

Allianz Insurance plc

# The Future of Mobility

Changes in vehicle  
technology

**Allianz** 

DAC beachcroft



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We have dedicated specialists dealing with pre-litigation and MoI portal claims handling, credit hire and credit hire fraud expertise as well as a unique, dedicated motor prosecutions team who are accessible to customers 24 hours a day.

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## Introduction

Whether it's our daily commute, the distribution of goods produced by a business or the annual trip back home to see the family, we're a nation hugely dependent on motor vehicles. But, over the next 10 to 20 years, advances in technology will change our relationship with motor vehicles, with major implications for society, the economy and the insurance industry.

Among the technologies that are already in production are in-car cameras, external air bags, vehicle to vehicle and vehicle to infrastructure communication, augmented reality dashboards and advanced driver assistance systems. And, while these developments are a significant step forward in themselves, many lead to what is being widely heralded as the future of transport - the autonomous, or driverless, car.

These technological advances will have far-reaching effects. Cleaner fuels will benefit the environment and health while safety devices such as autonomous braking systems will lead to significant reductions in the number of people killed and injured on the UK's roads.

The economy will also benefit. As well as the savings delivered through safety and fuel economies, more efficient transport will save time and money when it comes to delivering goods. In addition, the UK's government is looking to build on our role in the automotive sector by securing our place at the forefront of these technological advances.

These advances will also drive change in the insurance sector. Improvements in road safety and accident risk will help to reduce claims but, as autonomous vehicles take to our roads, the question of liability will need to be addressed.

In this White Paper we assess how mobility will evolve over the next couple of decades and how this is likely to affect insurance.



Smart grid technology could turn electric cars into suppliers as well as consumers of electricity, with the vehicle's battery becoming a supplementary source of power during peak demand times and even feeding any spare capacity back into the grid.

## Changes in vehicle technology

Advances in technology, the demand for further improvements in road safety and a shortage in natural resources will drive significant change on the roads. While, additional factors may yet come into play, the following are four of the key trends currently shaping the future of mobility: green cars, telematics, advanced driver assistance systems and autonomous vehicles.

### Green cars

Growth in environmental consciousness coupled with fuel costs mean that a move away from today's gas guzzling vehicles is a certainty.

While oil prices have fallen since mid-2014, figures from the Department of Energy & Climate Change show that longer term, the trend is upwards. Its DECC Fossil Fuel Price Projections report (September 2014) shows that, based on the central projection, while a barrel of oil was US\$105 in 2014, this was expected to rise marginally to US\$107.7 by 2025 and to US\$135 by 2035.

The first step on this path to greener driving is the electric vehicle. Although the prototypes in this field had limited use due to issues relating to mileage and charging, new technology is making them a viable alternative to the petrol vehicle. As an example, plug-in hybrids, which use lithium-ion batteries that can be charged by being plugged into the grid, are a major step forward in terms of power, performance and price. When driven as a hybrid, Volvo's V60 Plug-in Hybrid offers up to 155 miles to the gallon and, with emissions as low as 48g/km, lower road tax. But, switch to power mode, and it can go from 0 to 60 in less than six

seconds. And General Motors claims that its plug-in hybrid Chevrolet Volt costs around 1.2 US cents a kilometre to drive, compared to 7.5 US cents for a conventional vehicle.

This shift away from petrol also benefits the corporate customer. As well as cost efficiencies, running a fleet of greener vehicles can help to reduce the organisation's carbon footprint. This has reputational benefits but can also help to secure contracts and win business.

Further innovation is also expected to make green vehicles more desirable. Smart grid technology could turn electric vehicles into suppliers as well as consumers of electricity, with the vehicle's battery becoming a supplementary source of power during peak demand times and even feeding any spare capacity back into the grid.

Motor manufacturers are also exploring alternatives to batteries, including developing body panels that can store energy and charge the vehicle. These could be charged through a variety of means including solar energy, electricity and even the energy the vehicle creates through braking and other processes. An additional benefit of this would be that the panels would be lightweight, helping to increase the vehicle's energy efficiencies.

