Connected & Autonomous Vehicles – The future of Mobility and the implications for insurance

Chartered Insurance Institute

@AXADavidW

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AXA Insurance UK

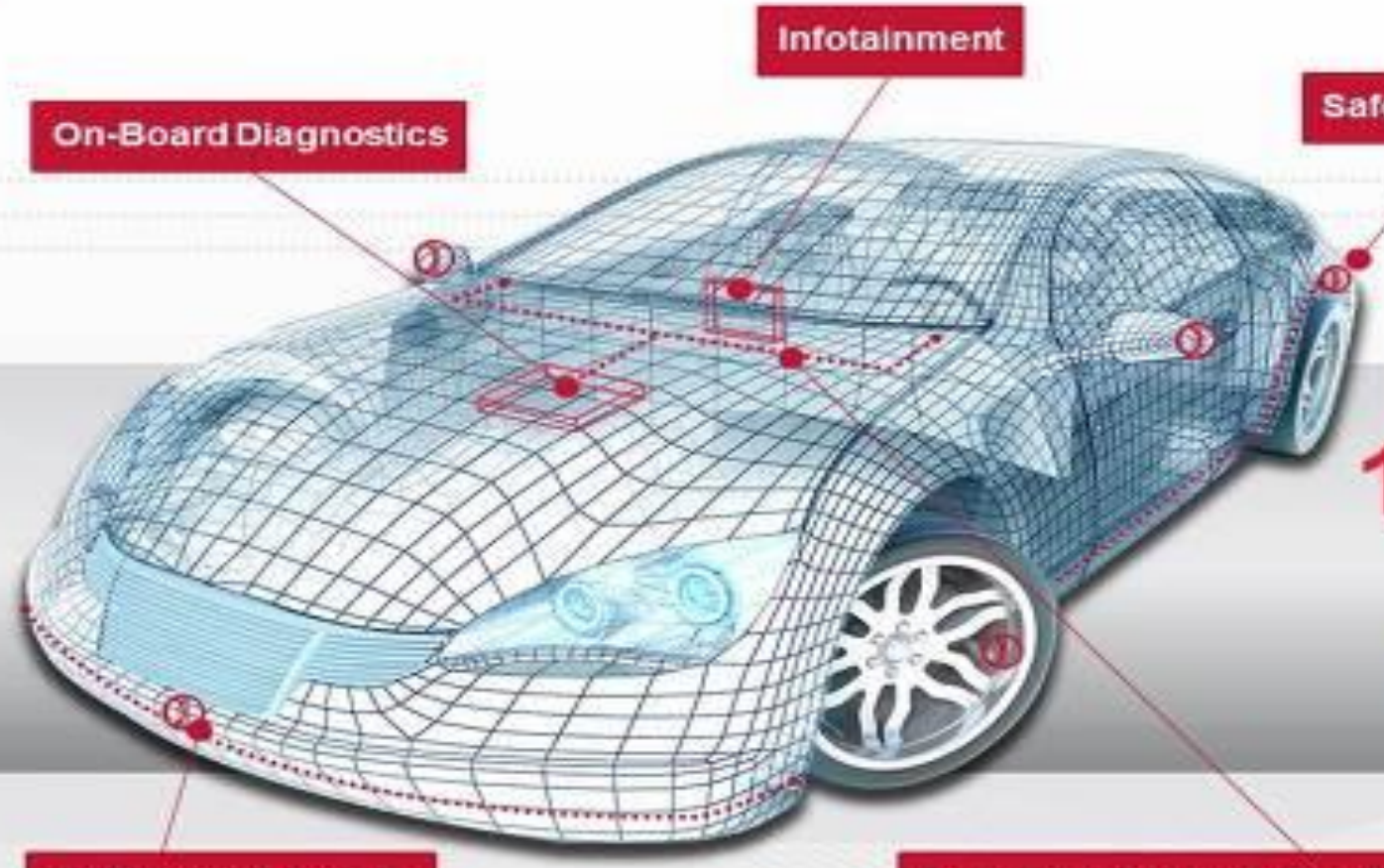
Learning Objectives - What will we cover today?

At the end of this event, you will:

- Have gained an understanding of some of the Government backed consortia and why AXA & other insurers are involved in these
- Seen how the UK Insurance industry is responding and the workings of the ABI ADIG
- Understand details of the governments work with regard to making **Connected & Autonomous Vehicles** (CAV's) a reality for the UK
- Be aware of Possible Timelines for the various stages of Driver assistance systems moving through to fully autonomous driving
- Have discussed possible impacts of CAV's on the current insurance market, including changes to Motor and Public/Products Liability
- Have considered the implications of the Uber Crash
- Have heard about other recent developments!

Connected & Autonomous Vehicles (CAV's)

THE CONNECTED CAR



"DRIVERLESS CARS"

100% Of cars will be connected by 2025[1]

75% Of cars on the road will be autonomous by 2035[2]

Source: [1]GSMA 2013, [2]Navigant Research 2013

- Autonomous Technology
- Motor Manufacturers (OEM's)
- Mobility as a Service / Sharing Society

Why are Insurers Involved?

35 Million Vehicles
licensed on the road

This figure has increased every year since the end of the Second World War (except 1991)

90%
of all accidents are caused by driver error

1,700+
people died in vehicle collisions in the UK in 2013

Road traffic injuries are the leading cause of death among young people, aged 15–29 years

2,500
lives saved in the UK by 2030

£2,767
average cost claimed for car insurance

£11,292
average cost claimed for bodily injury

£16bn
annual cost to GB econonmy

46% 17-30 year olds do not hold a full driving licence

Autonomous Driving Insurance Group (ADIG)

