



Advancements in Connected & Autonomous Vehicles – Cambridge Insurance Institute



Thatcham
Research



@AXADavidW

David Williams, Managing Director, Underwriting & Technical Services
AXA Insurance UK

Driverless Cars – An Update!

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
- ➔ Adding – Some thoughts on new Risks & Liabilities
- ➔ Plus some new ideas, the possible impact of Covid-19 and an additional European slant!

Autonomous Driving Insurance Group (ADIG)



CLEAR ► CONCISE ► CONNECTED



LLOYD'S MARKET ASSOCIATION



Global Motor Premiums

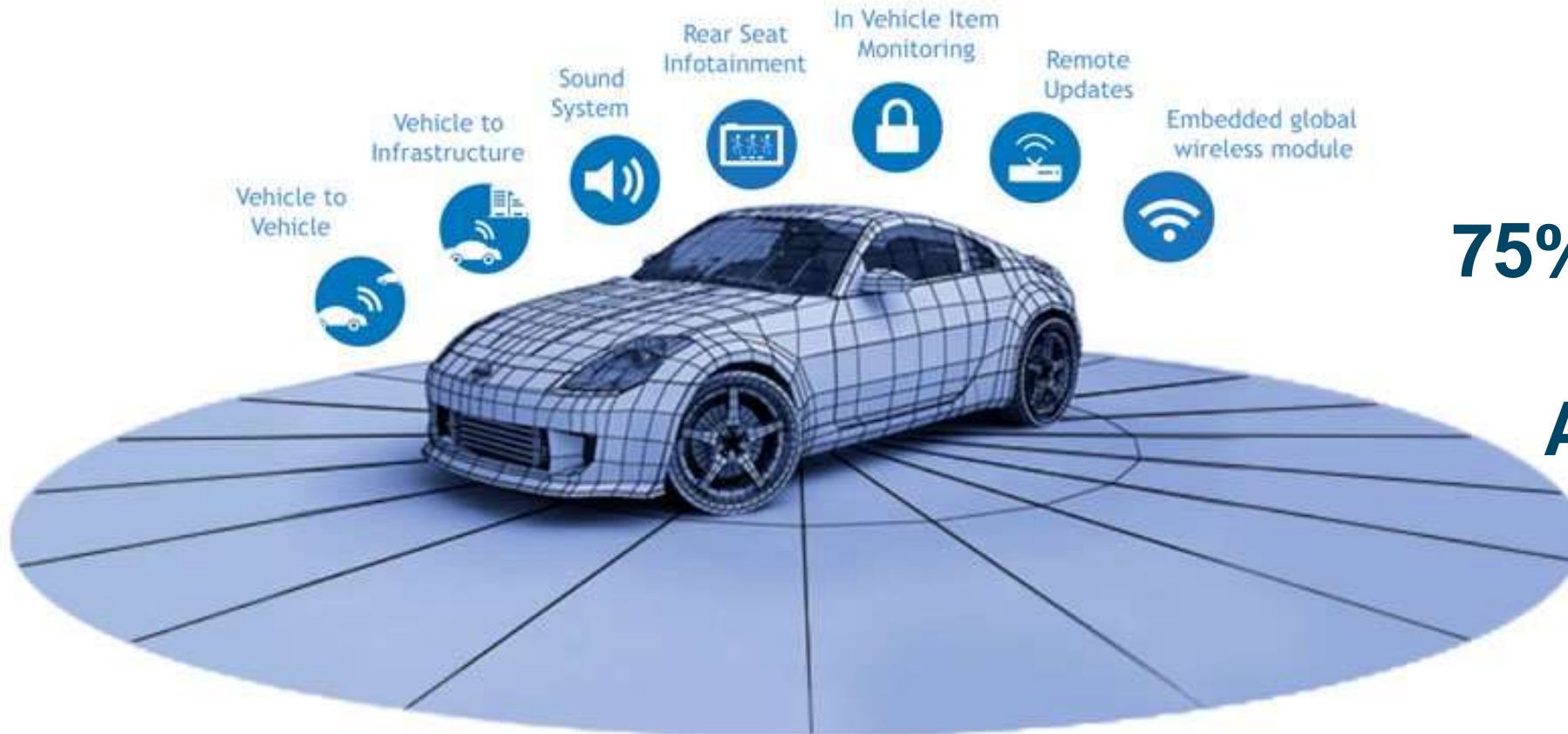
→ Market Overview

- The global motor insurance market is estimated to be more than **USD 880 billion** in 2019, and it is expected to witness CAGR of approximately 6.2% during the forecast period.
- Premiums from motor insurance accounted for more than 40% of the overall non-life insurance premiums in 2018. This is expected to increase in the next few years, due to the rising demand from developing countries primarily in Asia.
- The mandatory requirement for a vehicle to be insured by various countries across the world, coupled with the estimated increased number of sales of new vehicles, is expected to drive the global motor insurance market during the forecast period

→ <https://www.mordorintelligence.com/industry-reports/global-motor-insurance-market>

Connected & Autonomous Vehicles (CAV's or CAM?)

100% of cars will be connected by 2025*



75% of cars on the road will be Autonomous by 2035! *

**GISMA & Navigant Research*



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

AXA Involvement in CAV/CAM projects

UKAutodrive



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 economy



46%

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

A man in a blue jacket and jeans is carrying a young child on his shoulders. They are both smiling and laughing. The child is wearing a striped shirt and polka-dot overalls. In the background, there is a red car parked on a grassy area with trees.

Imagine technology that saves over 1 million lives a year

AXA is a partner in the development of driverless car technology, helping to create a future with safer roads.

We're restless for a reason

axa.co.uk

1 million lives worldwide.

Europe on the Move – Towards Vision Zero

WHY WE NEED TO ACT



25 300 FATALITIES
20% less than in 2010,
but no significant
improvement since 2013



**49 FATALITIES PER
MILLION INHABITANTS**
Global average: 174



**135 000
SERIOUS INJURIES**



**€120 BILLION
PER YEAR**
Estimated socio-economic
cost of accidents

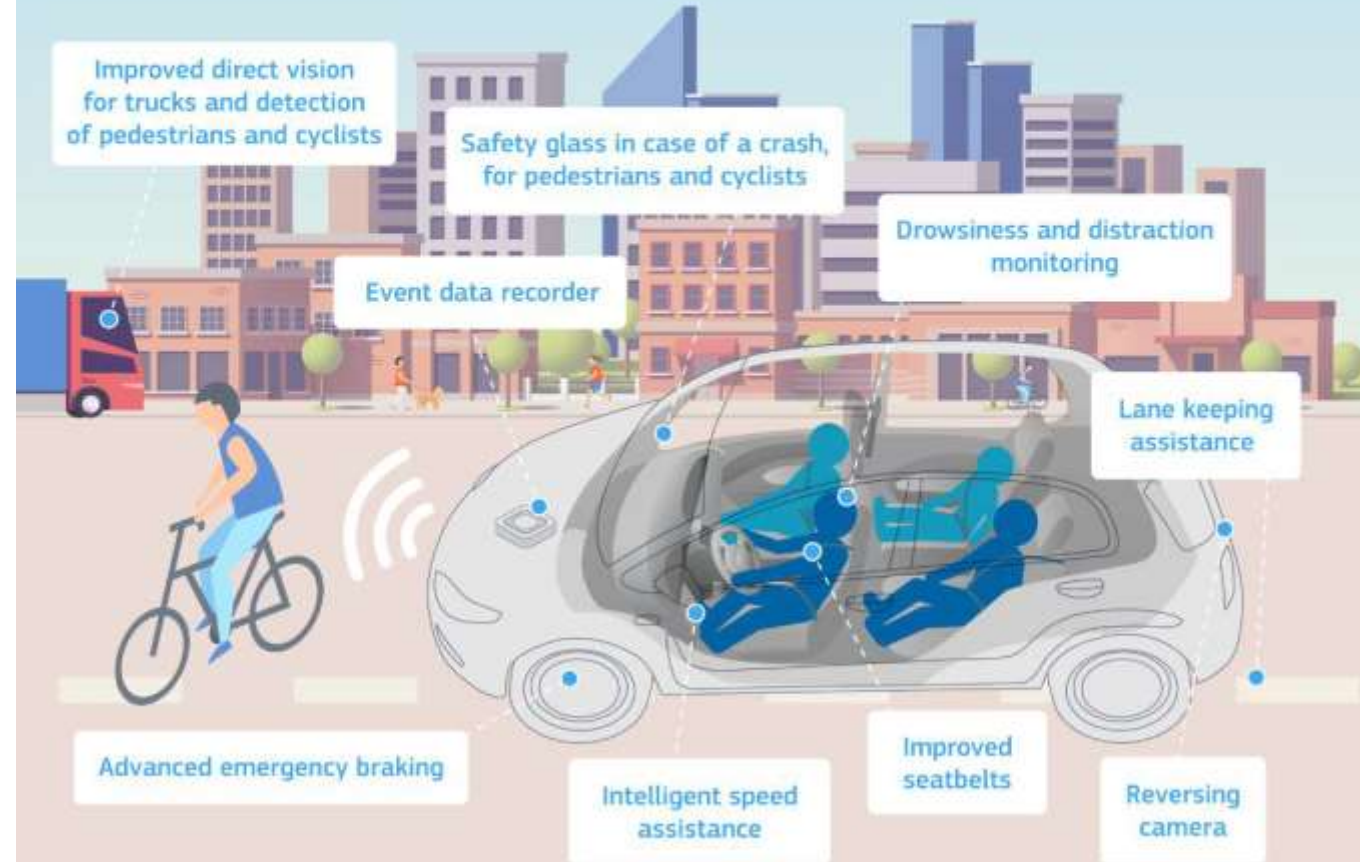
- President Juncker Stated - “Road safety is a responsibility shared between the EU and the Member States. The Commission focuses on actions with strong EU added-value and is today proposing a new policy framework for 2021-2030. It confirms the EU’s long-term goal of moving close to zero fatalities and serious injuries by 2050 (“Vision Zero”), with an interim target of minus 50% between 2020 and 2030.
- To help achieve these targets, the Commission is making legislative initiatives on vehicle and pedestrian safety, and an additional €450 million available under the Connecting Europe Facility to support projects in the Member States contributing to road safety, digitisation and multimodality