**Telematics can be pivotal in helping to protect road users, improving the management and speed of claims and delivering significant cost savings to businesses.**

### Telematics

Telematics is a form of black box technology, similar to that used in airplanes. It collects data on the distance travelled, using GPS to determine location, speed and the type of road. This data provides an insight into the way the vehicle is being driven and the risk the driver presents. The cost of telematics technology initially meant it was used primarily within the logistics sector and among younger drivers. In the young driver sector, insurance premiums covered the installation of the black box and gave a financial incentive to demonstrate that the driver's risk profile justified lower premiums.

But, as technology has matured, its price and the size of the equipment required has shrunk, and it is now possible to deliver multiple solutions both via more traditional fitted black boxes, 'self-install devices' or apps on smart phones. As a result of this, the way it is used and can be used is evolving too. Rather than being regarded as a means to

purely track vehicle usage, telematics technology, when used effectively, can help to influence driver behaviour and improve the overall business performance.

By highlighting driving habits it can encourage better techniques, reducing the likelihood of causing an accident. In addition, as the technology tracks where a vehicle is, it can speed up emergency service response times if an accident does occur.

For a fleet manager, this insight is invaluable too, helping them to optimise how vehicles are used. This can lead to reduced fuel costs and improved customer service through effective route planning.

These benefits mean that the use of this form of technology is set to increase significantly over the next decade. As an example, the European Parliament has recently voted for eCall, which automatically calls the emergency services in the event of an accident, to be implemented as standard in new cars and light vans from 31 March 2018. This alone is predicted to cut the emergency services response time by up to 60% in built-up areas, saving hundreds of lives across the EU each year.

But, while we're likely to see more growth in telematics over the next few years, it could, in its current form find itself consigned to the history books in the next 10 to 20 years. As advanced driver assistance systems and ultimately autonomous vehicles take over more and more control of the vehicle, telematics, as an influence on driving behaviour, may become redundant.

### Case Study Disputed Liability

Allianz received notification from third party solicitors alleging an incident had occurred 6 months previously for which their client was claiming personal injury and vehicle damage. The policyholder was confident his car hadn't left his driveway and stated he had never heard of the loss location. Immediately after the request was received, customer's consent was sought to obtain the telematics data to support his claim and a request was logged with the broker.

This was returned the same day and supported our insured's version of events. The policyholder's vehicle had been 175 miles from the loss location. In this case, utilising telematics resulted in being able to defend the clients' interests and reject the third party's claims.