Bristol

BAE SYSTEMS

VENTURER

Fusion Processing

Burges Salmon

UWE Bristol | University of the West of England

brl
Bristol Robotics Laboratory

WILLIAMS

First

AXA

South Gloucestershire Council

University of BRISTOL

ATKINS

Testing technology plus a focus on legal and insurance implications

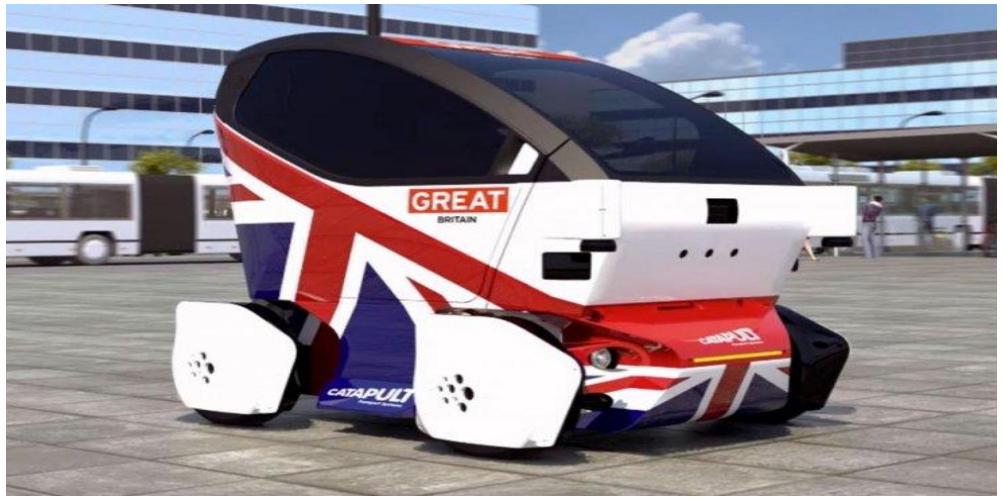
Coventry & Milton Keynes

UK Autodrive

University of Oxford

University of Cambridge

ARUP



Jaguar

Land Rover

Gowling WLG

MK

milton keynes council

TATA MOTORS

RDM Group

The Open University

Coventry City Council

Ford

Vehicle Technologies and looking at integrating vehicles into urban environments

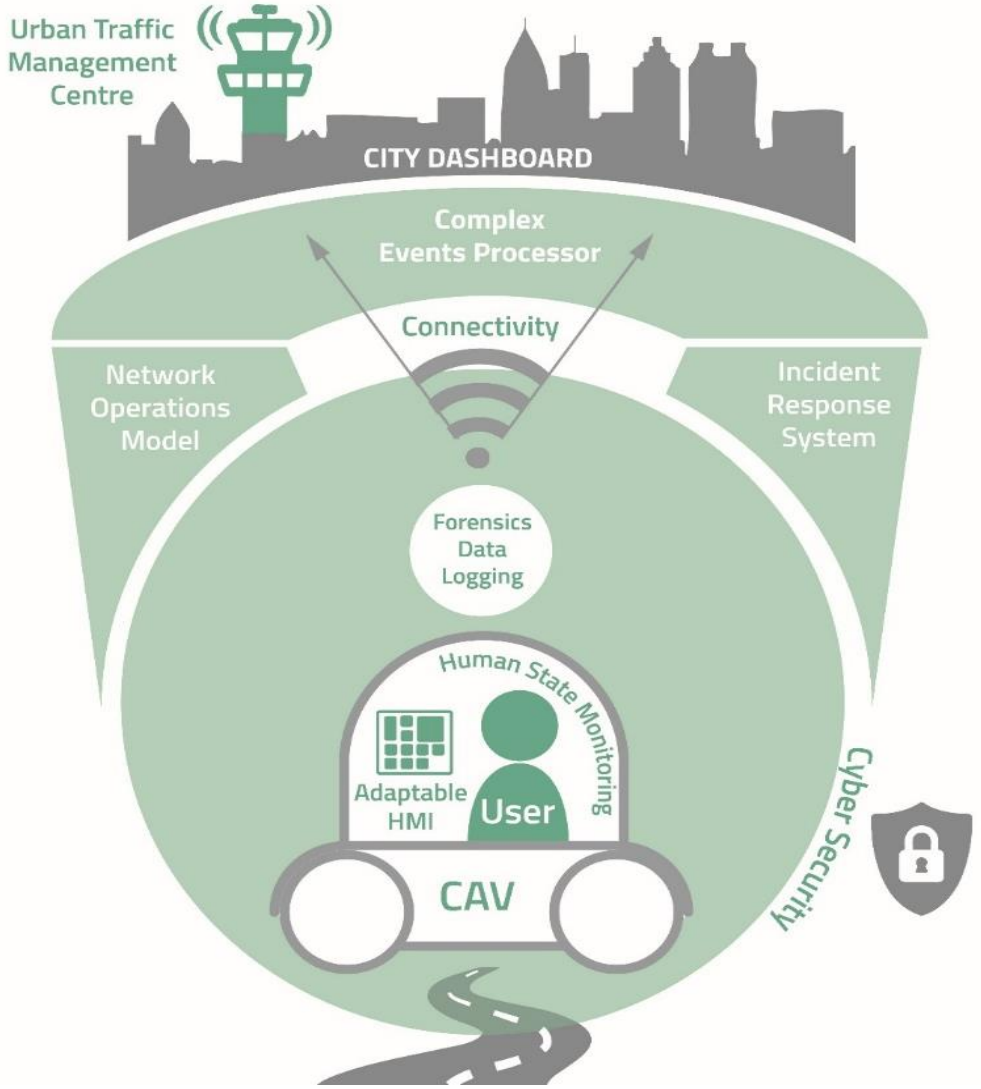
flourish
empowerment through trusted secure mobility

1. To develop an understanding and articulation of user needs and expectations of CAVs in order to maximise the mobility potential they pose.

2. To develop usable adaptive interfaces, performance certification processes and products and services that enable secure, trustworthy and private technology within CAVs.

3. To capture the data created by CAVs to develop innovative new tools and products.

4. To leverage existing investment to expand validation and test capabilities in both urban and interurban networked environments and enhance the commercial opportunities this will deliver.

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@WestfieldAVS

#PodOnTour!

CAPRI - Connected & Autonomous POD on-Road Implementation

Project will trial POD mobility service at Queen Elizabeth Olympic Park

Pilot could pave the way for the use of autonomous and connected vehicles in airports, hospitals, business parks and shopping centres

About CAPRI

CAPRI (Connected & Autonomous POD on-Road Implementation) is a large consortium comprising 20 partnering organisations.

With a strong mix of academia, business and public sector authorities, each member will play an important role in the delivery of the CAPRI mobility service pilot scheme. The 20 CAPRI partners are: AECOM, AXA, Burges Salmon, Conigital, dynniq, ESP Group, Fusion Processing, Heathrow, Loughborough University, NEXOR, Queen Elizabeth Olympic Park, South Gloucestershire Council, Transport Simulation Systems, University of Warwick, University of Bristol, thingful, TVS, University of the West of England, Westfield and YTL.

Robopilot

- Charge Automotive has won Innovate UK backing to help develop autonomous driving functionality for its new range of electric freight vehicles. Dubbed **Robopilot**, the project will see look to bring autonomous racing technology to the light commercial vehicle market.

- **Robopilot** combines input from sensors around the vehicle – such as radars, cameras, ultrasonics and lidars (light sensors to measure the distance to a target object) – with mapping, artificial intelligence and fleet information, which is then acted on by autonomous software.

- The Oxfordshire-based firm plans to bring a range of affordable, zero-emission freight trucks to the market that will be priced in line with traditional diesel counterparts.

Extract from 'T&VS' Press Release on RoboPilot

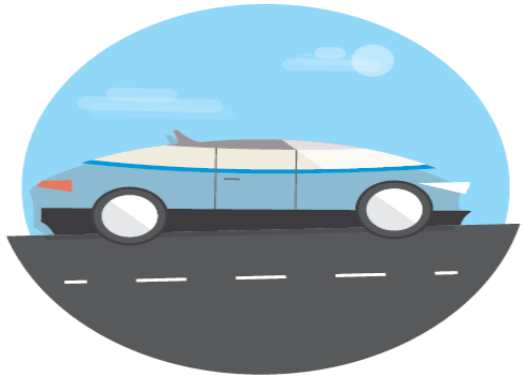
Consortium partners

Arrival (previously Charge Automotive)
UPS UK Thales UK
Loughborough University
University of Bristol, University of West of England
South Gloucestershire Council
Test and Verification Solutions
Burgess salmon
AXA UK

Back to Bristol & Venturer….

https://youtu.be/k1JRmMA7NqU

Consortium Project Prospectus - The 4 'T's!



Transport

The deployment of CAV capability has considerable ramifications on the wider transport sector and cities/communities in general. Key questions that must be addressed relate to the infrastructure investment needed, the data intelligence that can be garnered for a transport operator, and how CAV is one piece of the Smart City puzzle.

Time

CAV deployment is a question of 'when' rather than 'if'. For the UK to create a competitive advantage it is necessary to continue to invest in this area. Significant growth potential exists as well as growing global competition. The UK must maximise the opportunities that regulation currently provides and aggressively target market growth in the areas of testing and validation.

Testing

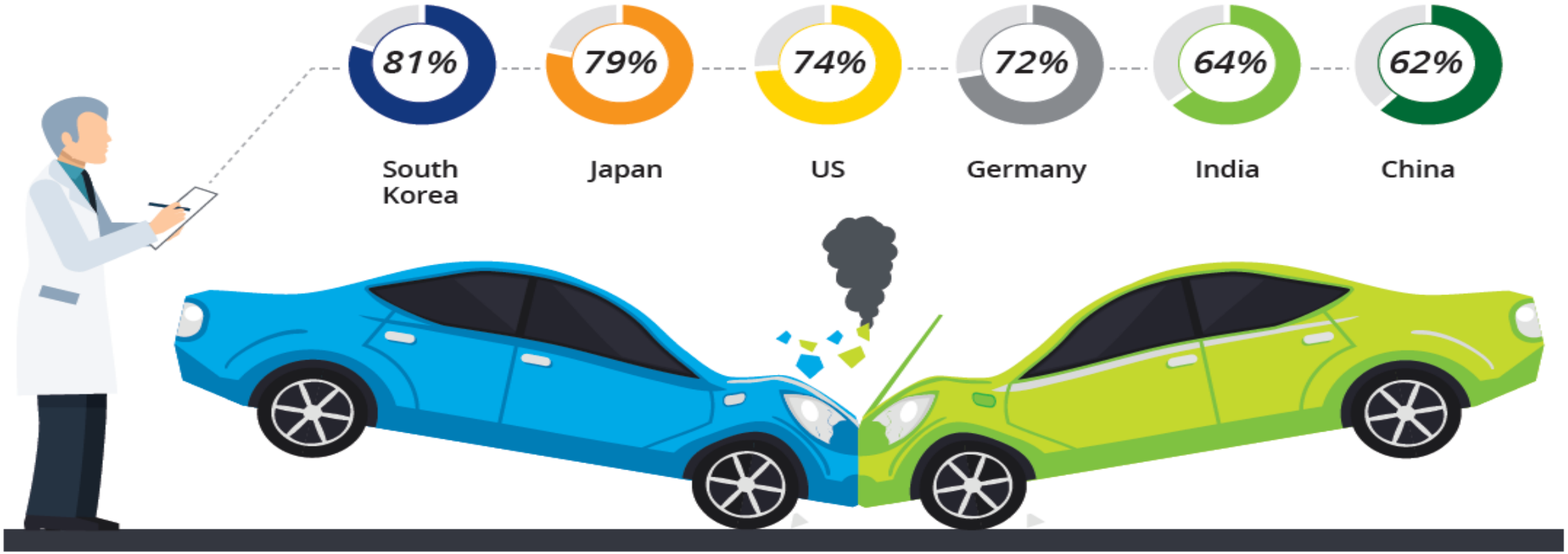
Independent validation is fundamental to emphasise the capability and safety of any solution in the CAV space. It is vital that appropriate and audited testing takes place in a controlled environment before any deployment takes place in. As the software and hardware components come from multiple vendors and integrated numerous ways, the various levels of testing required must be fully understood and integration with primary and secondary parts must be considered. The communications backbone must be robust and secure with a realistic urban backdrop. This is necessary to fully understand real life deployment issues.

