the business model used by vehicle manufacturers and transport operators.

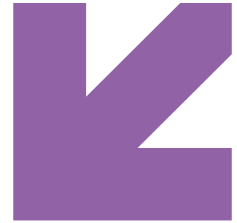


68%

**THINK CAVS NEED TO BE SUBJECTED  
TO REAL-WORLD TESTING BEFORE  
THEY CAN BE USED ON UK ROADS.**



# CAVS – THE FORMATIVE YEARS:



Although the future transport system is likely to be powered by CAVs, the full impact they will have on society and the implications of their rollout are yet to be fully realised or considered. According to this study, we're still very much in the formative years of CAVs. Collaboration between industries, governments and regulators will be essential in navigating this final period of development and eventual implementation.

One of the key questions, is who should be responsible for this rollout? Car manufacturers understand that CAVs may change vehicle ownership models forever and that to ignore the imminent disruption would be folly. The technology industry, playing a central role in the operation of the vehicles, has much to gain from CAVs being made commercially available. Whether it's supplying the in-car technologies, sensors and software, or the digital infrastructure, urban and rural connectivity and data management solutions, all parts of the CAV ecosystem will have to work together for their deployment to be successful.

When asked where the primary responsibility for the rollout lies, 43% said with technology companies, while 41% answered vehicle manufacturers. While this indicates that deploying CAVs in the UK must be a cross-industry collaboration with no primary leader, there is a clear mandate for the private sector to set the pace of this rollout. Less than a third (30%) feel that national government should take responsibility.

Most leaders in the private sector think personal cars (32%) will be the first vehicles to become autonomous, twice as likely as taxis and buses (16%). From a commercial perspective this may be because self-driving personal cars command more consumer appeal than taxis or buses. This nods towards private sector organisations leading the way, although there is a chance that the first CAVs in the UK will be taxis or buses, rolled out as part of government programmes to build trust in the technology. This may be required before personal CAVs are considered commercially viable.

Although there is a sense that this rollout

will not be led by national government, one factor to consider is that public sector bodies are focused on easing congestion caused by personal vehicles and instead promote public transport methods. The impact of autonomous vehicle technologies on the public transport experience could be profound in terms of increasing consistency, efficiency and satisfaction.

The assumption that CAVs will be led by technology and automotive organisations may be linked to the factors which could delay their rollout in the UK. Investment in strengthening the UK's digital infrastructure was flagged (39%) as a key step for making self-driving cars commercially available in the next five years. In-vehicle technology (47%) and roadside technologies (44%) were also noted as requiring advancement enough to support a full rollout. Given the lack of real-world deployments of CAVs in the UK on which to base this theory, it is understandable that a perception exists that the necessary technologies are not ready.

To move the needle on those perceptions, more successful trials and testing of autonomous vehicle technologies need to take place on UK soil – especially in complex urban settings. Collaboration between the technology industry, vehicle manufacturers and the public bodies responsible for these infrastructure upgrades will be crucial for making CAVs a commercial success.

## **Rigorous testing is essential in bringing CAVs to the market**

Navigating the interplay between in-car technology, roadside technology, broader vehicle infrastructure, data security and regulation requirements is too complex for any one developer or industry to solve on its own. Comprehensive testing, collaborative R&D and collective regulation development is the only way for CAVs to become a commercial reality.

Arguably, the least surprising finding of the study is that 92% of industry decision makers acknowledge that some form of testing is required before CAVs can be made commercially available to UK road-users. More than two-thirds (68%) think CAVs need to be



subjected to rigorous real-world testing before they can be used on UK roads.


Taking it one step further, 45% think live testing environments are important. These testing environments need to involve interaction between CAVs and human-driven vehicles as well as pedestrians. A further 39% think extensive consumer trials must take place before CAVs will be a commercial reality.

This response indicates that, while generally the process of testing roadworthiness of vehicles is entrusted to vehicle manufacturers and industry bodies, a more involved process is expected for self-driving vehicles.

Most respondents (84%) agree that the UK needs its own testing facilities for CAVs. There are multiple interpretations available as to why senior industry decision makers feel that the UK needs its own testing facilities. Consumers today are, for the most part, prepared to drive vehicles which were not manufactured or tested in the UK, and this finding may be evidence of an assumption that vehicles which are bought and sold for use in the UK have been locally tested.

Another interpretation is that people feel that roadways and road-users in the UK are distinct enough to require a testing environment designed specifically for them. There are unique challenges, even for machines, which are brought about by different terrains, transport systems and the behaviour of other road users. It is possible that there is a consensus among industry decision makers that driverless cars demand completely different local testing protocols than user-controlled ones.

The research supports the view that city-based testing facilities can make a positive contribution towards innovation in driverless car technologies as well as reassuring stakeholders from multiple industries and consumers of their safety and reliability.



84%

**BELIEVE CAVS WILL BECOME  
AVAILABLE IN THE NEXT DECADE.**

# NEXT STEP? STANDARDS.

Consistent with the generally positive response to the potential of CAVs being rolled out in the UK, 70% are confident that CAVs can be successfully regulated against a standard – something with which almost 50% of CEOs strongly agree. This consensus is a major vote of confidence in the ability of UK transport bodies to successfully regulate the use of CAVs, ultimately enabling their commercial use.

However, 39% said that regulatory and technology standards must be agreed upon before CAVs can fulfil their commercial potential, with 41% noting that insurance policies and legal liability frameworks must be in place. Insurers and lawyers have been - and still are - engaged in lengthy debates around how issues such as liability and compensation will be regulated should a road-traffic collision or breakdown involving a CAV occur.

Uniting the industry focus on safety, the broad need for public and private sector collaboration, and the essential role of product and business model testing is the agreed requirement for exacting standards.

Real-world testing and collaboration is just as important for regulators as it is for vehicle manufacturers and technology developers. Governments and regulators need to know that the rules they put in place for CAVs do everything necessary to support growth, foster innovation and protect consumers.

This survey of senior decision makers from the transport, technology and automotive industries has provided a strong indication that it is a matter of when and not if CAVs become available in the UK – supported by the fact that only 2% of respondents said that this would not happen and 84% believe that this will happen within the next decade.

The next steps are already in motion. The [Smart Mobility Living Lab: London \(SMLL\)](#), a co-innovation project led by TRL and a consortium including Cisco, Transport for London, DG Cities, Queen Elizabeth Olympic Park, Cubic, and Loughborough University, has taken on the challenge of facilitating the searching for solutions.

SMLL brings together technology, public infrastructure and transport experts to build a testbed, located across the Royal Borough of Greenwich and the Queen Elizabeth Olympic Park, to offer a uniquely complex urban setting for developing future transport technologies, services and business models. The testbed will become the place to go for advanced real-world CAV and transport testing – where technology and service providers from related and unrelated industries can look at the entire connected transport environment and get their products and services market-ready, faster.

A UK road network used predominantly by CAVs isn't five, ten years away, it is almost upon us. The journey has begun.

---

## ARE YOU WITH US?

Join us at [smartmobility.london](https://smartmobility.london)

[@SMLL\\_London](#)

[#JourneyMakers](#)







Smart  
Mobility  
Living Lab  
London

Join us at [smartmobility.london](https://smartmobility.london)

@SMLL\_London

#JourneyMakers