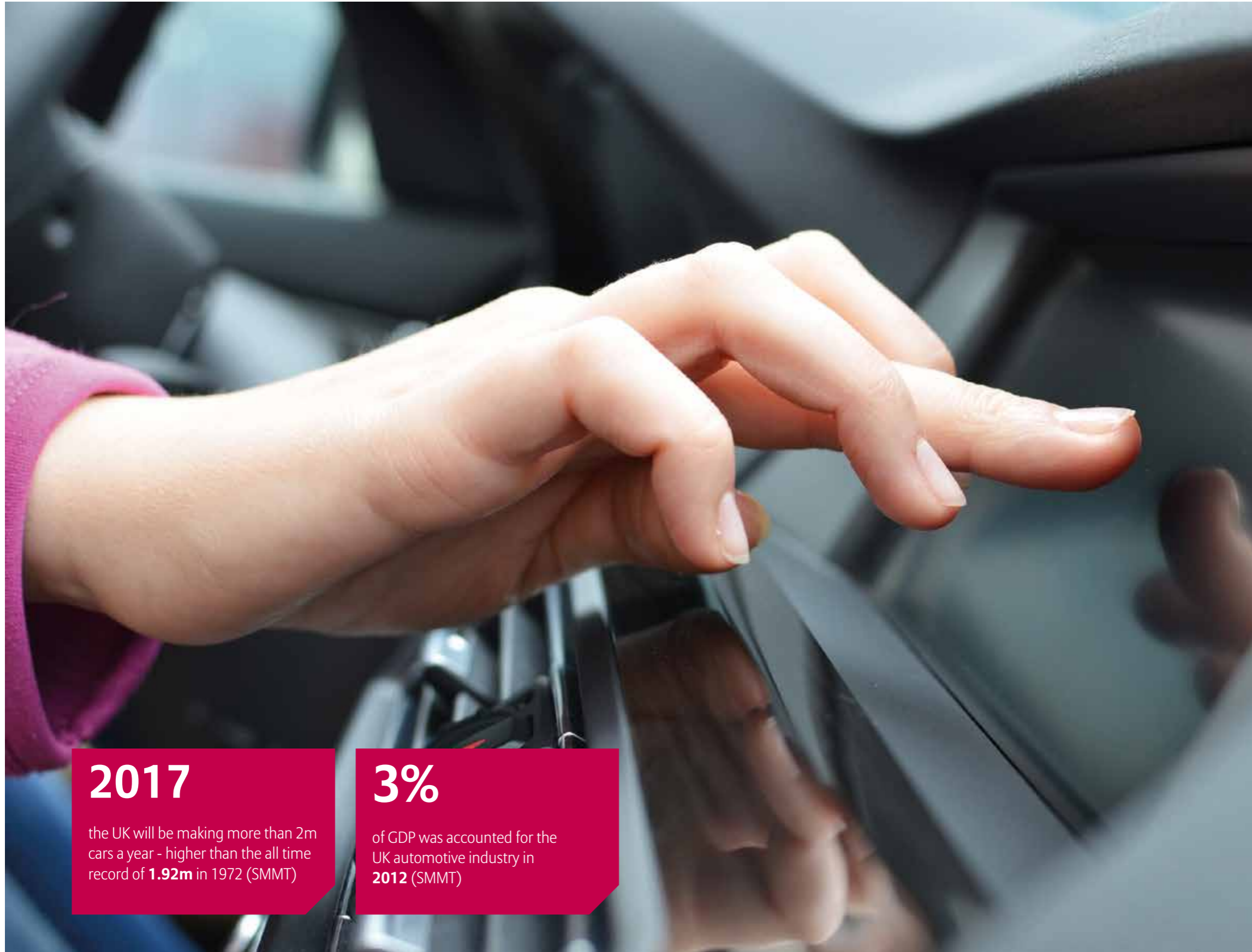
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**"Used effectively, telematics technology can materially influence driving behaviours, delivering significant safety benefits to drivers and road users alike as well as improving business performance."**

Jonathan Dye, Head of Motor Insurance,  
Allianz Insurance





## 2017

the UK will be making more than 2m cars a year - higher than the all time record of **1.92m** in 1972 (SMMT)

## 3%

of GDP was accounted for the UK automotive industry in **2012** (SMMT)

### Advanced driver assistance systems

Advanced driver assistance systems (ADAS) support the driver by automating some of the vehicle systems such as steering, braking and lighting, usually only in the event of an emergency. As human error accounts for around 90% of road accidents, having this automated driving support can significantly improve vehicle and road safety.

A variety of different technologies are included under this category including adaptive cruise control, autonomous emergency braking (AEB), lane departure warning systems, intelligent speed adaption, blind spot detection and vehicle communication systems. The impact of these technologies can be significant. Take AEB as an example. This automatically applies the brakes if the driver does not respond in time, helping them to avoid or mitigate a collision. Research by Thatcham found that, as well as being effective in mitigating the devastating effects of high speed crashes, in low speed accidents (under 20mph), where more than three quarters of accidents occur, AEB reduced the occurrence by around 20%.

Transforming these probabilities into more meaningful numbers, Thatcham forecasts that, if an incentive scheme were combined with regulation requiring mandatory AEB fitting on new cars by 2020, it would prevent more than 750,000 damage claims and 19,000 deaths and serious injuries between 2015 and 2025.

Unsurprisingly these safety statistics mean AEB is already becoming increasingly commonplace. Since it was first introduced in 2008 by Volvo with its standard fit City Safety, it is now offered, either as standard or an option, by 17 vehicle manufacturers. This means that around 1.5% of vehicles on the road have AEB.

### Autonomous vehicles

Progressing from the ADAS technologies already seen in many vehicles is the autonomous or driverless car. Already under development with projects such as Google's Self-Driving Car, these vehicles have the potential to revolutionise transportation.

Although the prospect of switching from being in control of a vehicle to just being a passenger is likely to challenge some diehard motorists, the benefits of going driverless are potentially huge. First and foremost, automating all the driving processes removes the risk of driver error and therefore may lead to much safer roads.