List of Mandated Features

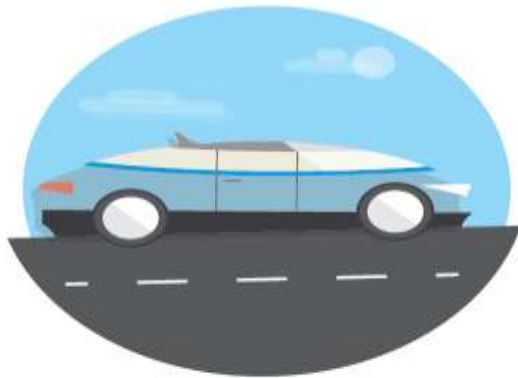
- Advanced emergency braking (cars, vans)
- Alcohol interlock installation facilitation (cars, vans, trucks, buses)
- Drowsiness and attention detection (cars, vans, trucks, buses)
- Distraction recognition / prevention (cars, vans, trucks, buses)
- Event (accident) data recorder (cars, vans, trucks, buses)
- Emergency stop signal (cars, vans, trucks, buses)
- Full-width frontal occupant protection crash test - improved seatbelts (cars and vans)
- Head impact zone enlargement for pedestrians and cyclists - safety glass in case of crash (cars and vans)
- Intelligent speed assistance (cars, vans, trucks, buses)
- Lane keeping assist (cars, vans)
- Pole side impact occupant protection (cars, vans)
- Reversing camera or detection system (cars, vans, trucks, buses)
- Tyre pressure monitoring system (vans, trucks, buses)
- Vulnerable road user detection and warning on front and side of vehicle (trucks and buses)
- Vulnerable road user improved direct vision from driver's position (trucks and buses)

Europe on the Move

New safety features in your car



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.

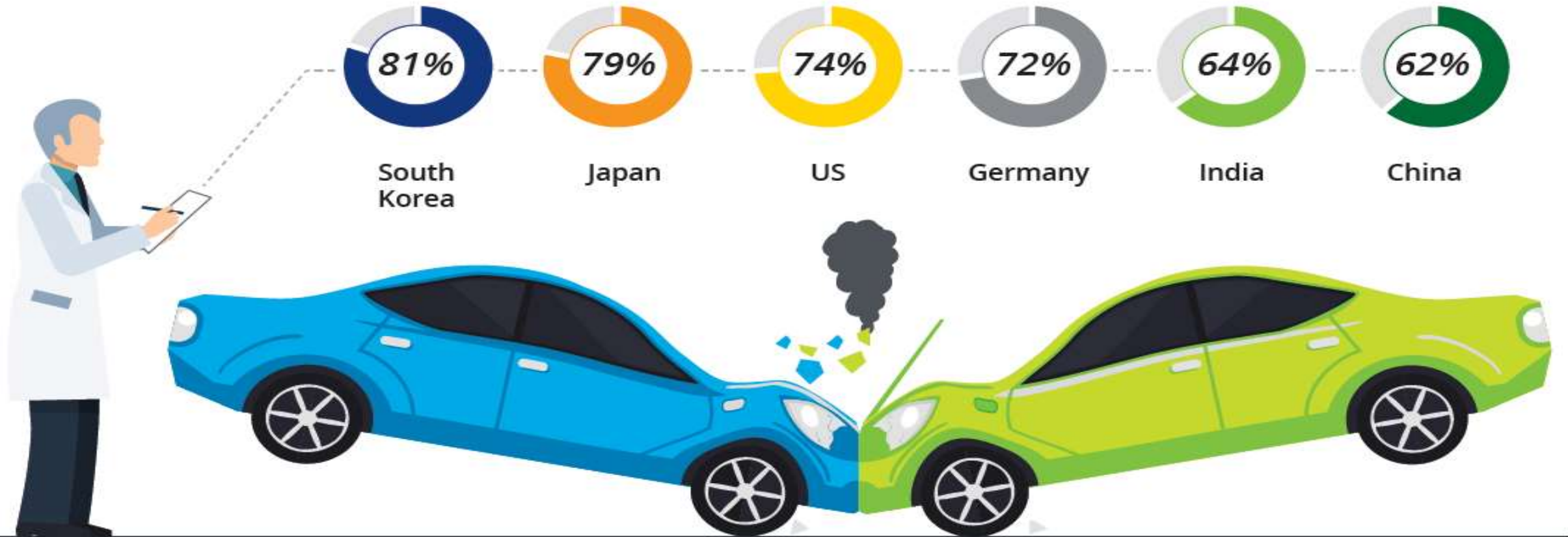


Trust

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

Infographic: Trust and self-driving cars

36% of people believe **autonomous driving** will be the dominant form of transport in **10 years'** time.



Almost two thirds (**65%**) favor the idea of enhanced protection against thieves; e.g. **fingerprint recognition technology**.



More than half (**58%**) currently do not trust **driverless cars**.



Real-time traffic information is the most popular (**66%**) anticipated feature of **connected cars**.



31% like the ability to **personalize** car features through **software updates**.



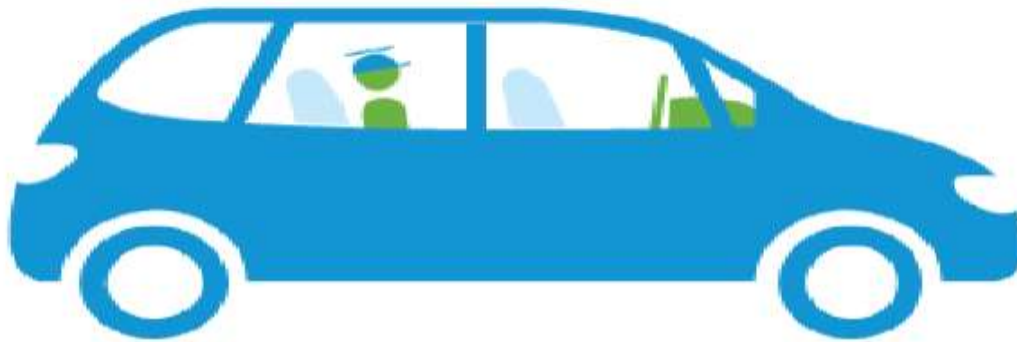
47% are currently concerned about **driverless car hacking**.



Attitudes are changing, recent CISCO research

Consumers Desire More Automated Automobiles

Consumers Trust Driverless Cars



57%

of consumers, globally, trust driverless cars—even more so in emerging markets



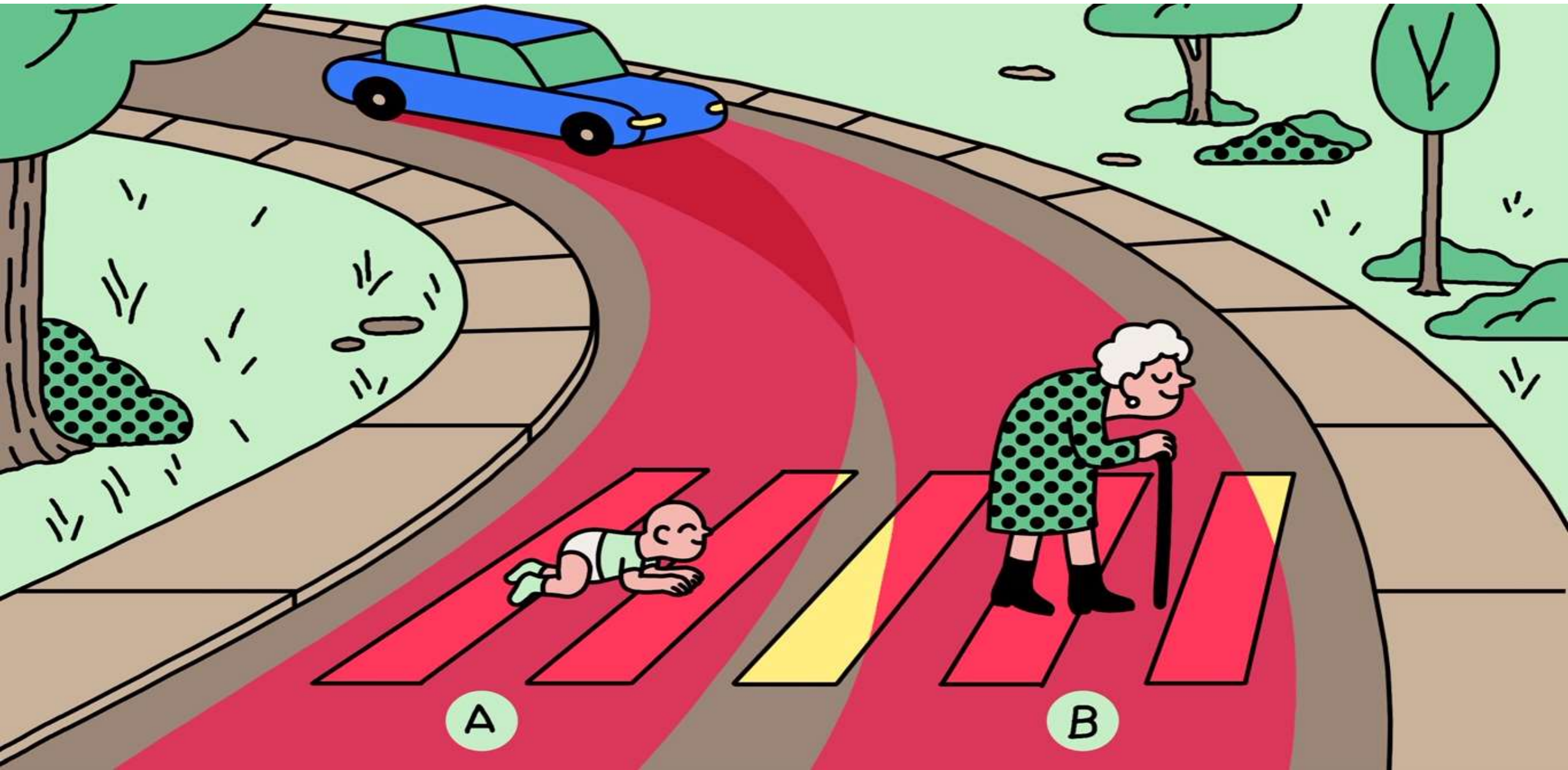
Source: Cisco Customer Experience Report for Automobile Industry, May 2013 survey of 1,511 consumers in 10 countries.



