

GATEway

Background Research Report

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GATEWAY-PROJECT.ORG.UK
#GREENWICHDRIVERLESS

BACKGROUND RESEARCH PROCESS

A breakdown of desk research & expert input analysis

REVIEW OF THE FIELD

- Companies working on autonomous technology (at what levels and what are their strategies);
- Different kinds of automation that exist;
- Historical milestones;
- Representations in science fiction;
- An image collection on design-related themes, looks & features;



MEDIA REVIEW

- Journalists' perspectives and understanding, in different media sectors;
- Public commenters' perspectives and understanding on mainstream media (UK, US, provincial, national);



ANALYSIS ON PEOPLE'S VIEWS

- Classify and group the perspectives and dimensions emerging from media;



EXPERTS' INPUT

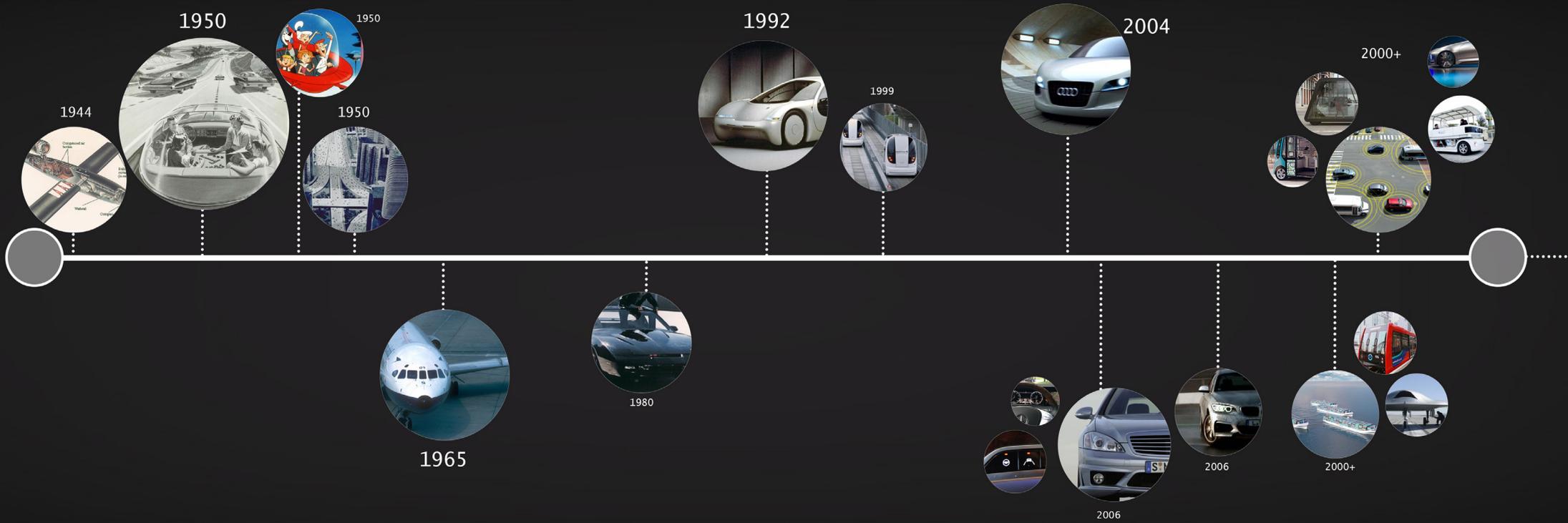
- Partners within the project—RSA, TELEFONICA etc.
- People outside the project but who have expertise or interest (TFL, RICA etc)

Aim to find out:

- Their vision of driverless cars, mental models of how system(s) could work, to enable comparison with public understanding;

A HISTORY OF AUTONOMOUS VEHICLES AND MACHINES

A timeline of the state of the art and historic milestones of different kinds of automation. From 1944 with the first autonomous machines used in World War II to present



COMPANIES WORKING ON AUTONOMOUS TECHNOLOGY

Current companies that are working on autonomous vehicles, including design related themes, looks and features

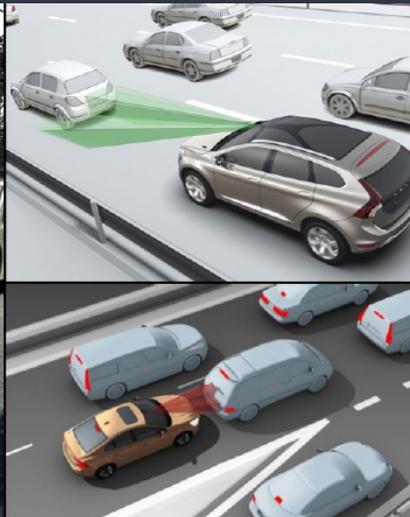
WOLSVAGEN - SELF PARKING



MERCEDES - ADAPTIVE CRUISE CONTROL FOR LUXURY



VOLVO - ADAPTIVE CRUISE CONTROL FOR SAFETY



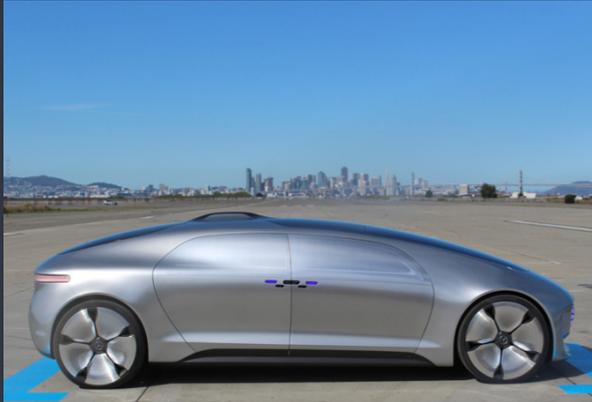
BMW - DYNAMIC



HOW WILL AUTONOMOUS VEHICLES LOOK?