Traffic jams would also be a thing of the past, with vehicles able to travel much closer together. For example, a study from California Partners for Advanced Transit and Highways (PATH) found

that, even when used efficiently, only 5.5% of US road is covered with cars. This is to ensure a safety margin for human drivers, but this would shrink considerably in a computer-steered vehicle.

As an example of the potential, the European Commission funded project Safe Road Trains for the Environment (SARTRE) is exploring technologies that would enable vehicle platoons - electronically linked vehicles that are actively controlled by the lead driver on normal public roads. In its first trial in 2012, it successfully linked five vehicles, which were driven 200km at a top speed of 85kmph with a gap of just six metres between each of them.

Autonomous vehicles are also more efficient. As well as helping to improve traffic flow, thereby requiring less braking and acceleration, there would be none of the bad habits found in human drivers. These can dramatically increase fuel consumption as a fuel economy test conducted by

Ford demonstrated. It found that avoiding excessive idling, aggressive driving and exaggerated use of air conditioning can reduce fuel consumption by more than 20%.

Autonomous vehicles also bring social benefits. No longer required to drive, people will be free to do something more constructive or relaxing while travelling. And, in some instances such as collecting someone or something, it will be possible to simply send the car rather than undertake the journey yourself.

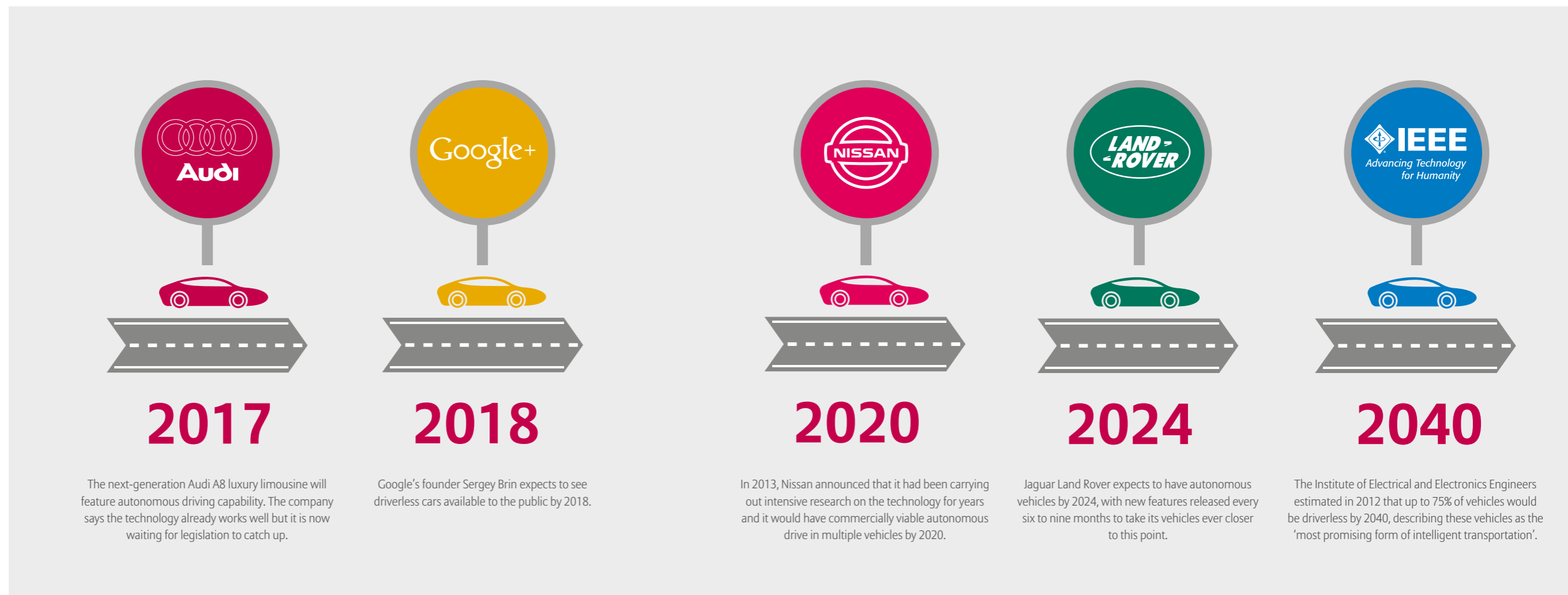
As well as social benefits there are also significant business benefits to going autonomous. On top of the savings that can be realised through more efficient vehicle use, with traffic flow improved and initiatives such as the vehicle platoons an option, transporting goods will be simpler and faster. But, in spite of the benefits, how quickly autonomous vehicles will be on our roads is down to a number

of factors. While the technology may already be in place, the nature of the change means government support and legislation is essential.