Trust

People must believe and trust the technology they are using. They must feel safe and want to use/buy new services that CAV open up to them rather than being sold solutions that are not fit for purpose or for person. CAV must be safe, secure and valued by the consumer and understanding the behaviour and emotions around CAV is an important step towards deployment.

TRUST?

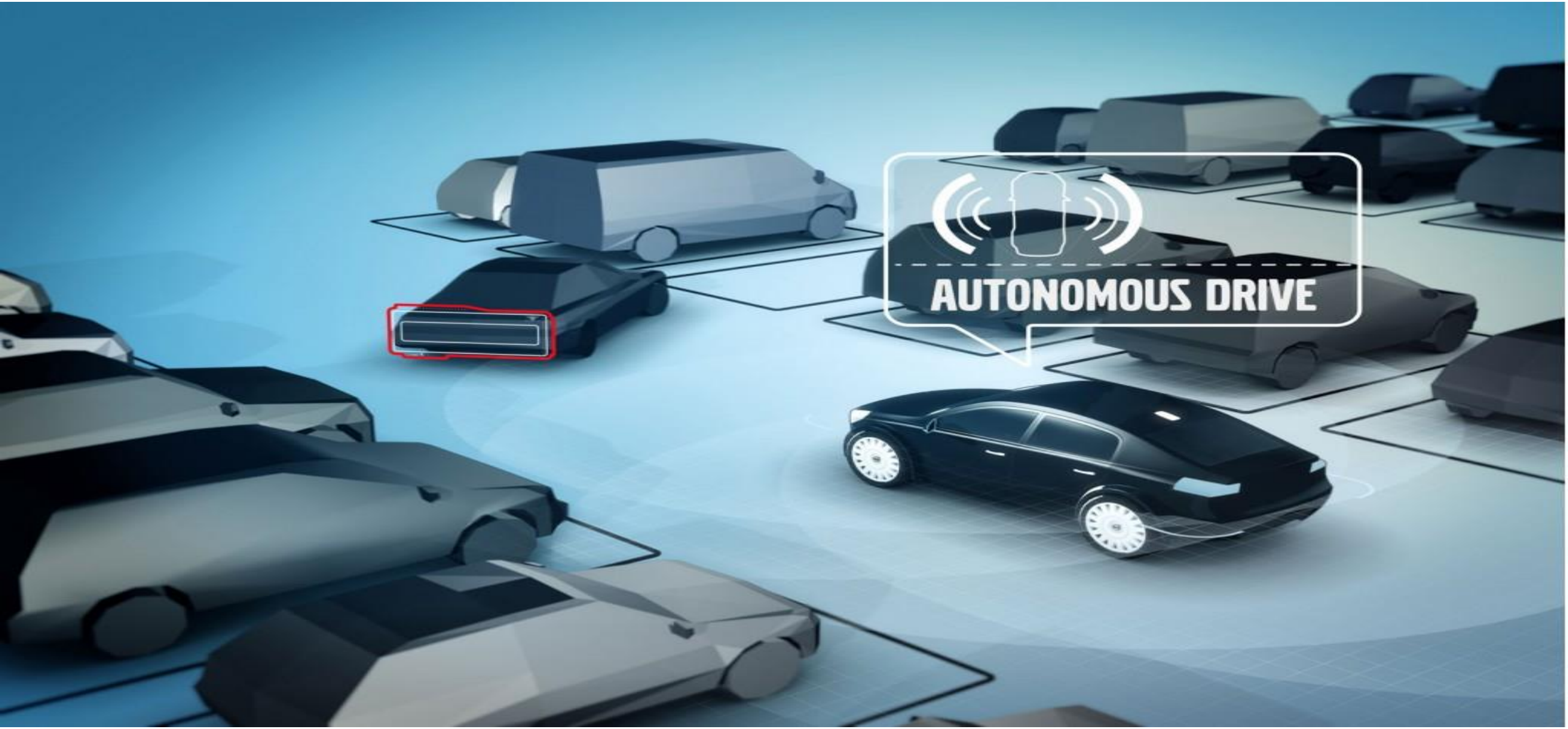
Percentage of consumers who feel full self-driving vehicles will not be safe



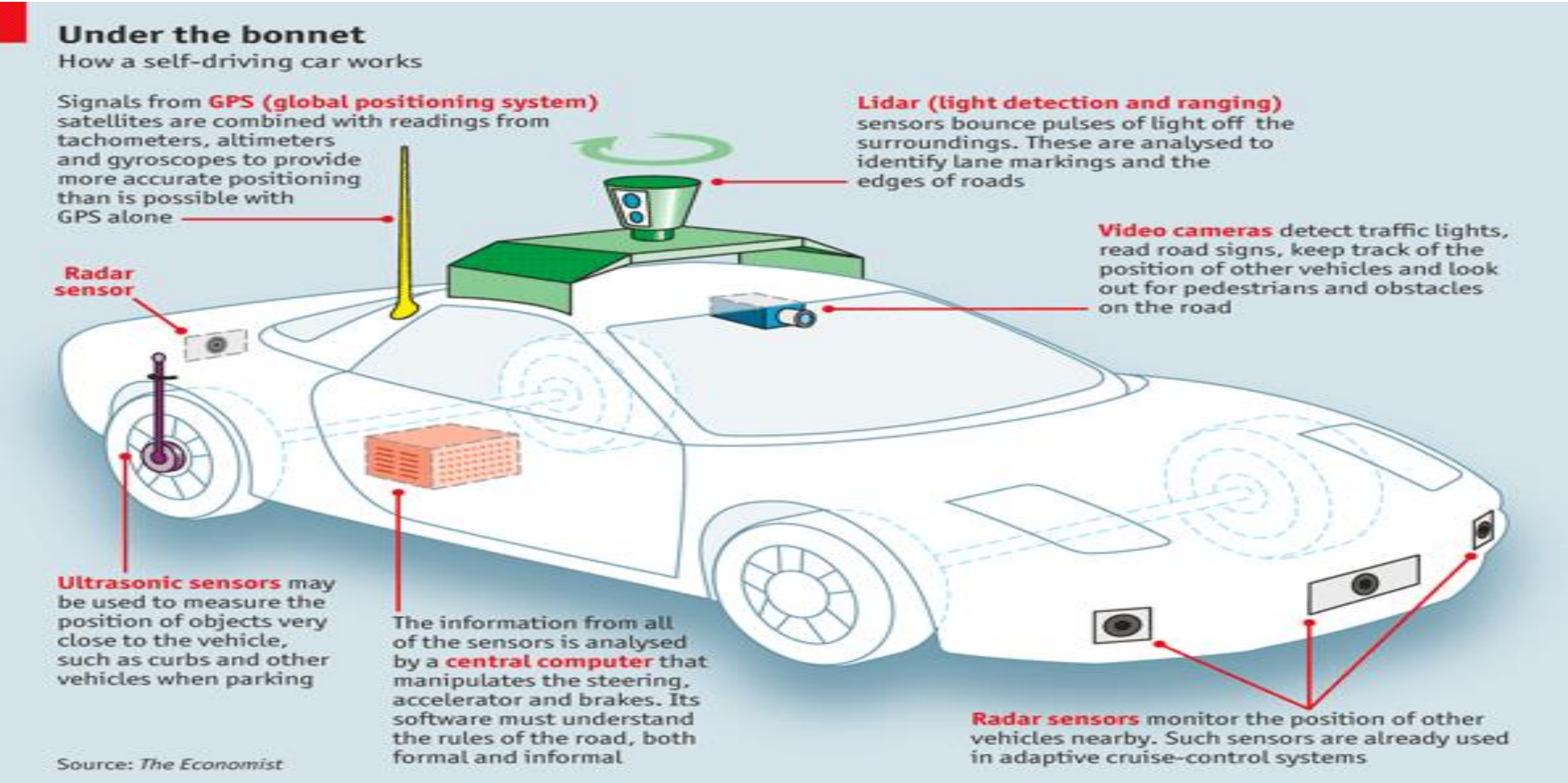
Source: Deloitte Global Automotive Consumer Study