Public Perception – A History of Distrust & Fear



Social & Moral Perspectives? – ‘The Trolley Dilemma’





TRANSPORT - Integrated Solutions & Wider Implications



In the Open Mobility project in Berlin, Siemens has integrated transport services from 15 different operators.



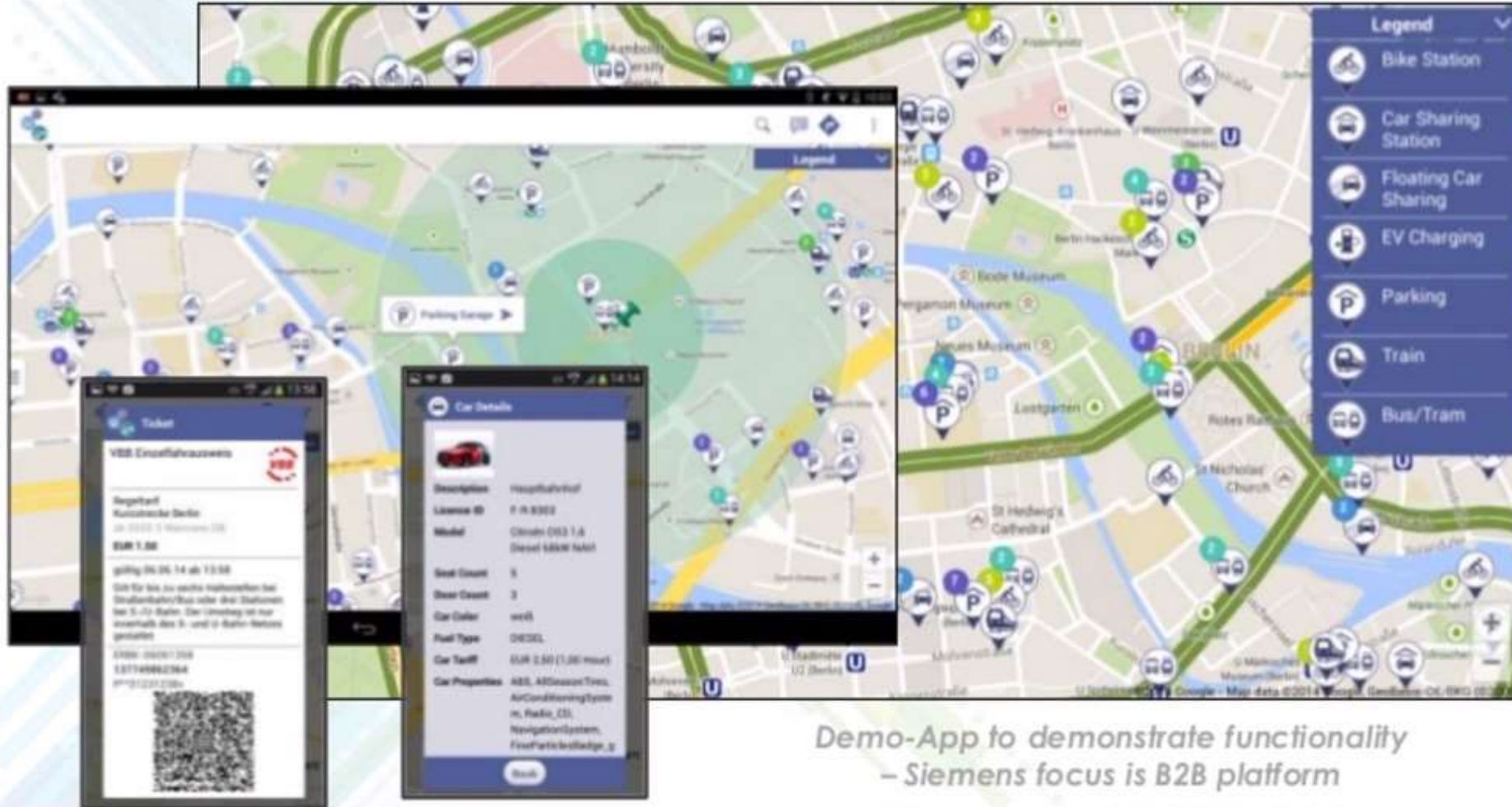
IT Solutions for Public Transport



15 different operators

- Public Transport
- Car Sharing
- Bike Sharing
- Taxi
- Road
- Parking
- EV Charging

in Berlin-Brandenburg

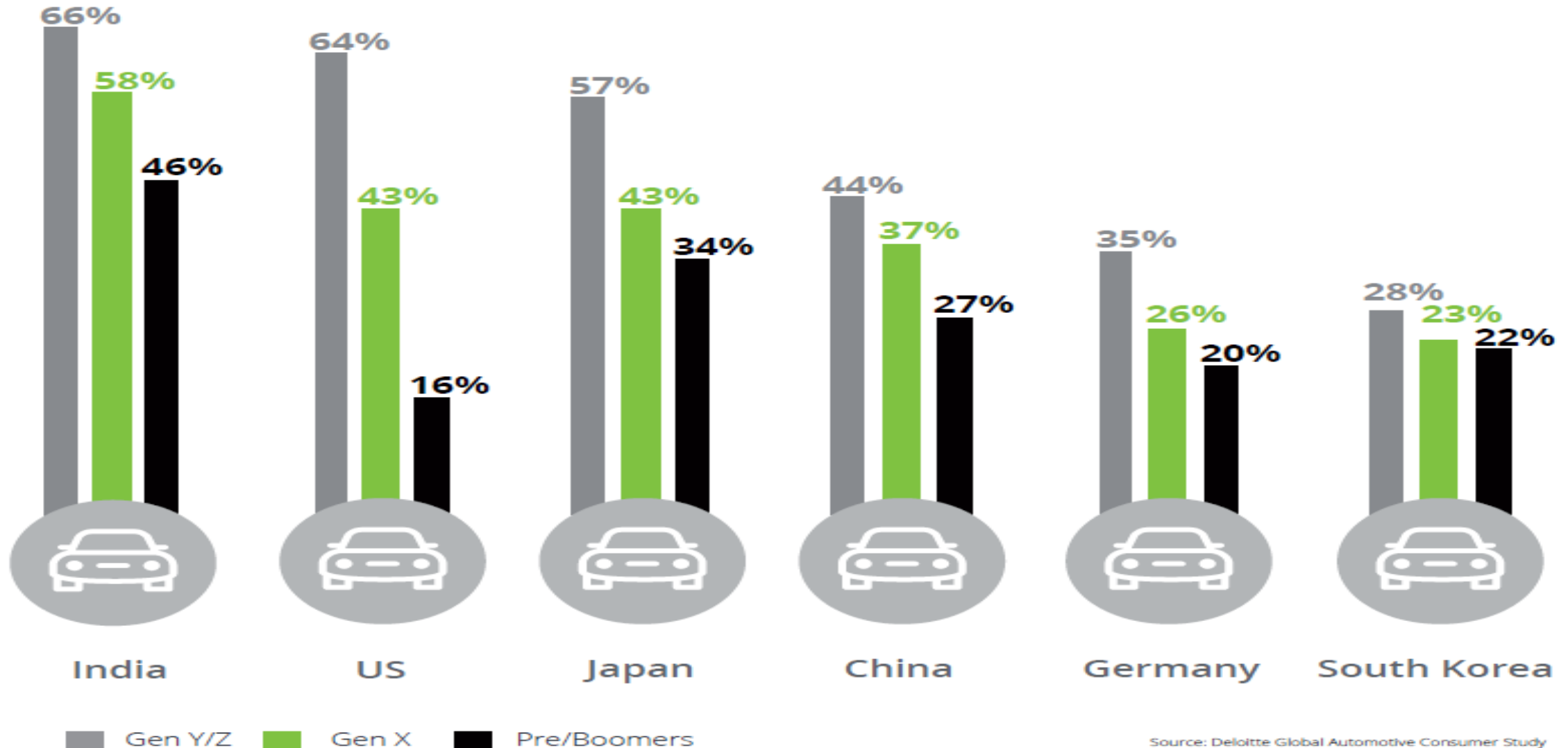


*Demo-App to demonstrate functionality
– Siemens focus is B2B platform*



Society - Sharing and The Uber Effect?