In the UK this is beginning to fall into place with the Chancellor George Osborne announcing the creation of four driverless car test-beds in the December 2014 Autumn Statement. Formal trials kicked off in January 2015 and are expected to run for between 18 and 36 months. This is being supported by a review of relevant legislation and regulation by the Department of Transport to enable wider use of this type of technology.

But, although this supports the government's aim to make the UK the global hub for the research, development and integration of driverless vehicles, this form of technology is still unlikely to be widespread for at least 10 years.

### Autonomous vehicles when will they be on the roads?



# Car safety measures through the years

## 1959 - Seatbelts

When front seatbelts became compulsory in the UK in 1983, Department of Transport figures indicated that it would save as many as 1,000 lives a year. Research also found that wearing rear seatbelts, which became compulsory in 1991, would save a further 160 lives a year. Statistics from Brake, the UK's road safety charity, indicate that wearing a three point seatbelt reduces the chance of dying in a crash by 50%.

## 1987 - Airbags

Designed to provide additional protection in the event of a collision by preventing injuries caused by striking vehicle fittings such as the steering wheel or windows, having an airbag in conjunction with wearing a seatbelt reduces the chance of dying in a crash by 67% according to Brake.

## 1987 - Electronic stability programme

by checking up to 25 times a second whether the driver's steering matches the vehicle's actual movement, ESP helps to counteract skidding when bad road conditions lead to a loss of control. Compulsory in new cars in the EU since 2014, research by Allianz Center for Technology found that if all passenger cars were fitted with it, it would reduce accidents with bodily injuries by 25% and fatal accidents by 35% to 40%.

## 2007 - Blind spot information system

radar sensors or small cameras in a vehicle's side mirrors constantly scan the blind spot, alerting the driver of any hazards if they signal to turn. A study by European research project euroFOT found that 80% of drivers found it improved safety, especially in heavy inner-city traffic.

## 1978 - Anti-lock Braking System (ABS)

Allowing the driver to maintain steering control under heavy braking, the ABS system is designed to prevent the wheels from locking by automatically regulating brake pressure.

## 2000 - Lane departure warning

this safety device uses cameras to track a vehicle's position within its lane, alerting the driver if it crosses a lane marking. This helps to avoid the three main causes of collisions - driver error, distraction and drowsiness. In addition, research by the EU's Transport Research Laboratory found that it would have prevented around 16% of accidents on the UK's 70mph dual carriageways in 2005 and 2006.