Public Perception – A History of Distrust & Fear

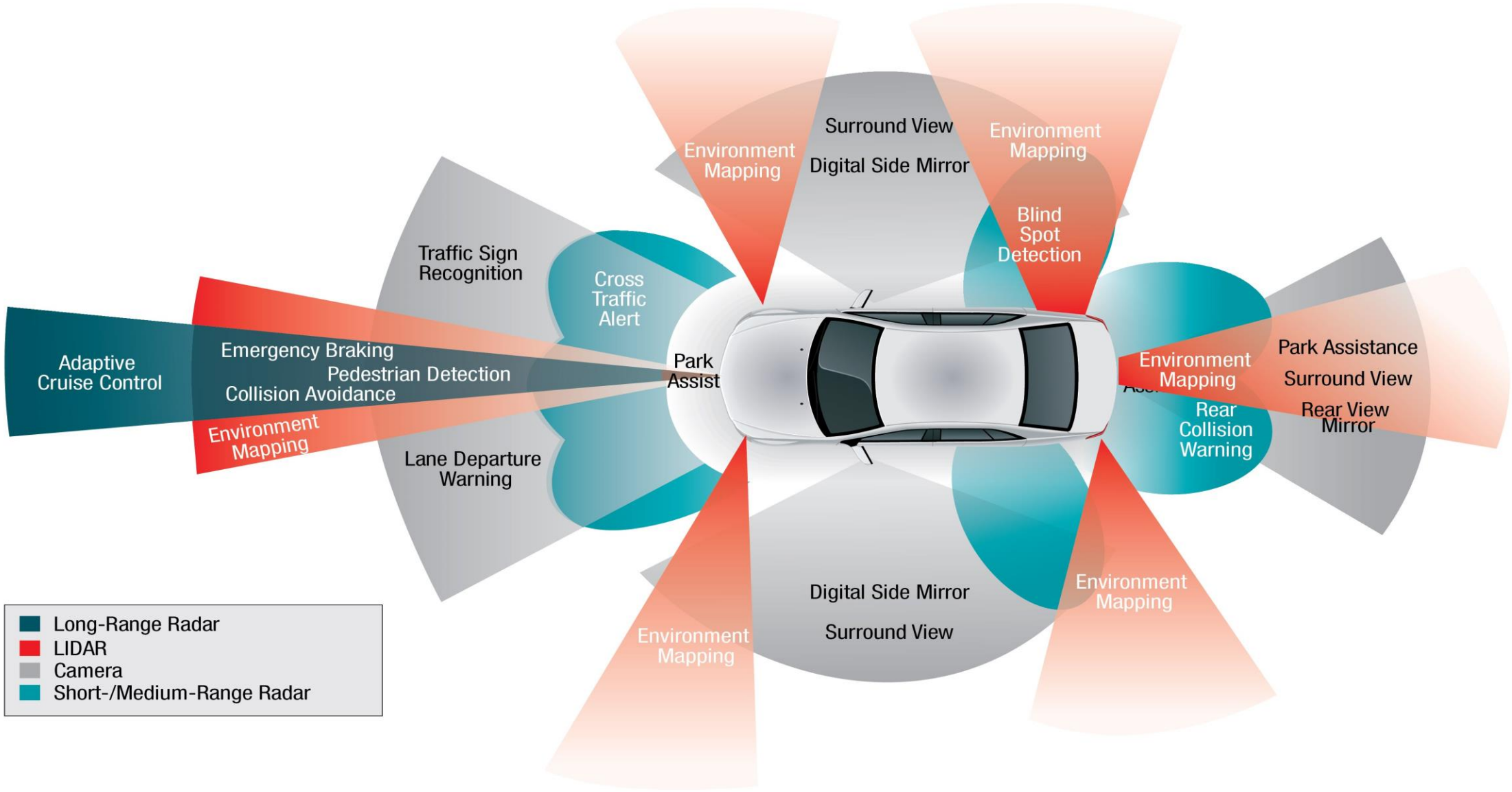
TRANSPORT - Integrated Solutions & Wider Implications



TESTING – Understanding the Technology



Autonomous Vehicle Technology



AUTOMATION LEVELS OF AUTONOMOUS CARS

LEVEL 0

There are no autonomous features.

LEVEL 1

These cars can handle one task at a time, like automatic braking.

LEVEL 2

These cars would have at least two automated functions.

LEVEL 3

These cars handle “dynamic driving tasks” but might still need intervention.

LEVEL 4

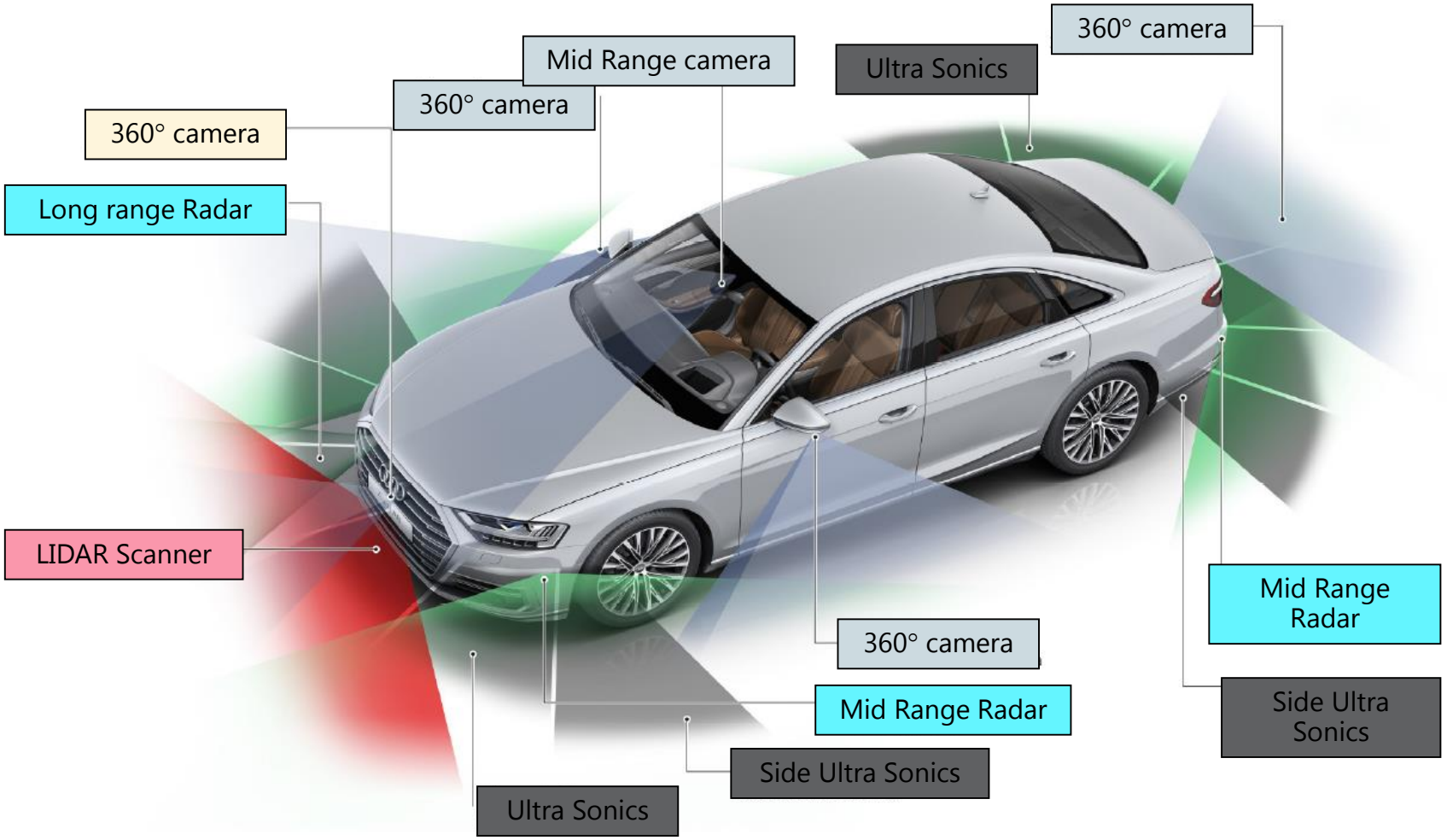
These cars are officially driverless in certain environments.

LEVEL 5

These cars can operate entirely on their own without any driver presence.

2018 Automation – What level have we achieved?

So where does that leave the 2018 Audi A8 AI System?