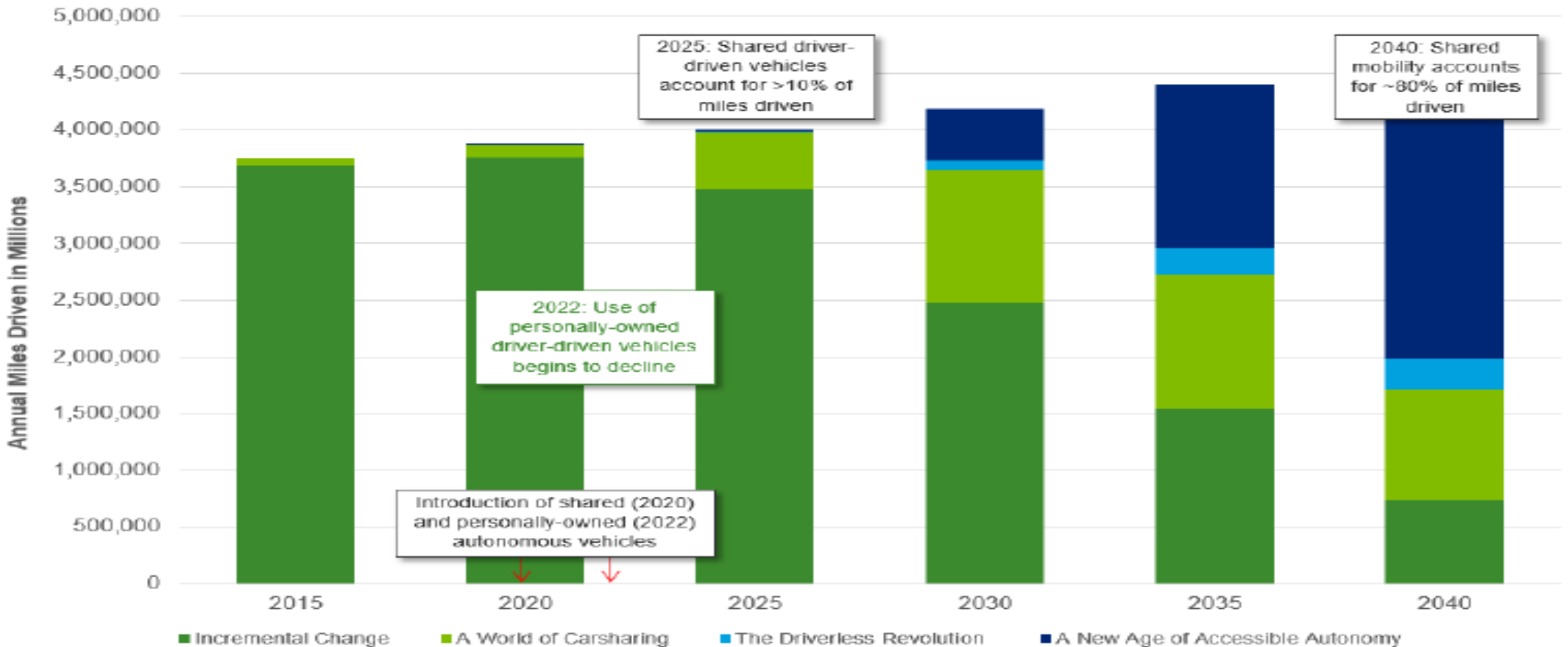
Percentage of consumers who use ride-hailing services that question whether they need to own a vehicle in the future, by generation



Source: Deloitte Global Automotive Consumer Study

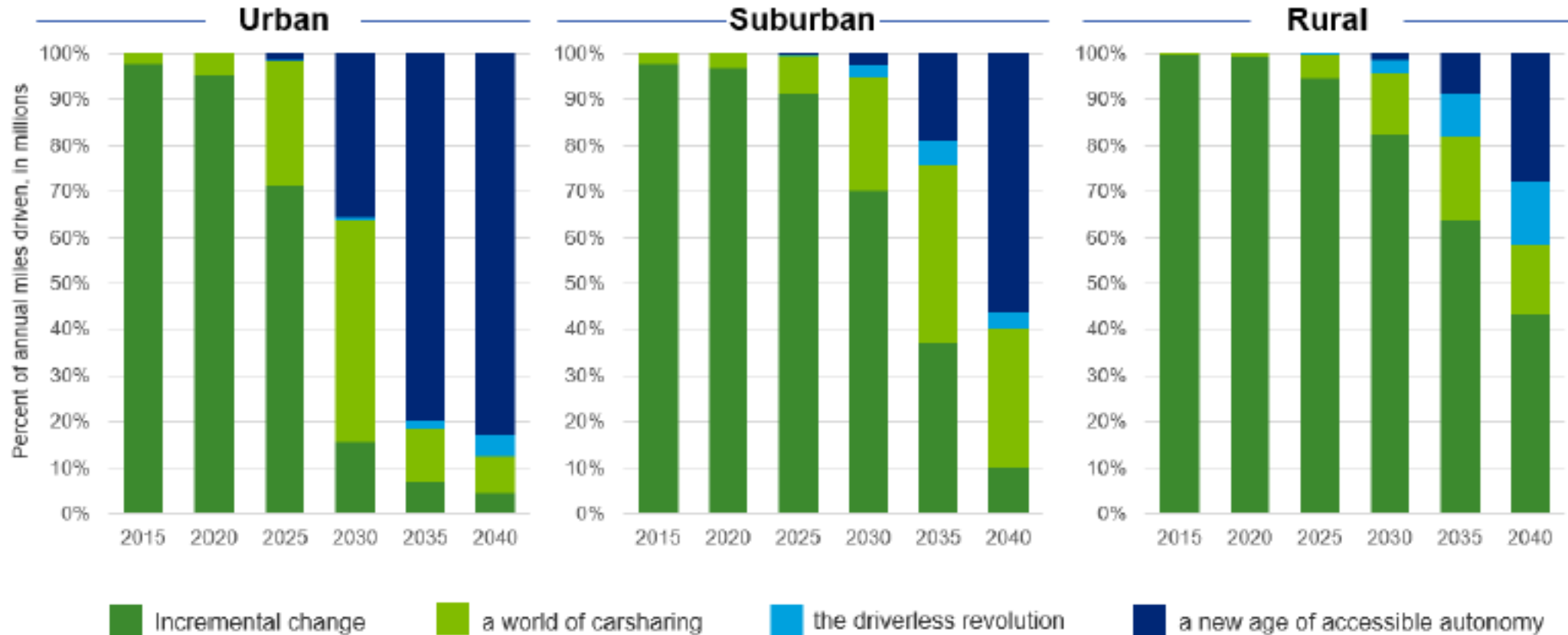
People miles driven by 2040 will increase by 25% and shared mobility will account for the majority of them

People Miles Driven by Future State



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

Adoption will vary between locations





#PODonTour!

Timing?

Stages of Automation

Thatcham
Research
Safer cars, fewer crashes

Today



2019



2021



2025+



Assisted Driving

Automated Driving

The Evolution of Self-Driving Cars

LEVEL 1

Active (control-based) ADAS Solutions

Active lane keeping, adaptive cruise control, automatic emergency braking, etc.



LEVEL 2

Partial Autonomy

Full automation within a lane – driver remains fully engaged, with hands on the wheel

LEVEL 4

Highly Autonomous Vehicle

Driverless in certain areas



LEVEL 3

Conditional Autonomy

Full automation on a highway – but driver required to resume control



LEVEL 5

Fully Autonomous Vehicle

Driverless door-to-door



Source – Automotive Technology Roadmap: The Road to Autonomy from the Consumer Technology Association and Vision Systems Intelligence

Worth Repeating? 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



**“Does not turn a
Tesla into an
autonomous vehicle
and does not allow
the driver to abdicate
responsibility.”**



Automated and Electric Vehicles Act 2018

New rules to ensure safe and effective insurance for self-driving cars



We were involved in discussions throughout the various iterations of the Automated and Electric Vehicles Bill, and continue to engaged now the Act has gained Royal assent

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

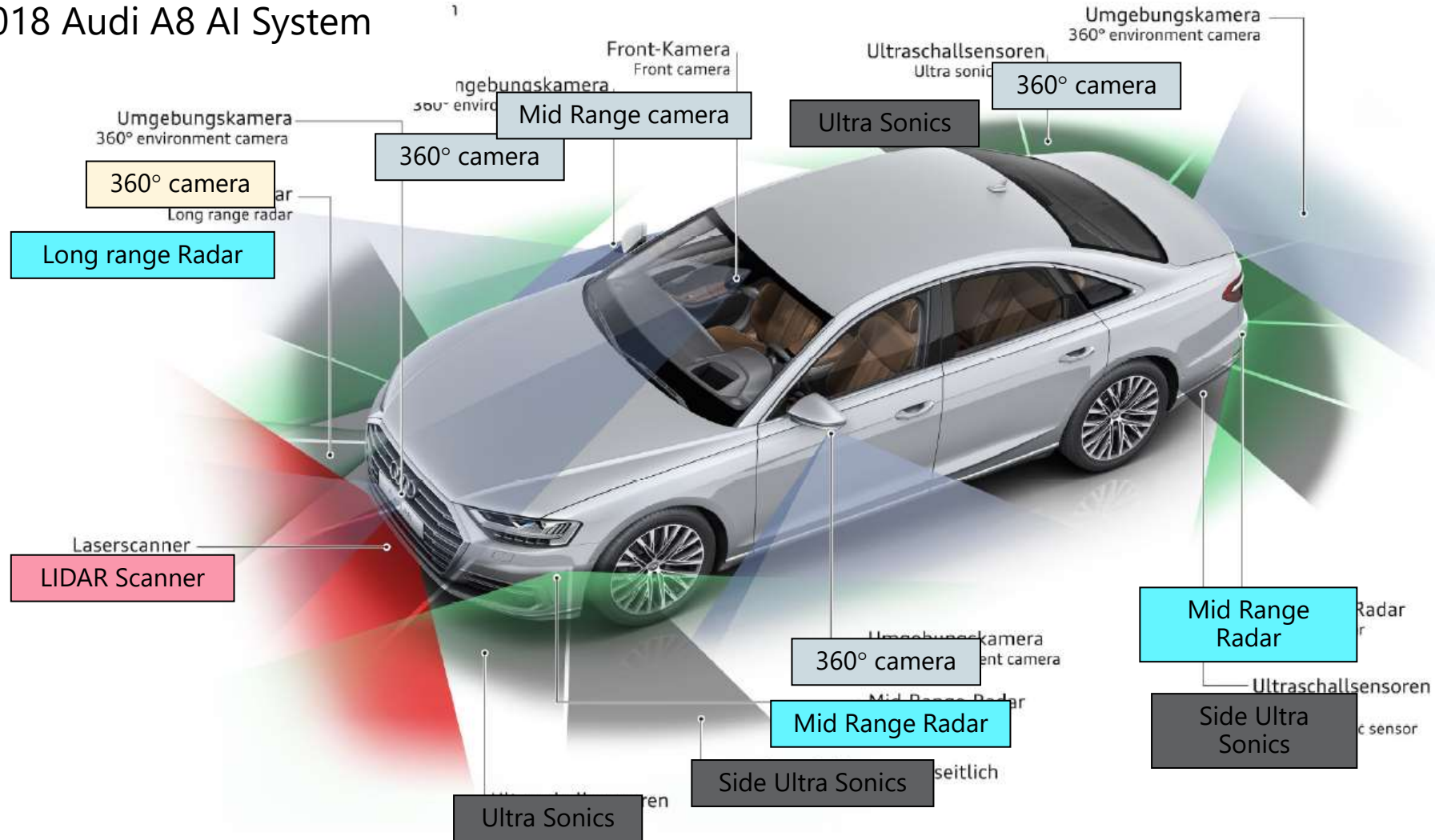
Realistic levels of liability on OEMs and other third parties to encourage innovation



