The journey to successful connected autonomous vehicles

Connected and autonomous vehicles (CAV) are not just part of an imagined future street scene; they are here today on our roads in a growing number of pilot projects. And connected and autonomous technologies are increasingly prevalent in new production vehicles. However for fully CAVs to operate on our streets there are a number of issues and questions that still need to be addressed. So what are these issues and whose responsibility is it to find the answers?

The automotive sector

For the automotive industry, the development of autonomous vehicles represents massive disruption to a well-established market. New challengers with new ideas, new expertise and new intellectual property are on the scene. They are making huge investments to get the technology to work. But the sector has yet to develop a meaningful CAV business model or models. This means understanding what advantages a connected, driverless vehicle can offer consumers over a conventional vehicle or a taxi service. The sector needs to work out if people will move away from vehicle ownership and leasing to renting a CAV for a specific trip and if we will move to a system where mobility becomes a service we purchase like any other. A service type model would have huge implications for the manufacturers – they would no longer sell vehicles to end-users, rather they would either sell mobility or would sell to intermediaries (who would then sell on mobility). That is a very different business model, with very different revenue streams, and would require very different relationships with their customers.

The insurance industry

Insurers too will need to change their current model. As over 90% of motor collisions are due to driver error, the introduction of CAVs would be expected to cut the number of crashes. Indeed, there are 20% fewer collisions involving cars fitted with emergency braking systems.

That means it is likely that insurers will move away from insuring the driver to insuring the use of the vehicle – effectively product liability. Volvo has already announced that it will accept full liability for collisions involving its driverless cars and other manufacturers are expected to follow suit. In theory this simple solution makes a lot of sense. However there are still potential complexities. This includes determining what to do with vehicles that are out of warranty and therefore not in the mechanical state envisaged when designed. This could mean that CAVs will be unusable or uninsurable after, say, three years or they could need substantial refits to enable the manufacturer to accept on-going liability.

Highways authorities
The development of CAVs requires not only the right vehicle technology but the right infrastructure to support that technology. So highways authorities have the very real challenge of building and maintaining the infrastructure for the vehicles of today which will also be fit for the future. If they do not take account of the operational requirements of CAVs, infrastructure that is currently being built may need rework in the medium term to allow them to operate to their full potential. A very simple example is road markings – removing these may help reduce vehicle speeds however they will also reduce the benefit of vehicle lane detection systems (and hence reduce their potential safety benefits).

The regulators

It is clear that Government has a huge part to play in developing an effective operating framework for CAVs. By not ratifying the Vienna Convention on Road Traffic, the UK has been able to create a supportive environment for the development and testing of connected and autonomous vehicle technologies. However, for CAVs to be widely adopted, existing regulations governing how vehicles are used and maintained will need changed. This is likely to involve modifications to the MOT test to check roadworthiness (to include software updates) and the Highway Code. The challenge for the regulators is whether they try and steer the market (building a legislative environment into which manufacturers can develop vehicles and a working business model) or respond to it (amending the legislative environment in response to development/events).

Police

Whilst the widespread adoption of CAVs has the potential to drastically reduce the number of collisions, they also could create a number of very real policing challenges. For example how do police stop and redirect autonomous vehicles (for example up a one way street to avoid an incident)? And how can CAVs clear the highway to respond to an emergency vehicle? Operators will also need to ensure that vehicle connectivity (vehicle to vehicle, infrastructure and to highways authorities) is not used to create widespread disruption. And on a more immediate level, what investigating capabilities will the police need to deal with collisions involving CAVs?

Users of CAVs

CAVs present a huge potential to increase the safety of individuals’ journeys, shorten journey times, increase the productivity of travellers and allow unprecedented shifts in working patterns and resulting improvements in work-life balance. However, these benefits come with costs; placing reliance on the safety of the underpinning vehicle technology, entrusting personal data to an unproven set of systems, and the surrender of personal vehicle control. So a key challenge, while technology and systems are in their infancy, will be to convince users of the advantages of CAVs and so create a market for them.

An emerging system of systems

As technology and testing develop it will be easier to bridge the credibility gap with potential users. But there are still a number of significant challenges that need to be
overcome for CAVs to operate effectively. The most significant of these relates to the very inter-connectivity of these challenges – the solution for each will have an impact on the other areas in a way that is very new for the automotive sector. In order to clarify these interconnections and show how the inter-relationships can be managed, PA has developed a visual representation of the different factors which will affect the successful development of CAVs (see below).

The picture clearly shows that getting CAVs on the road as a viable and attractive option will be complex. There will be multiple solutions, for example covering different types of CAV user (e.g. commercial vs private). It also underlines that insurers, manufacturers, regulators will all have to work together to create a new world of collaboration and interconnection.

These complexities clearly illustrate that making CAVs a reality is not just a technological or even a commercial challenge but a political, social and cultural one too, and that understanding the inter-dependencies between them is going to require careful and focused attention in the coming years. The potential prize is significant but more work is needed to map out the route to get us there.

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