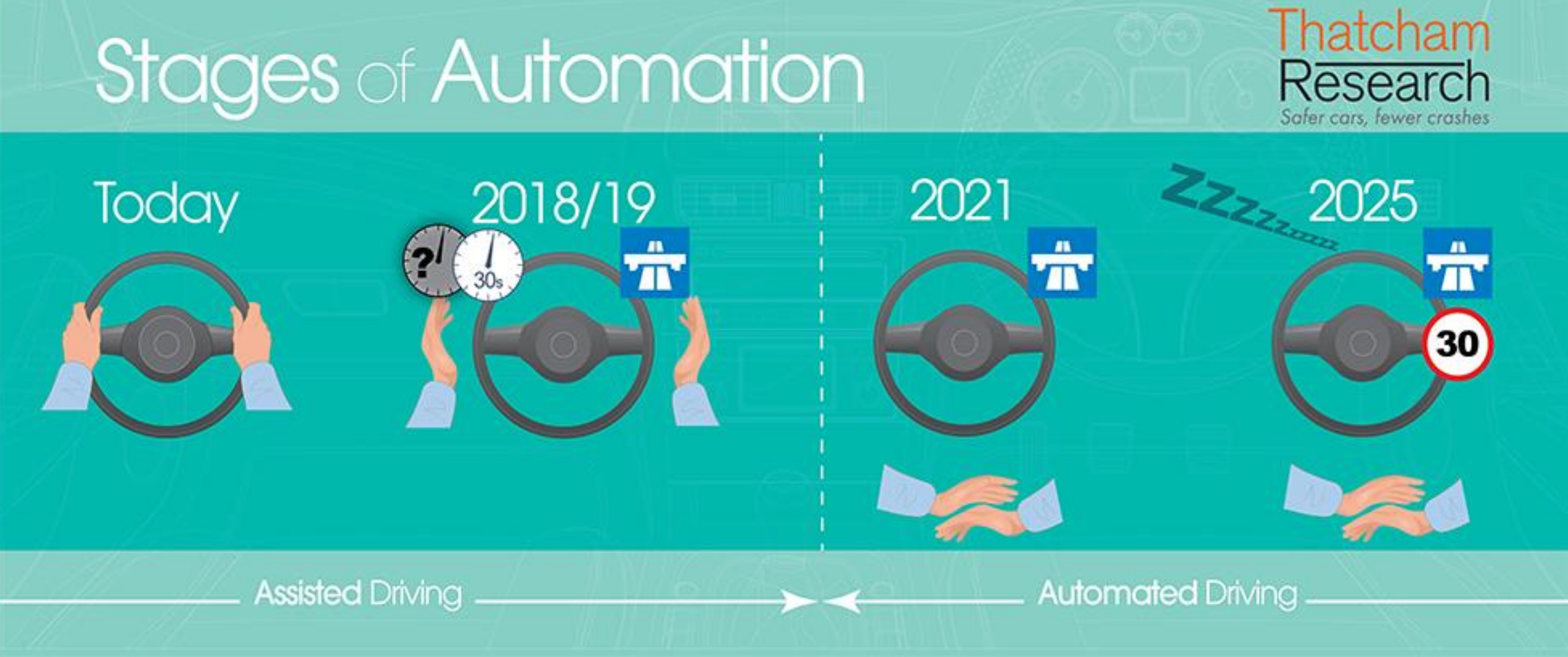
From ADAS to Automated Driving

Lack of Clarity? = Worried insurers

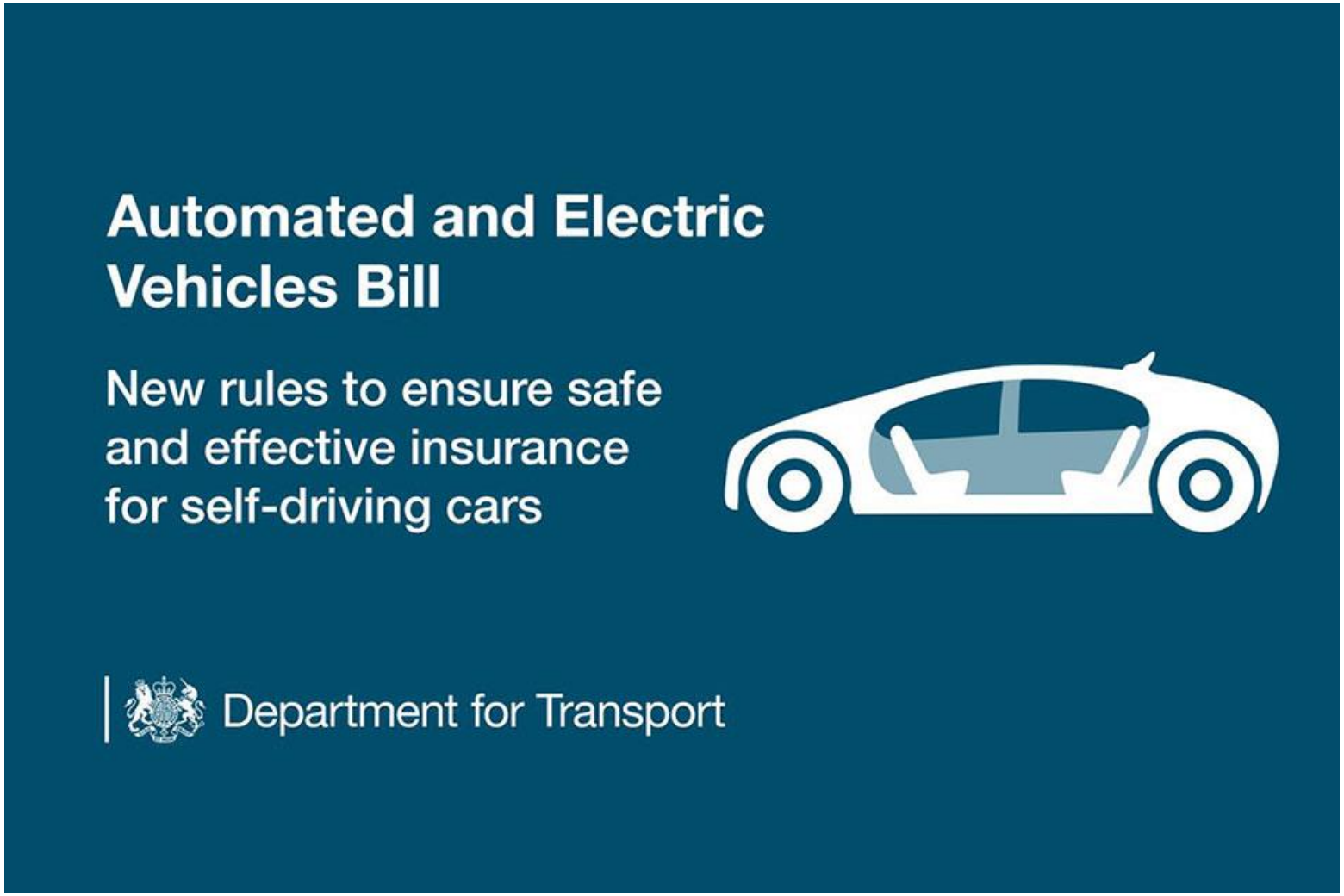
SAE Level	0	1	2	3	4	5
	None	Assisted	Partial	Conditional	High	Full
Estimated Timeline	Current	Current	2016	2018	2021	2025
Control of steering, throttle, brakes	Driver	Driver & Vehicle	Vehicle	Vehicle	Vehicle	Vehicle
Monitoring of driving environment	Driver	Driver	Driver	Vehicle	Vehicle	Vehicle
Responsibility if driver fails to take control when requested	Driver	Driver	Driver	Driver	Vehicle	Vehicle
System capable in…	No capability	Some driving modes	Some driving modes	Some driving modes	Some driving modes	All driving modes

- Driver perception could be that vehicle is responsible…
- But vehicle is not responsible yet

TIME – Crystal Balls at the ready!



Automated & Electric Vehicles Act



We have been involved in discussions throughout the various iterations; Modern Transport Bill / Vehicle Technology & Aviation Bill / Automated and Electric Vehicles Bill

Effective strict liability on insurers to pay out in the first instance keeping the safety of road users and pedestrians at the heart of the legislation

Realistic levels of liability on OEMs and other third parties to encourage innovation

UK Department for Transport proposal

UK Government's policy aim:

- Ensure there is compulsory insurance requirement to protect victims in collisions involving a highly automated vehicle; and
- The process for the victim to make a claim is not significantly different from claims arising from conventional crashes.