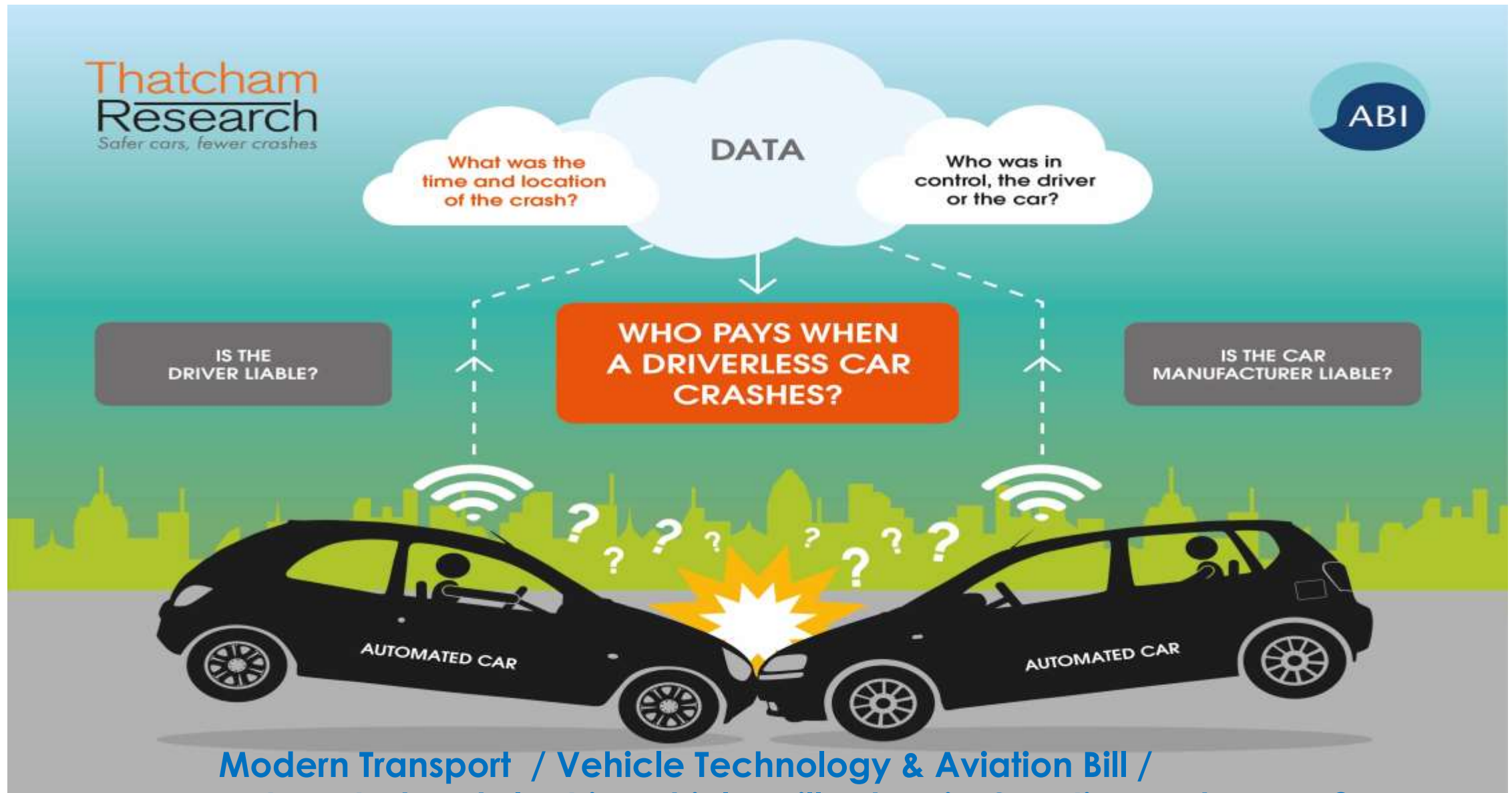
Centre for Connected & Autonomous Vehicles

All This Technology is producing a mountain of new data

2018 Audi A8 AI System



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



Modern Transport / Vehicle Technology & Aviation Bill /
Automated and Electric vehicles Bill - The Big Question - Who Pays?



Insurers want drivers in the vehicle data ownership seat, not car manufacturers

“With connected cars and smart traffic comes ever more data. With data as the new oil, the questions over vehicle data ownership, access and purpose increase”

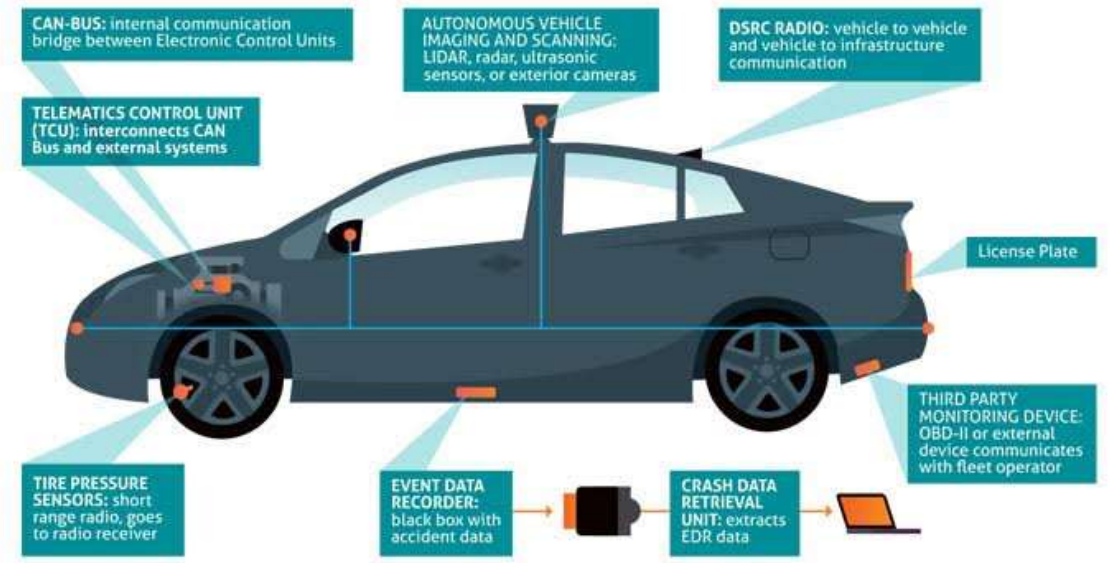


Claims can't be settled without data

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 and the CONNECTED CAR



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?

#Data4Drivers - ACEA Compromise

.....
SERVICE
ACCESS TO
THEY NEED
SECURE F
.....

Manufac
Contract
vehicle n



#Data4Drivers

WHETHER T
AND AN



#Data4Drivers

.....
MAKE DATA
RTIES
.....

er,

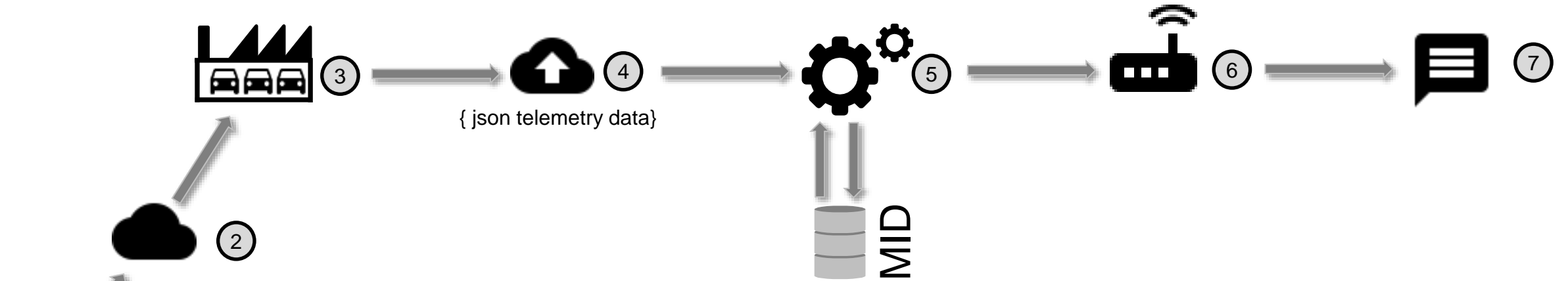
able
ons

ti-brand
access

s by
rver;

ANSPARENT
ETITION

Possible UK DSSAV Sharing Mechanism



- ① Driver has an accident which is detected by vehicle sensors
- ② Car submits DSSA telemetry data to the OEM
- ③ OEM receives the telemetry data from the vehicle
- ④ OEM sends a subset of the data to the MIB Cloud API
- ⑤ MIB receives and enriches the data with data from the MID
- ⑥ MIB pushes notification to the insurer
- ⑦ Insurer receives message and instigates claims processing

Using Data to provide additional / better Customer service?