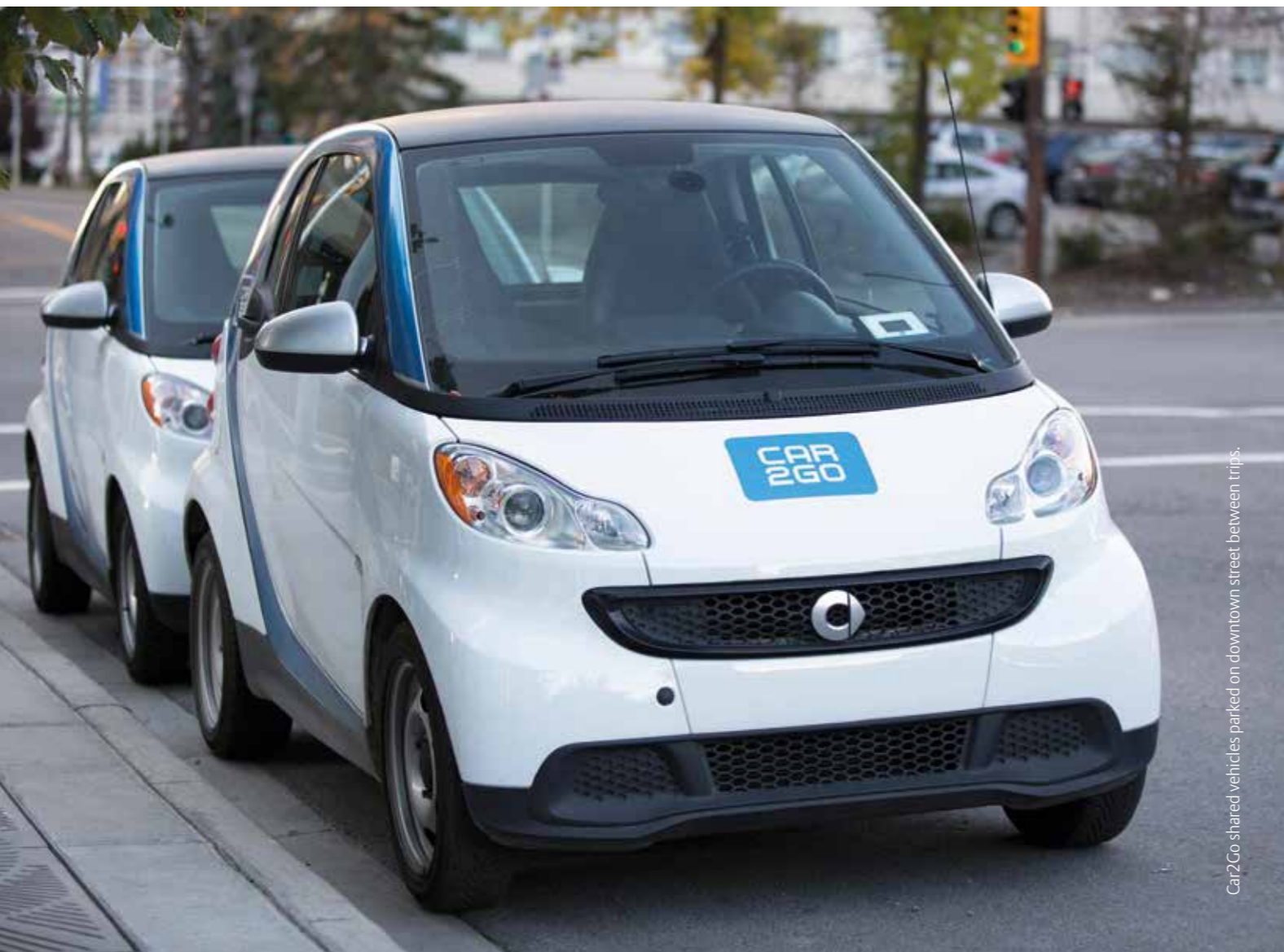
## 2008 - Autonomous emergency braking

by automatically applying the brakes if the driver does not respond in time, AEB can deliver a 20% reduction in the number of accidents that occur at less than 20mph.

## Tomorrow's vehicles, tomorrow's risk

As well as changing the way we drive and use vehicles, these technological advances will have a major influence on the risks associated with insuring them. But, while some risks will be greatly reduced or disappear altogether, it's highly likely that new risks and challenges will emerge.

These are some of the insurance related trends we expect to see as these technologies are adopted.



Car2Go shared vehicles parked on downtown street between trips.

### Improved safety

Whether by removing the risk of human error, in the case of advanced driver assistance systems, or by improving driver behaviour with telematics, many of the technologies currently being developed will lead to significant improvements in safety. This will reduce the risk of accidents and personal injury claims, potentially leading to lower motor insurance premiums.

A good example of this is autonomous emergency braking. Research by Allianz Center of Technology found that it resulted in a 15% reduction in third party personal injury claims costs; a 31% reduction in third party property damage and an 18% reduction in own damage.

This risk reduction has also been recognised by the Association of British Insurers, which announced that, from October 2012, autonomous emergency braking would be taken into account in vehicle group ratings. This could mean a vehicle achieves a reduced rating, with the driver benefitting from a lower premium.

“These developments have the potential to significantly reduce the compensation culture in the UK. Staged accidents, whiplash and credit hire could cease to be issues for the insurance industry.”

Craig Dickson, head of motor, DAC Beachcroft

### Fraud reduction

As well as reducing the number of genuine accidents, the introduction of more advanced driver assistance systems and ultimately autonomous vehicles, will also help to prevent fraud.