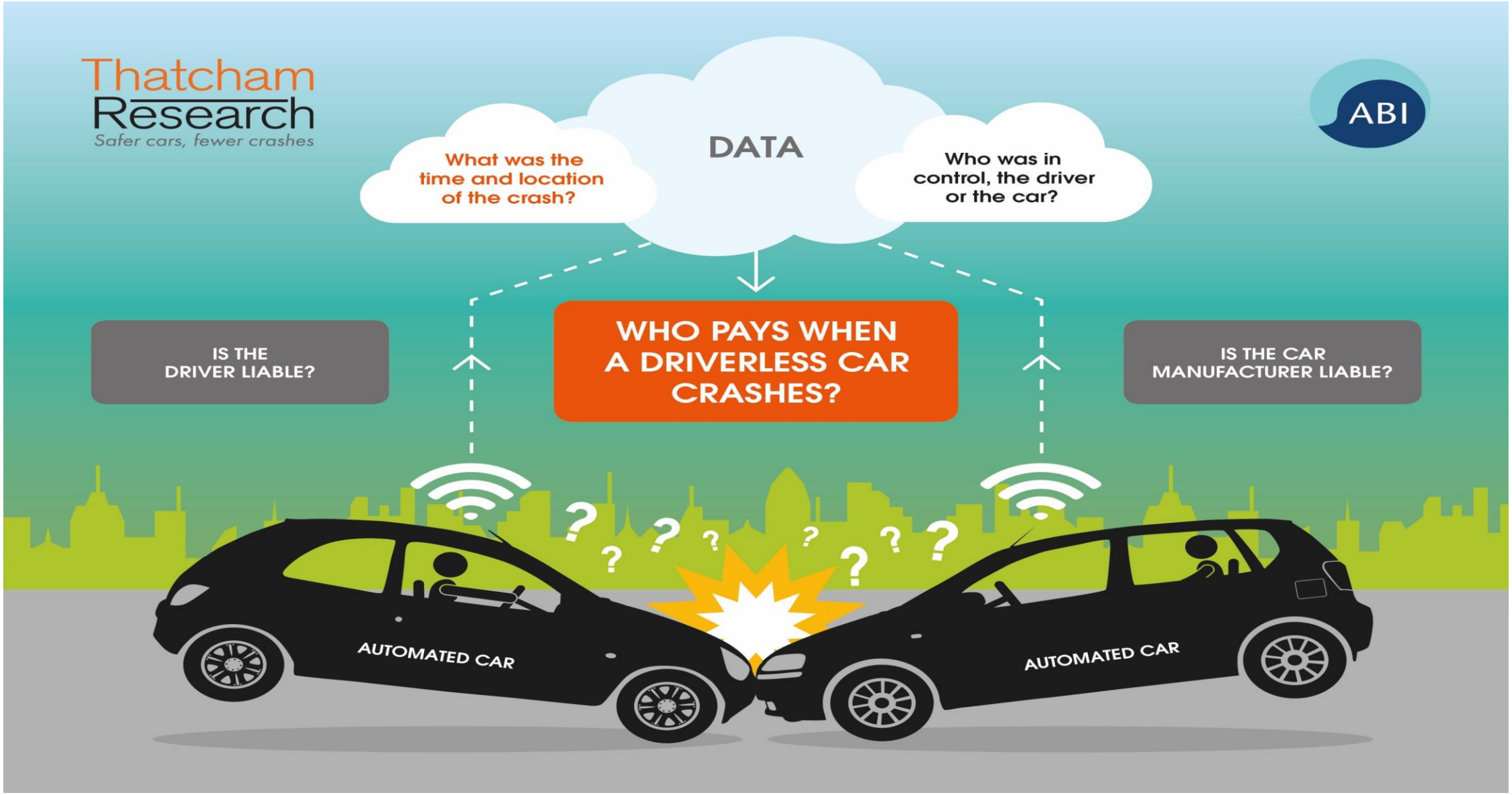
Their proposed solution:

- Don't change the civil liability regime;
- First route for the victim is via the driver/policy holder of the highly automated vehicle
- but… ***require that the owner has legal responsibility for making sure there is in place an insurance policy that includes cover for the manufacturer's and any other entities' liability***.

How will the new system work?

- Drivers should continue to buy a single motor insurance policy to cover both manual and automated driving (drivers WON'T need to buy separate Product Liability cover).
- Insurers should have a new legal right to recovery, allowing them to get costs back from motor manufacturers, software companies or other parties in cases where the vehicle or technology was found to have been at fault.
- Strict rules on what people can and cannot do behind the wheel need to be maintained and drivers will need absolute certainty about when they can safely allow the car to drive autonomously.
- This will need to be underpinned by consistent rules on data recording and accessibility. To settle claims fairly and efficiently, insurers will need to know if the car was in automated mode and, if so, if those functions were being operated correctly.

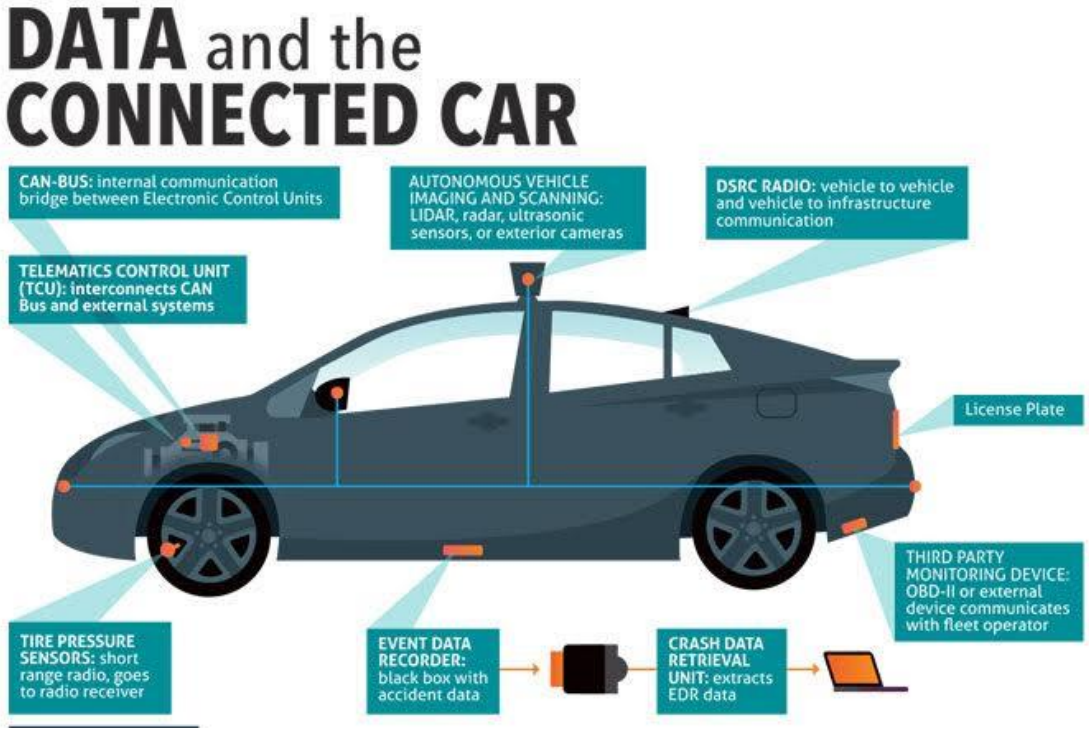
You can’t decide who is responsible without the Data!



Insurers make call for international data standards

Access to meaningful and reliable data is a vital part of a competitive insurance market