Car-related services

- Free roadside assistance automatic emergency assistance
- Theft/recovery notification
- Free oil/car services
- Free parking
- Remote vehicle diagnostics,
- Information on free parking
- Mobile phone GPS



Services non related to car

- Tailored communications based around places visited
- New Insurance Products
- Partnerships with Stores / Food outlets
- Geo-notification discounts
- Benefits for safe driving away from Motoring
- Credit for e-commerce websites



Data analytics and driving behaviour related services

- Embedded insurance, variable pricing?
- Portable 'Driving DNA'?
- Trip and expense log book
- Monitoring children's driving
- Carbon footprint feedback
- Gamification - compare driving with friends, family
- Access your driving data

TESTING – Understanding the Technology

Under the bonnet

How a self-driving car works

Signals from **GPS (global positioning system)** satellites are combined with readings from tachometers, altimeters and gyroscopes to provide more accurate positioning than is possible with GPS alone

Lidar (light detection and ranging) sensors bounce pulses of light off the surroundings. These are analysed to identify lane markings and the edges of roads

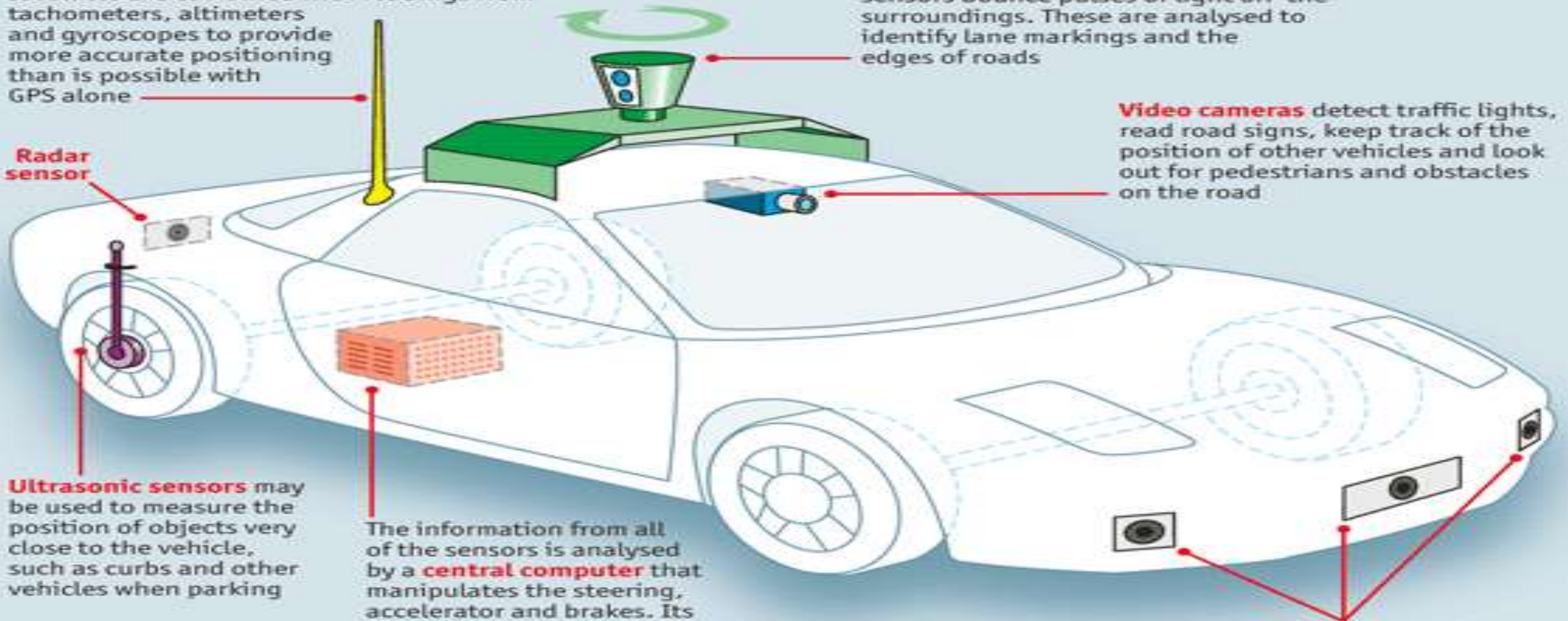
Video cameras detect traffic lights, read road signs, keep track of the position of other vehicles and look out for pedestrians and obstacles on the road

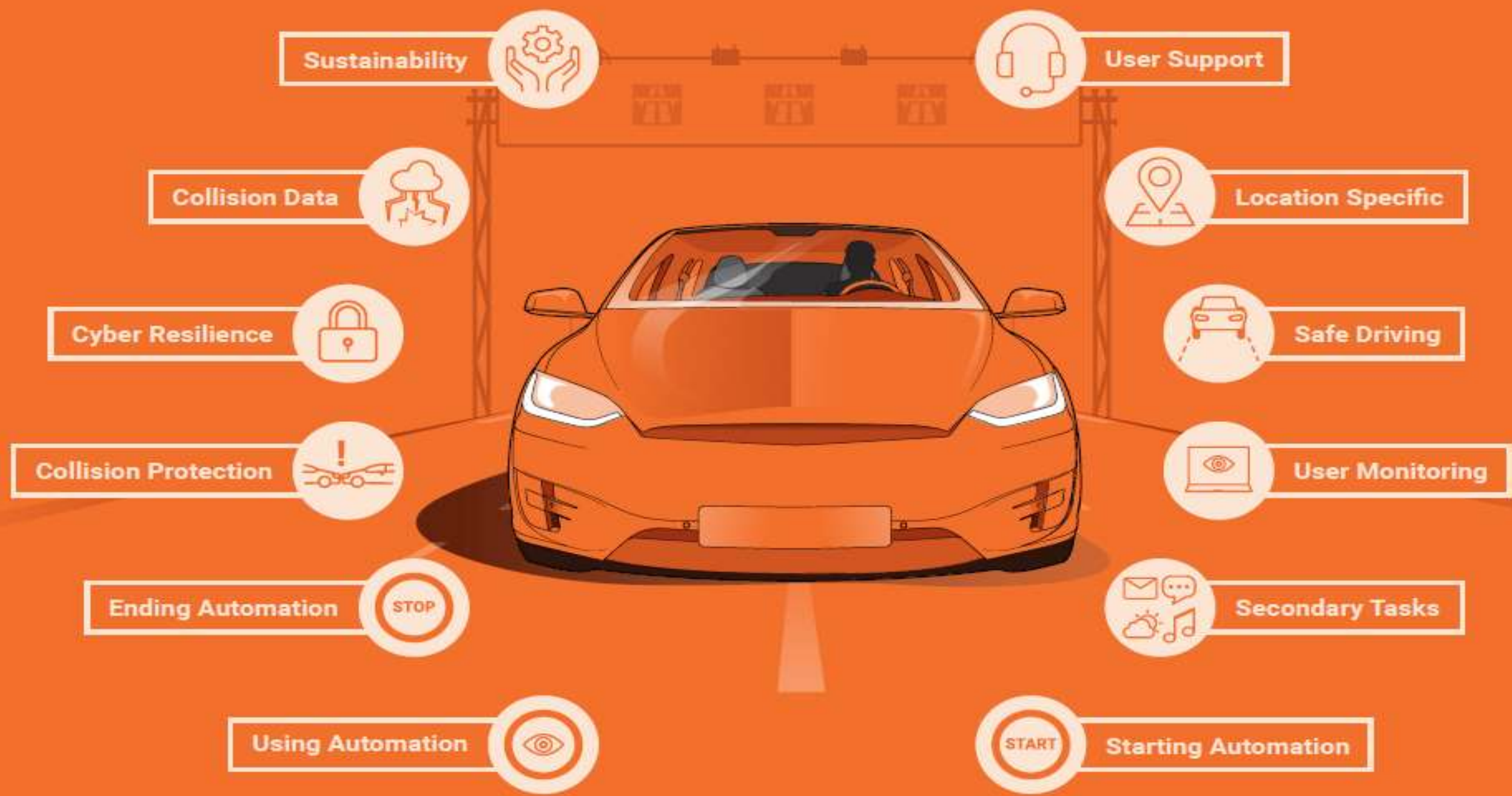
Radar sensor

Ultrasonic sensors may be used to measure the position of objects very close to the vehicle, such as curbs and other vehicles when parking

The information from all of the sensors is analysed by a **central computer** that manipulates the steering, accelerator and brakes. Its software must understand the rules of the road, both formal and informal

Radar sensors monitor the position of other vehicles nearby. Such sensors are already used in adaptive cruise-control systems





Swipe Right to Sue?

There's a new app that lets you "sue anyone by pressing a button."

DoNotPay

report errors
fix errors on your
tion or Experian report.

Refunds for late package deliveries
If your package is late, get the deli
fee refunded (or free Amazon Print

\$3500.0

Money you're missing out on from
hidden fees, prescriptions, & parking tickets

Start Saving

Navigation icons: Home, Money, Arrow, Gear

Your Products

- Bank fee refunds** **Connect**
- Free government & settlement money** **Connect**
- Get free prescription drugs** **Connect**
- Ridesharing Refunds** **Connect**
- DoNotPay Phone Network** **Connect**
- Maximize Privacy Settings** **Connect**

Navigation icons: Home, Money, Arrow, Gear

DoNotPay

Unlimited Visas
Green cards and tourist visas
without the help of a lawyer.