Staging an accident will be virtually impossible with a vehicle with advanced driver assistance systems such as autonomous emergency braking. Similarly, with telematics devices collecting information about how the vehicle is driven, it will be easier to understand what happened in an accident and determine whether it was genuine.

### Vehicle usage and ownership

Although many drivers are wedded to their cars, many expect to see our relationship with our vehicles change in the next couple of decades. This will be influenced by societal changes but also the way vehicle technology is evolving.

For example, shared car schemes, where users have access to a vehicle when they want, are expected to see huge growth. According to research by international analysts Frost & Sullivan this sector will have around 15 million users in Europe by 2020, up from 700,000 today.

Vehicle usage is also set to change completely when autonomous vehicles become the norm. Rather than drive to collect someone or something, a vehicle can be sent in much the same way as a courier or taxi is used today.

While incredibly convenient, this raises questions over how the vehicle would be insured and who would be liable if the vehicle arrived late or the wrong person or item was collected.



## Competition could be more intense, with insurers potentially competing for the driver's business every time they get behind the steering wheel.

### Customer relations

Technology will potentially enable insurers to have a closer relationship with their customers. Rather than an annual contact at the point of renewal, insurers will be able to interact with their customers more frequently and, through the provision of additional services and support, potentially more constructively.

This is particularly the case with telematics where an insurer can provide driving feedback or use the data to recommend routes or even destinations that might appeal.

Having this data will also improve customer service in the event of an accident. As well as making it easier to determine liability, the insurer will be able to have greater control over hire vehicles and rehabilitation for injured parties. This can help to create a much more strongly branded and customer-centric claims service.

### Insurance design

Telematics is changing the way driver risk is assessed, with insurers able to adjust the cost of cover as the data indicates that new behaviours and vehicle usage are taking place. This could lead to insurance breaking away from the annual policy model and instead become monthly or even priced for each individual journey.

While this approach will mean that cover is priced in line with risk, it will present challenges for insurers. Competition could be more intense, with insurers potentially competing for the driver's business every time they get behind the steering wheel.