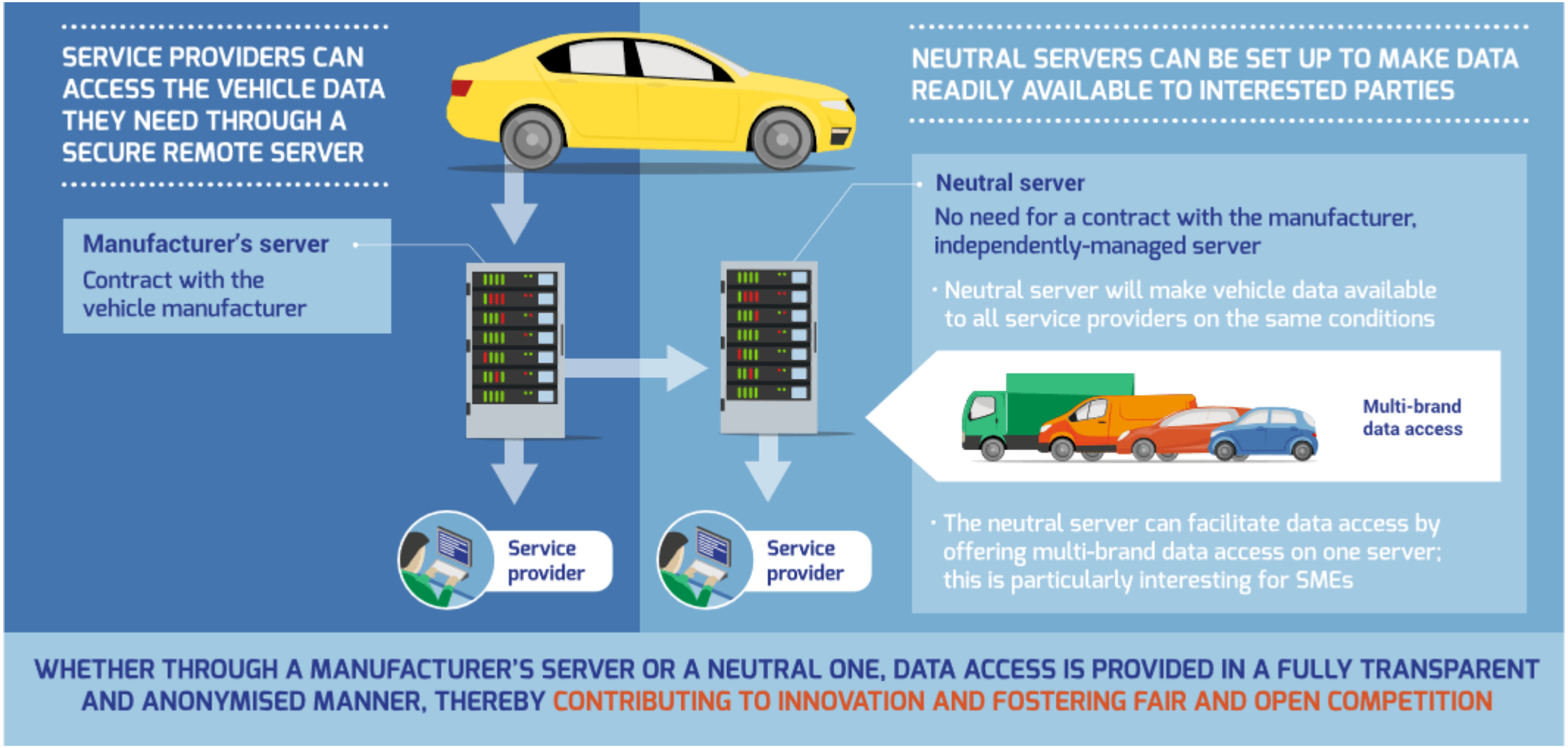
- However … Insurers recognise that consumers own their data and that it must be held securely
- ABI working with Thatcham and the Motor Insurers' Bureau to develop a proportionate proposal focussed on where access to data is fundamental to settling claims
- Will also seek to understand and address any barriers to data access that would hold back commercial innovation
- Regulation typically set at an international level – but ABI has emphasised to UK Government that its proposed system will not work unless it is possible to access collision data
- Important to work closely with manufacturers and recognise that there are legitimate concerns about vehicle security and protecting intellectual property.



Data Required following a Collision

- GPS record of time & location of the incident
- Was vehicle in autonomous or manual mode?
- If in autonomous mode, was vehicle parking or driving?
- When the vehicle went into autonomous mode
- When the driver last interacted with the system
- Recent driver activity (i.e. braking or steering)
- Was the driver's seat occupied?
- Was the seatbelt fastened?