Start Saving

Navigation icons: Home, Money, Arrow, Gear

HOW TO TURN OFF TESLA





impact

risk

opportunity

plan

analysis

customer

complex

data

process

COST

treatment

plan

strategy
resources

important

risk

plan

risk
retention

impact

management

planning

implementation
monitor

customer

research

rebtion

probability
assessment

identification

performance

organization

performance

project

assessment

perform

organiz

project

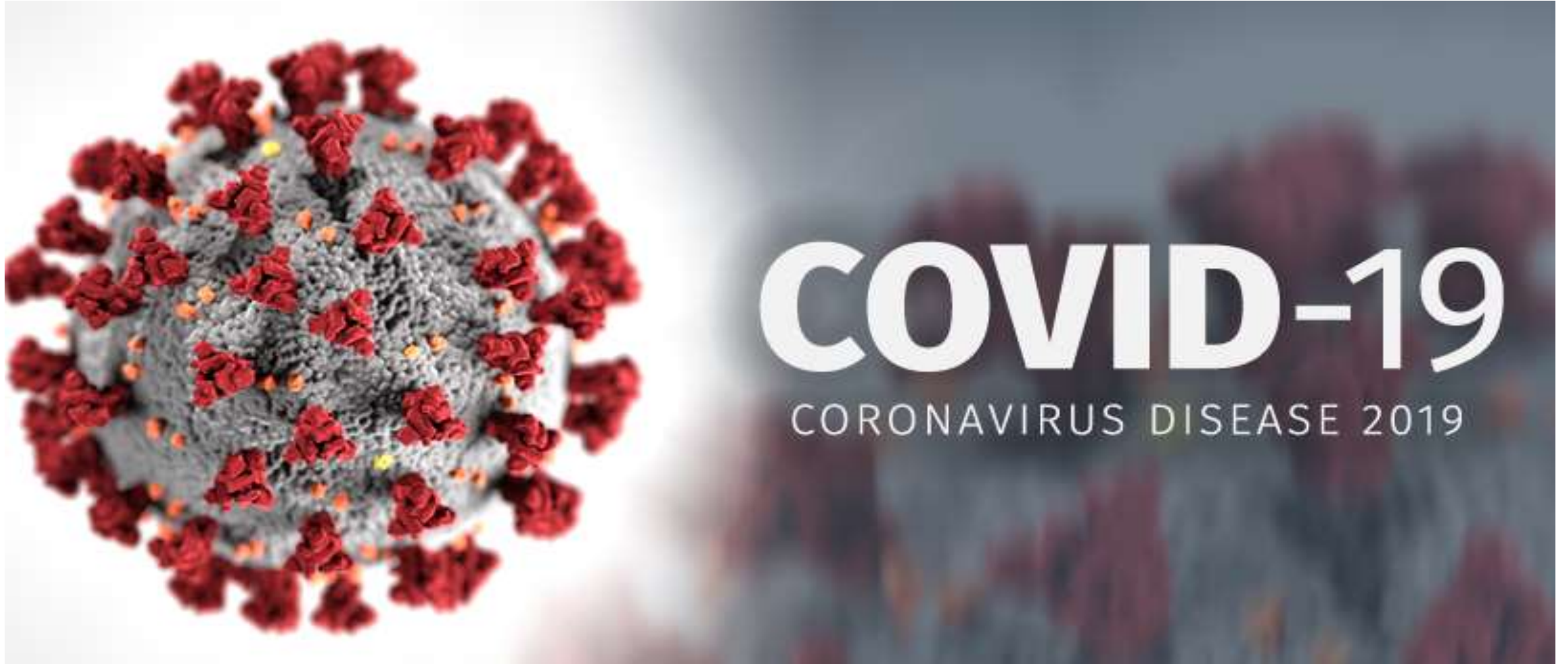
impact

organization

perform

sales

Coronavirus?



Impact on other businesses



HOTELS

The proliferation of driverless cars could cut into another big portion of hotels' customer bases: those who opt for a single-night stay at a roadside motel while driving from one place to another.

The hotel industry could look very different in the future. Already, the big chains have been [searching for ways to appeal to younger travelers](#), who have increasingly sought out lodging alternatives like Airbnb when vacationing. The proliferation of driverless cars could cut into another big portion of hotels' customer bases: those who opt for a single-night stay at a roadside motel while driving from one place to another. SVP of brand strategy at BMW Sven Schwirith (previously at Audi) [predicts that 20 years from now](#), many of these motel customers will instead choose to sleep in their driverless cars.

Impact on other businesses



REAL ESTATE

Faster and easier commutes could shift residential property value from properties in urban centers to those in suburban areas. In commercial real estate, spaces currently predicated on human drivers could be converted to other uses.

It's not just parking garages — the ripple effects of self-driving cars will require the entire real estate industry to undergo a large-scale reimagining of how it allocates space. Bloomberg's Noah Smith [says](#) faster and easier commutes will shift residential property value from properties in urban centres to those in suburban areas. In commercial real estate, spaces currently predicated on human drivers will be converted to other uses. For instance, PARTNER Engineering CEO Joe Derhake [has suggested](#) that there will no longer be a need for gas stations to be located on busy street corners to attract peoples' attention or for industrial space to be located near ports to help truck drivers.

Impact on other businesses



INSURANCE

As driverless cars evolve, demand for insurance could ultimately decrease as a result of fewer car crashes, potentially saving insurers money on payouts in the near future. In anticipation of this shift, some insurers are rolling out usage-based insurance policies.

Despite some challenges, many believe driverless cars will make automobile transportation a whole lot safer, and potentially reduce the number of auto accidents in the long run. While this might save insurers money on pay-outs in the near future, demand for insurance could ultimately decrease as the risk of a car crash drops. In anticipation of this shift, some insurers are rolling out usage-based insurance policies (UBIs), which charge consumers based on how many miles they drive and how safe their driving habits are.

Impact on other businesses

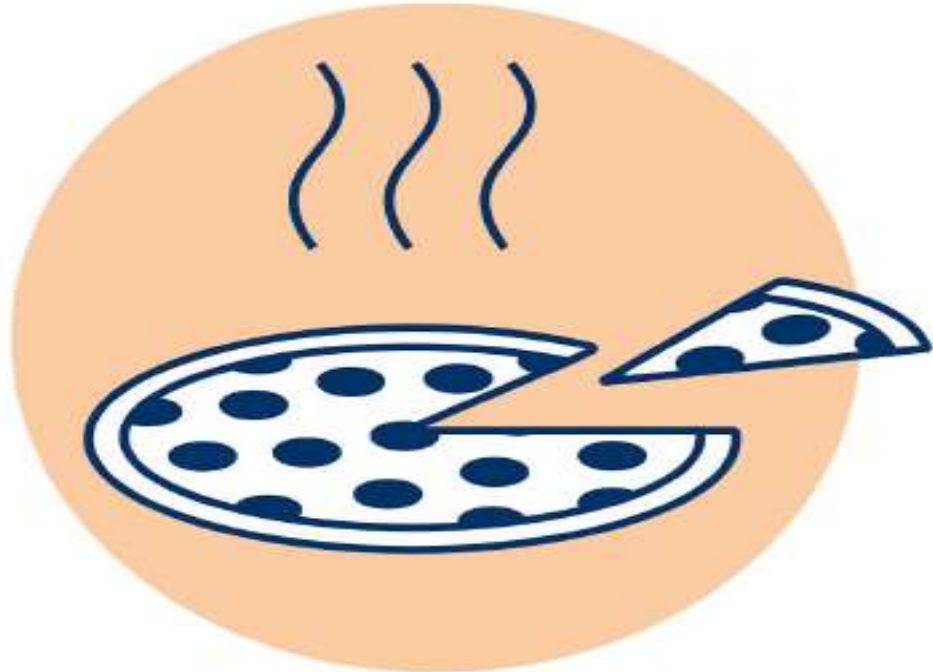


LITIGATION

Currently, 94% of crashes can be tied back to human error: automation could decrease these accidents, potentially leading to a decline in related lawsuits.

Driverless cars could alter the frequency and impact of car accidents — and the litigation that follows them. Currently, [94%](#) of crashes can be tied back to human error: automation could decrease these accidents, which could lead to a decline in related lawsuits. When accidents do occur, connected cars could provide more accurate data about accidents and who's at fault for a crash. Driverless cars will also likely [shift liability](#) from individual drivers to the companies that manufacture and own fleets of autonomous vehicles, potentially decreasing the demand for private practice lawyers while forcing car companies to expand their corporate legal departments.

Impact on other businesses



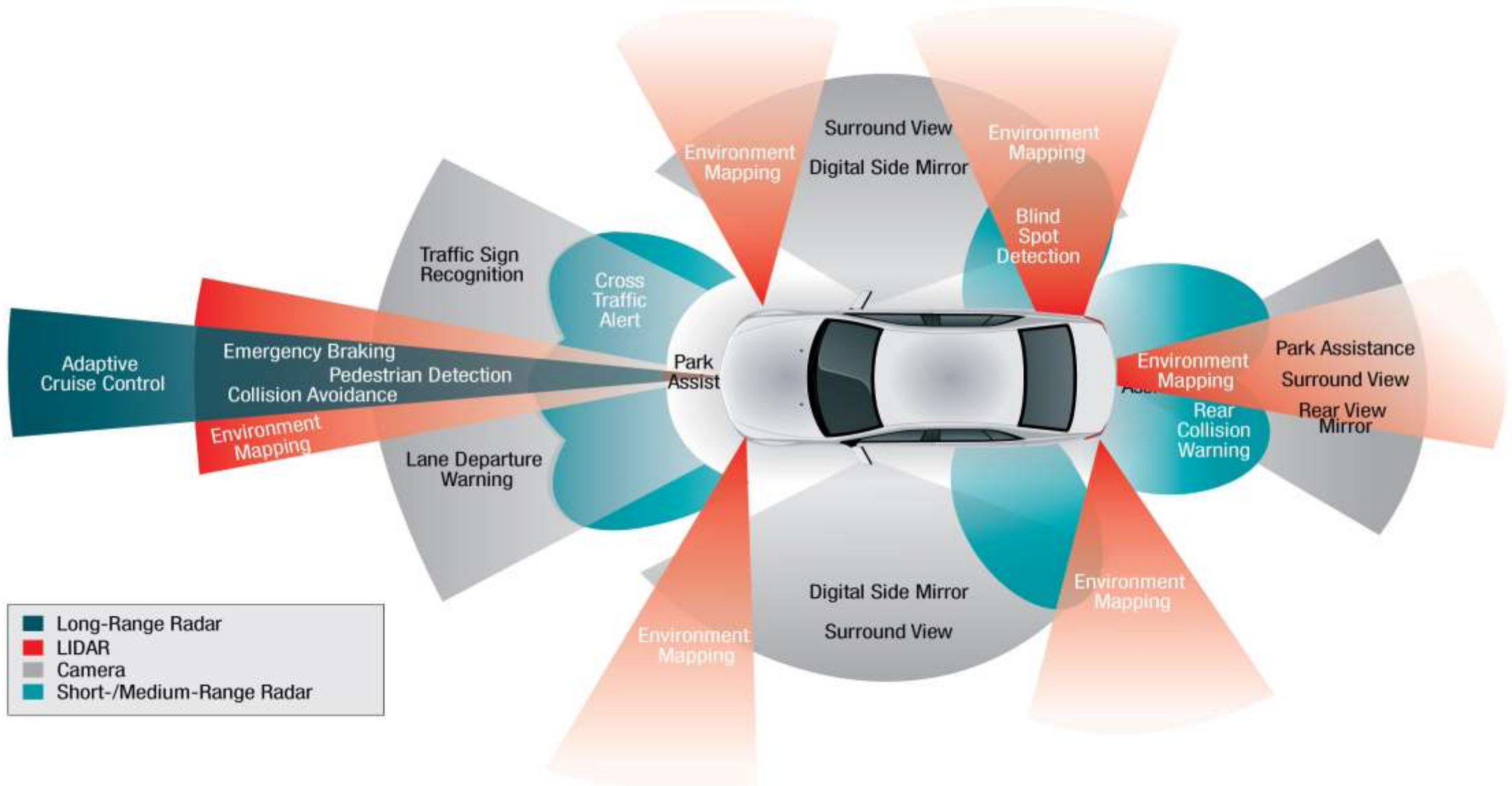
FOOD PREPARATION & DELIVERY

Automated vehicles could offer restaurants a way to efficiently deliver their food without needing to hire human drivers.