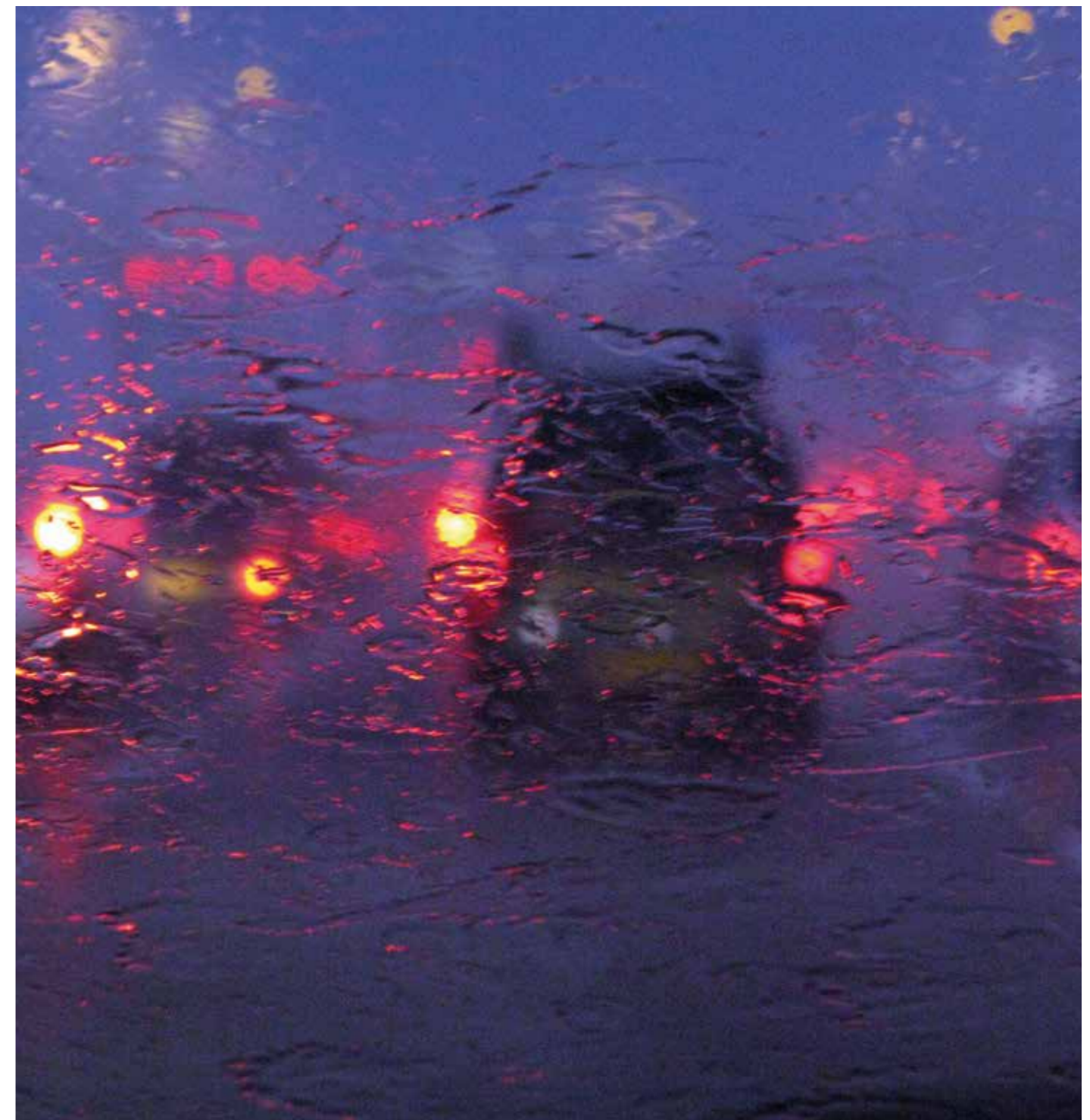
### Data issues

The growth in the amount of data available brings benefits to insurers when it comes to assessing risk and liability, but there are also potential issues around data ownership and access. This is particularly the case as the technology becomes more widespread and is installed by the motor manufacturer, for instance eCall, rather than the client or insurer.

### Liability issues

As technology takes the steering wheel in tomorrow's vehicles, the matter of liability will be a major consideration. Under UK law, primary liability rests with the driver of the vehicle and, where an accident occurs as a result of technology failure, the driver and their insurer would seek damages from the manufacturer.

But with an autonomous vehicle, this legal position is inappropriate and could even slow down the take up of this type of technology. To ensure this doesn't happen, governments will need to determine how legislation can support these advances.



“The real challenge lies with what happens if the technology fails. We could move from a position where rather than assessing negligence a claims handler becomes a product liability specialist.”

Craig Dickson, head of motor, DAC Beachcroft

## Conclusion

Over the next 10 to 20 years, our roads and the way we use, own and insure vehicles are set to change completely.

These changes will be far-reaching and will affect society, the economy and the environment and are likely to include:

- Improvements in road and vehicle safety due to advanced driver assistance systems and telematics. This will significantly reduce the number of people killed and injured on the UK's roads.
- Benefits to the environment and public health as alternative forms of energy are introduced that help to reduce pollution. The use of greener fuels will also drive cost savings, benefiting the public and the UK's businesses.
- More efficient transport will help to save time and money for drivers and businesses that rely on the roads to transport their goods. This will bring benefits to the UK's economy.
- Further economical benefits as a result of the government's decision to invest in autonomous vehicles to make the UK the global hub for the development of this form of technology.

It will also change the purchase and provision of insurance. Improvements in road and vehicle safety and the reduction in staged accidents could lead to lower premiums while the use of technologies such as telematics could see annual policies replaced with insurance that's priced for each journey.

Shifting to a journey-based model could make insurance more risk-reflective but it could also lead to greater competition in the market, forcing insurers to develop new, complementary services to gain customer loyalty.

There are also some thorny issues that will need to be explored in the insurance space. In particular, as autonomous vehicles take to the roads, primary liability may need to shift from the driver to the motor manufacturer.

But, given the benefits these technologies deliver, finding ways to ensure that these new risks can be insured is essential to support these advances and help shape tomorrow's roads.

At Allianz we will be watching developments closely to ensure that products respond to the advances and our customers' needs. For more information visit our Open Knowledge website

<http://knowledge.allianz.com/mobility>

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