Data – ACEA Compromise



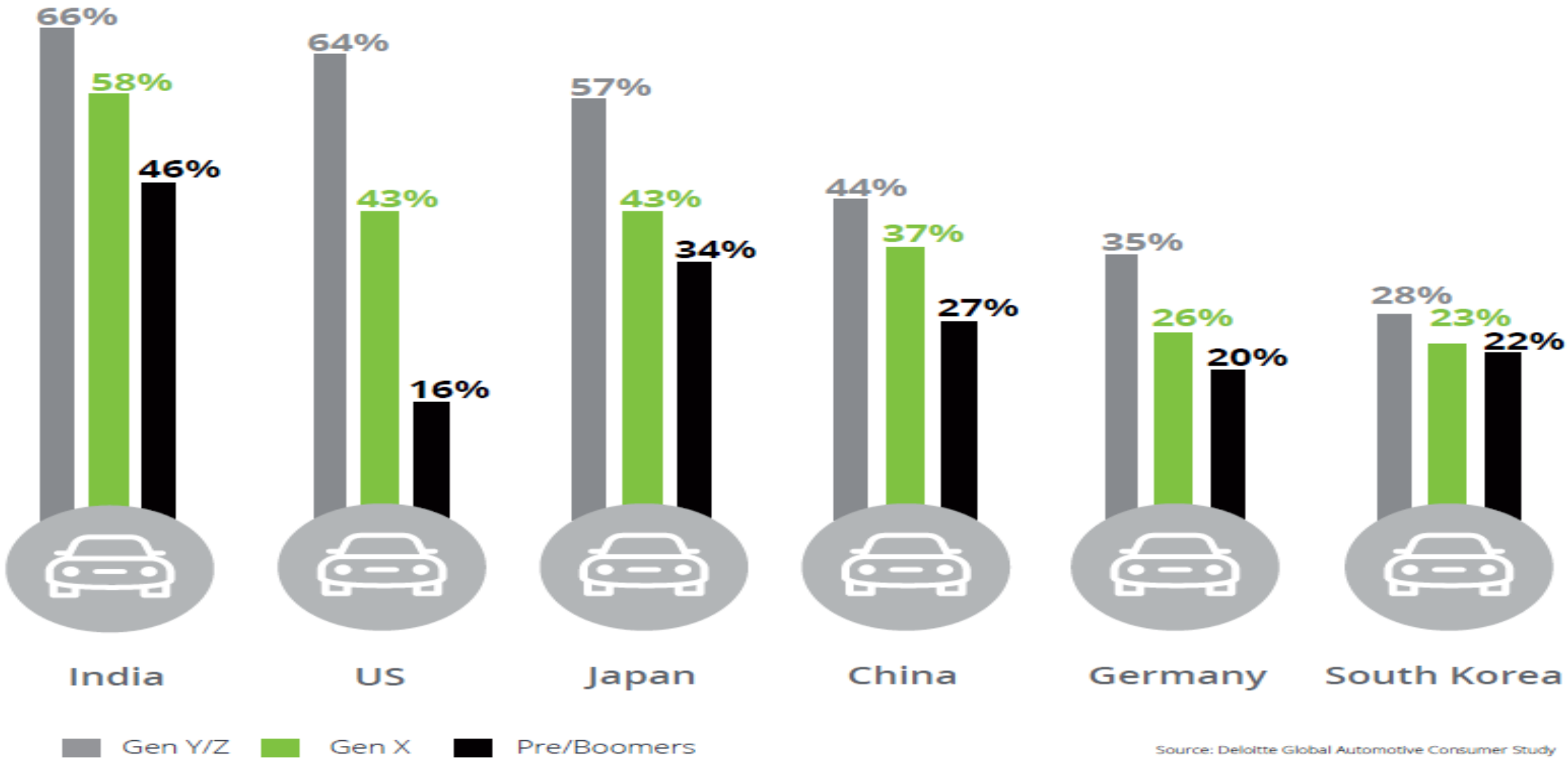

TEMPE
DEVELOPING STORY
DEADLY CRASH WITH SELF-DRIVING UBER
abc 15
ARIZONA
11:01
64°

AXA Report on Commercial Vehicle Impact

Estimated Savings over 10 years

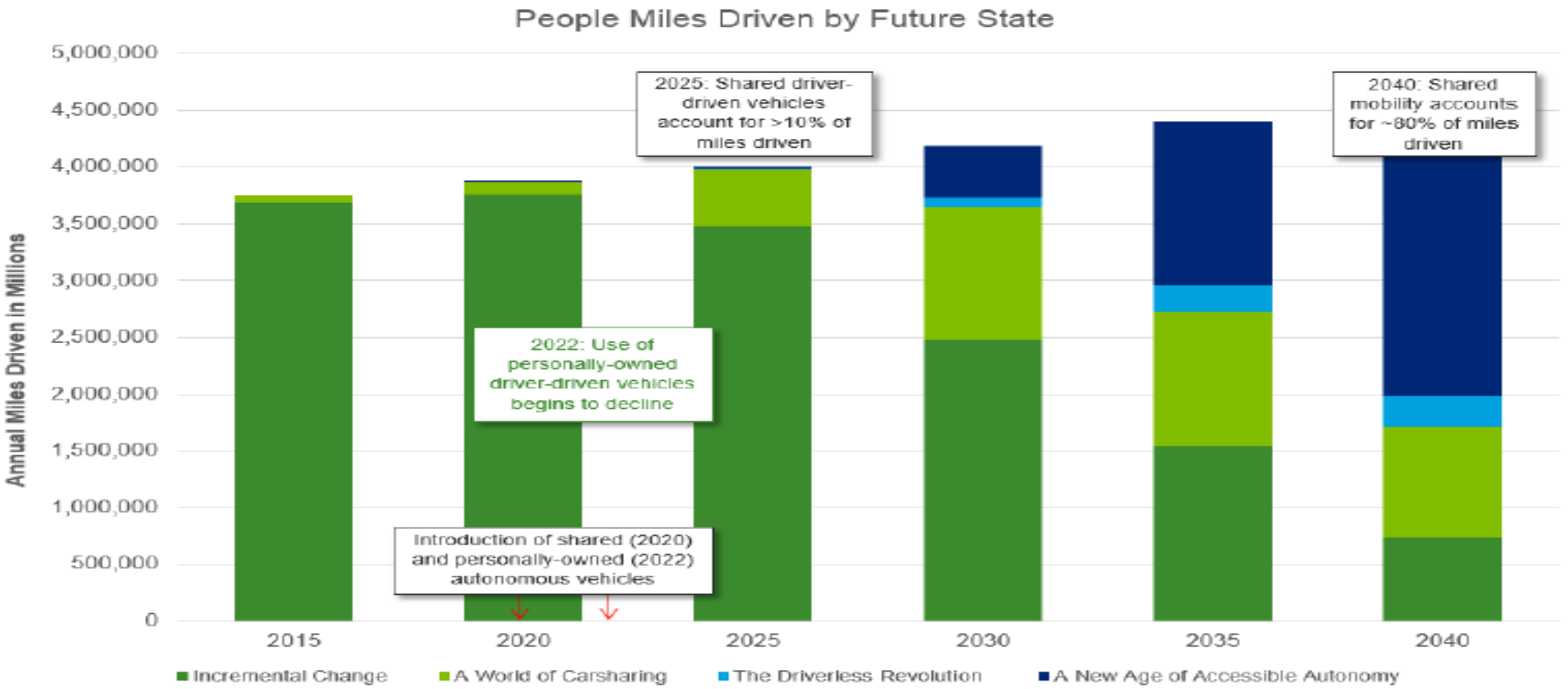
Society - Sharing and The Uber Effect?

Percentage of consumers who use ride-hailing services that question whether they need to own a vehicle in the future, by generation



Source: Deloitte Global Automotive Consumer Study

People miles driven by 2040 will increase by 25% and shared mobility will account for the majority of them



Deloitte.

Premium Mix will move away from conventional Motor Insurance and decline overall

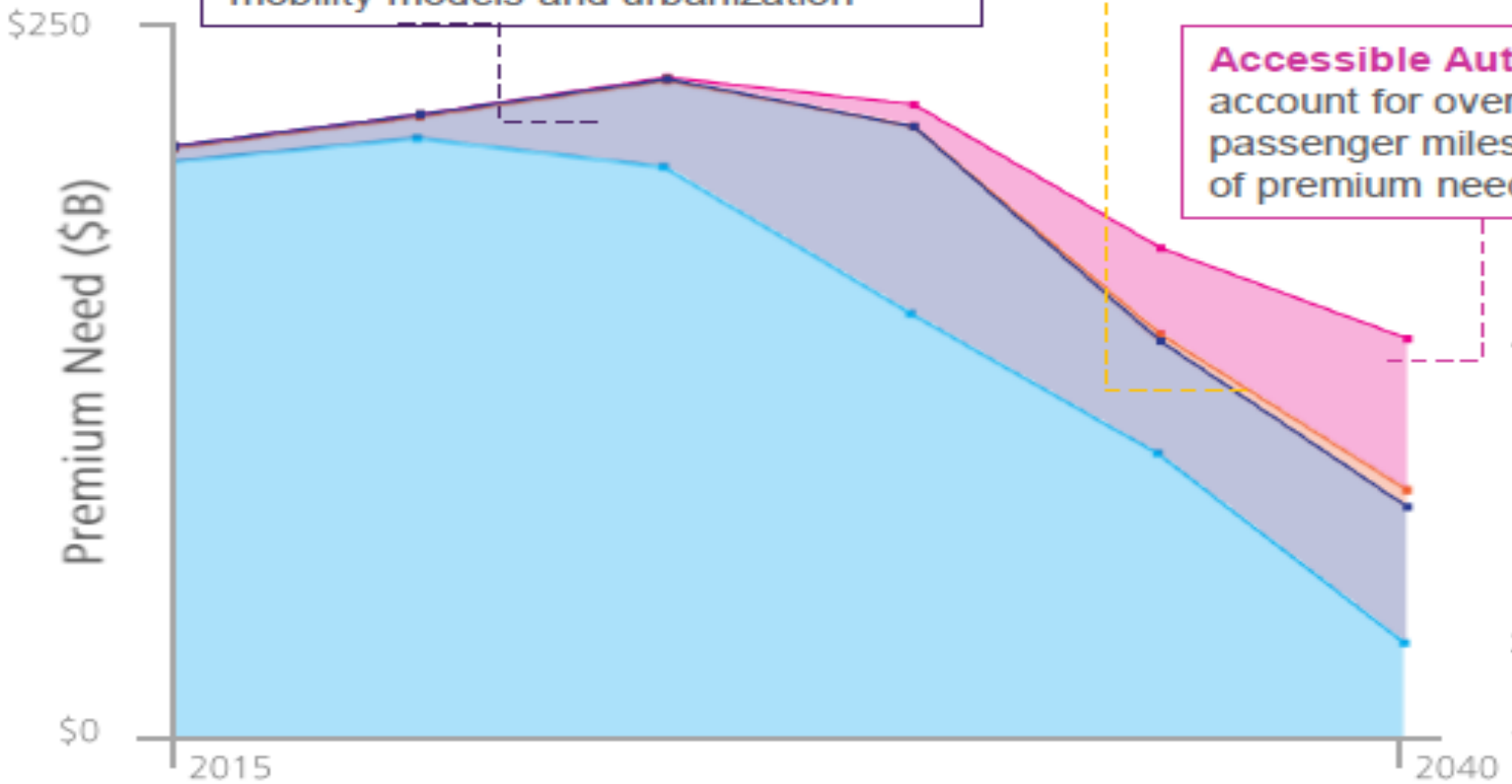
A World of Carsharing emerges in the mid-2020's as a significant market segment due to emergence of new mobility models and urbanization

The Driverless Revolution does not project to be a significant portion of the total market in the near future

Accessible Autonomy will account for over 60% of passenger miles and 25% of premium need by 2040

Innovator View:

As much as 80% of premium need in the future will be for new models of insurance



1 Incremental Change

2 A World of Carsharing

3 The Driverless Revolution

4 Accessible Autonomy

Source: Deloitte analysis

Note: *This model was developed by Deloitte's actuarial practice and is based on assumptions around distribution of passenger miles, frequency, and severity of loss events in each Future State*

Deloitte.


AXA
Imagine technology that saves over 1m lives a year
AXA is a partner in the development of driverless car technology, helping to create a future with safer roads.
See for yourself at axa.co.uk/xxxx
We're restless for a reason
1m lives worldwide

Figure 1.

What defines an automated vehicle?

Features and performance criteria

#1 NAMING
Clearly describes automated capability

#2 LAW ABIDING
Complies with UK traffic laws and the Highway Code

#3 LOCATION SPECIFIC
Functionality is limited to specific types of roads or areas via geo-fencing

#4 CLEAR HANDOVER
Transfer of driving control follows a clear 'offer and confirm' process

#5 SAFE DRIVING
Vehicle can manage all reasonably expected situations by itself

#6 UNANTICIPATED HANDOVER
Adequate and appropriate notice must be given if the vehicle needs to unexpectedly hand back driving control

#7 SAFE STOP
Vehicle executes an appropriate 'safe stop' if unable to continue or the driver does not take back control

#8 EMERGENCY INTERVENTION
Vehicle can avoid or prevent an accident by responding to an emergency

#9 BACK-UP SYSTEMS
Safeguards step in if any systems fail

#10 ACCIDENT DATA
Record and report what systems were in use at the time of an accident

ABI Thatcham Research

CII Lecture - Driverless Cars

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Thankyou for Listening
Questions?
@AXADavidW

Video Links to Support Presentation

Venturer Handover Tests - https://youtu.be/k1JRmMA7NqU

Pod in the Lake district - https://youtu.be/MGTXAEHF4wE

Extracts from Fast & Furious - https://youtu.be/NxhEZG0k9_w

See Motorist Play - https://youtu.be/qnZHRupjl5E

Uber Crash - https://youtu.be/AFHmWlKrZlM