In addition to disrupting the status quo for drive-thru fast food restaurants, driverless tech could also change food delivery. Automated vehicles can offer restaurants a way to efficiently deliver their food without needing to hire human drivers. Down the road, delivery vehicles could even be outfitted to cook food to order en route to customers, meaning that food arrives fresh and warm, and delivery operations are more efficient. A vehicle would be able to make several delivery stops rather than needing to return to a main restaurant location between each delivery.

In January 2018, [Pizza Hut](#) unveiled a partnership with Toyota geared to developing delivery solutions like an autonomous car. A month later, competitor Domino's announced that it was beginning a second round of tests for self-driving delivery vehicles developed in conjunction with Ford.

Autonomous Vehicle Technology – Lots of Expensive Kit!



Accidental Damage Analysis

What is driving premiums up?

Tax: Since the Budget in July 2015 there have been three separate increases in the rate of Insurance Premium Tax, which means that the tax will have doubled from 6% to 12% when the latest rise comes into effect on June 1 this year

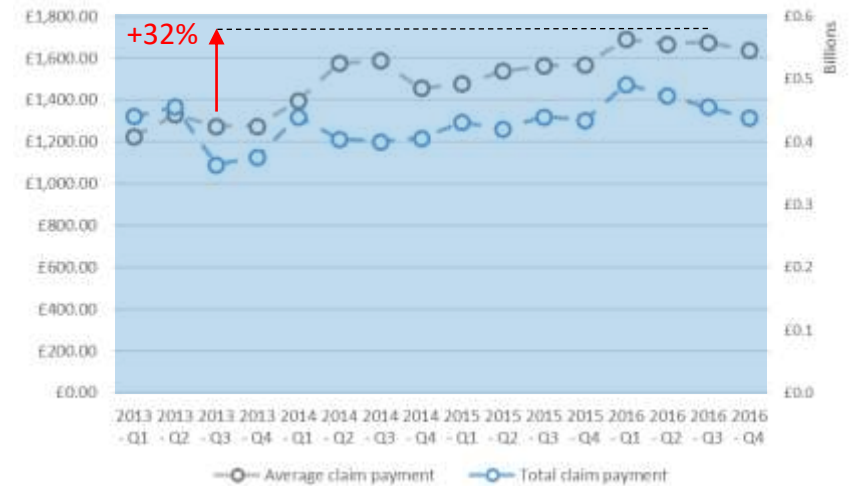
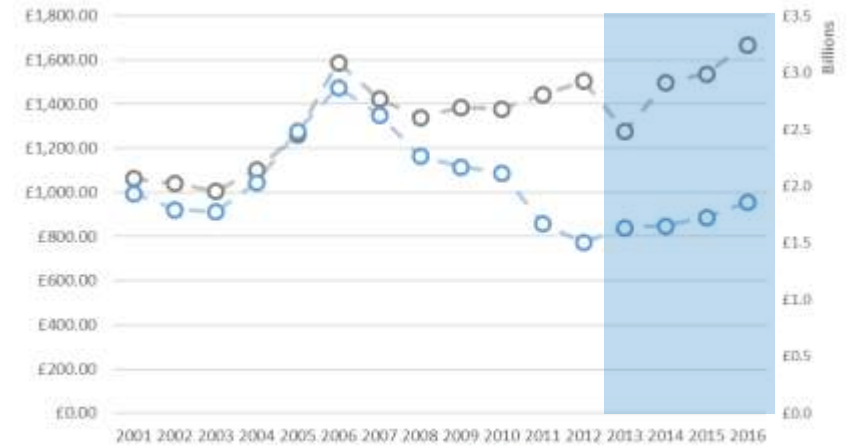
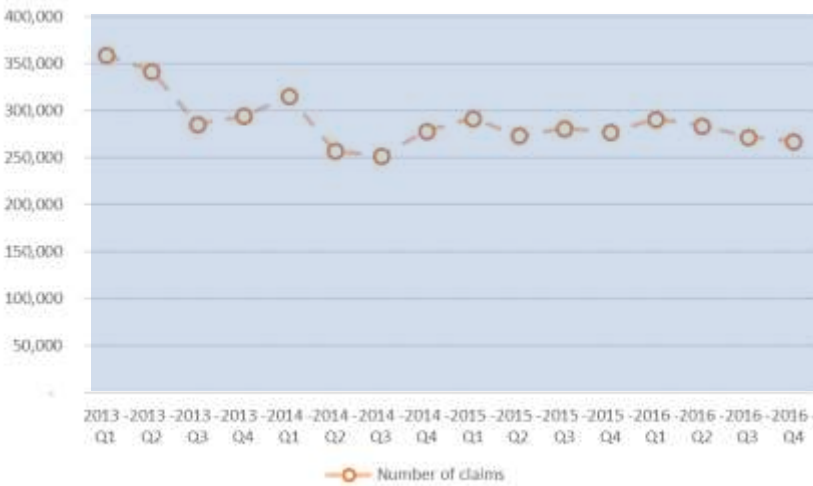
Personal injury claims like whiplash: The average bodily injury claim settled in Q3 2016 came to £10,674 - a 2.3% increase on the same period last year

Rising repair costs: The average repair bill has risen by nearly 32% in the last three years to £1,678 in Q3 2016. This is due to increasingly complex vehicle technology and rising cost of spare parts due to currency fluctuations



Association of British Insurers

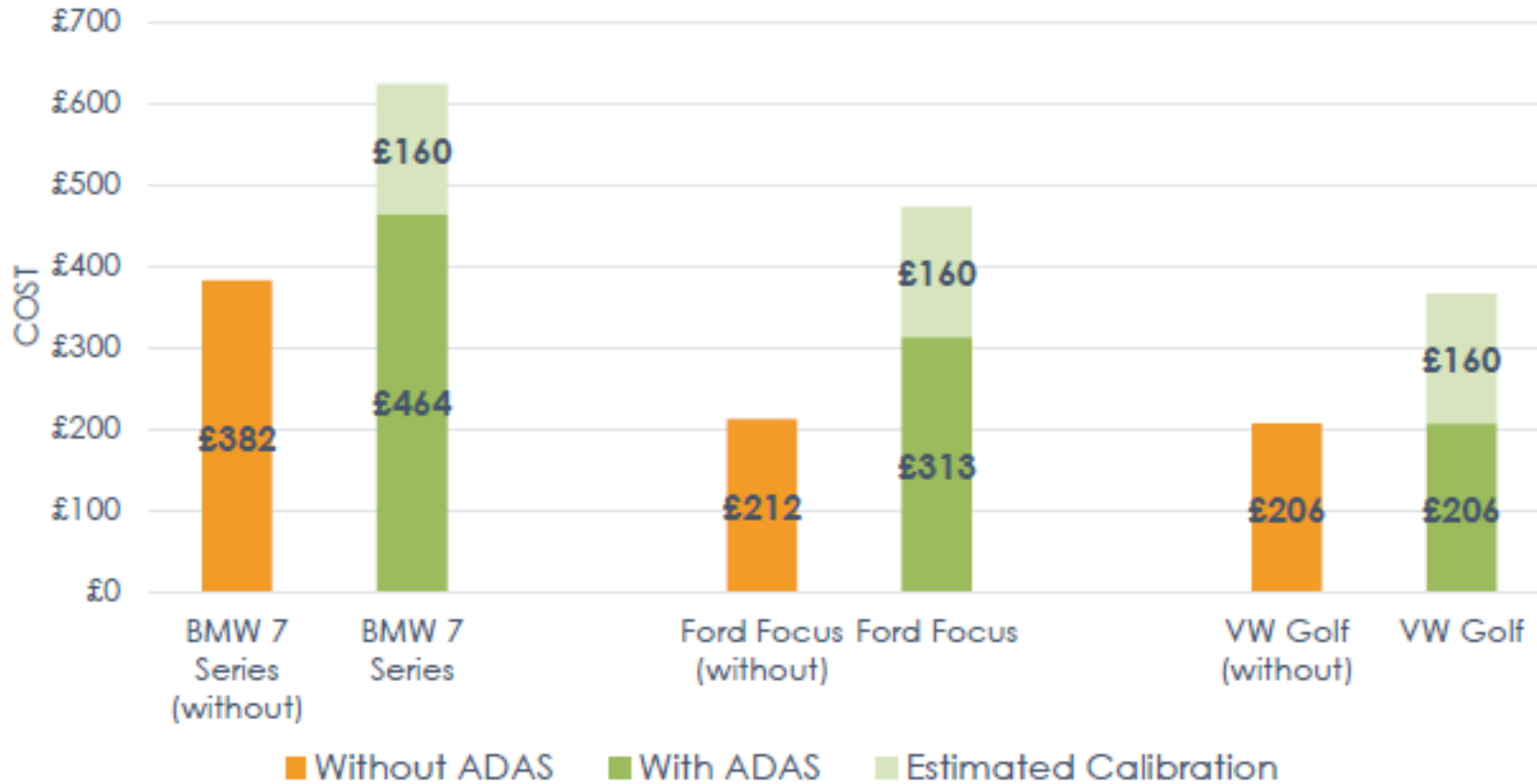
<https://www.abi.org.uk/News/News-releases/2016/12/Motor-insurance-premiums-reach-highest-recorded-levels>



Accidental damage claims should relate to claims payable to the policyholder/insured for damage to his vehicle and personal accident claims from the policyholder and partner (if appropriate). They should exclude windscreen claims and replacement vehicle costs but they should include all other costs related to the damaged vehicle, such as recovery, storage etc., including total loss.



Emerging Technology is expensive!



Average cost to replace a windscreen with & without ADAS fitted

Laser Beam technology Headlights vastly more expensive than standard models



THE
SAME
OLD
THINKING

THE
SAME
OLD
RESULTS



Thankyou for Listening



Any
Questions?

@AXADavidW

Thankyou for Listening

@AXADavidW