Companies that are currently working on autonomous vehicles, the different design features and looks that exist

MERCEDES



AKKA



MONO VOLUME



TESLA



MERCEDES TRUCK

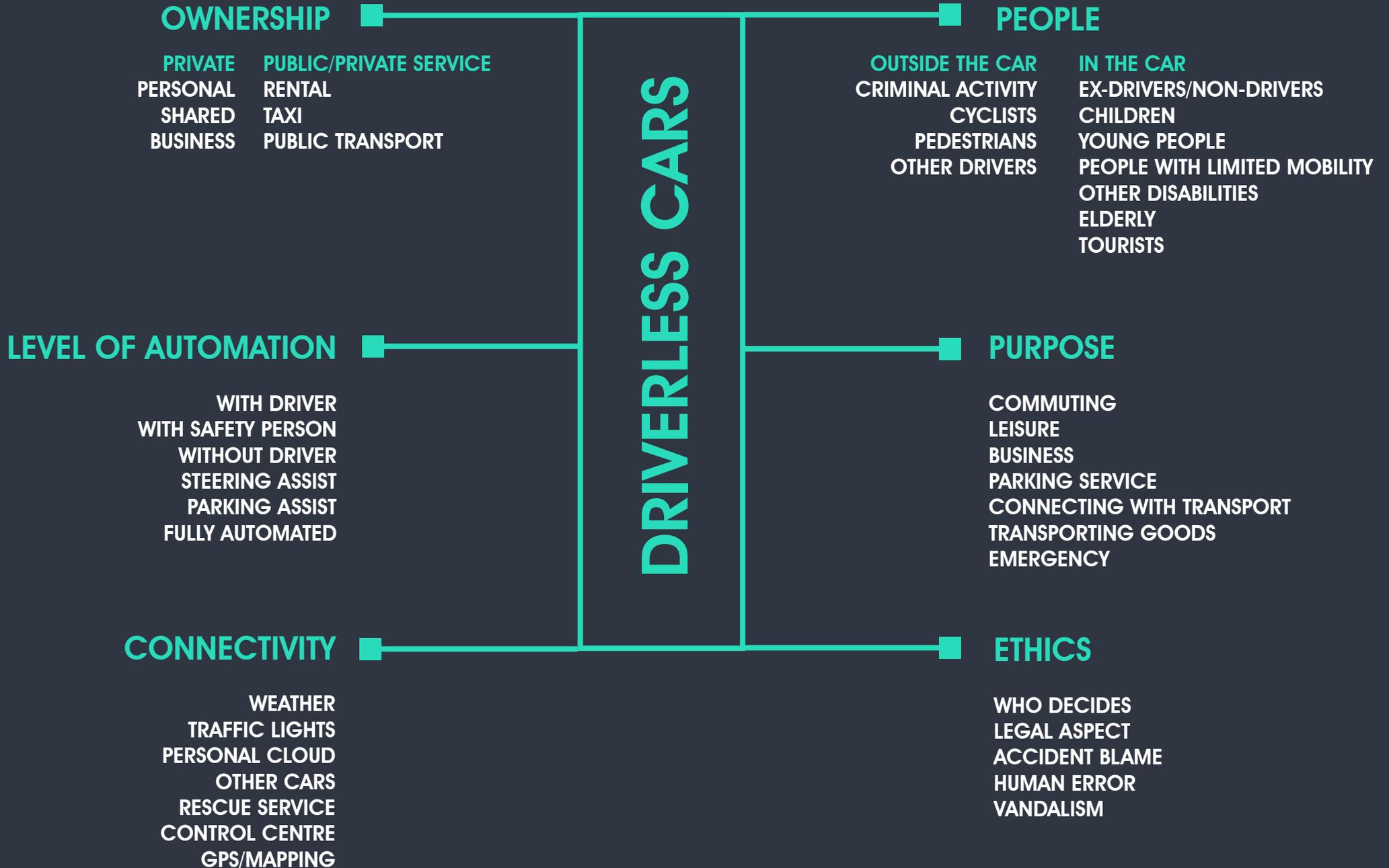


GOOGLE



FUTURE VISION OF DRIVERLESS CARS

An overview of the landscape of driverless cars



STATISTICS

A breakdown of survey results from LeasePlan and uSwitch about the acceptability of driverless cars globally and within the UK

UK DRIVERS FOURTH GLOBALLY IN THEIR WILLINGNESS TO ACCEPT DRIVERLESS CAR TECHNOLOGY

83% ACCEPT AV TECHNOLOGY

DENMARK

83% ACCEPT AV TECHNOLOGY

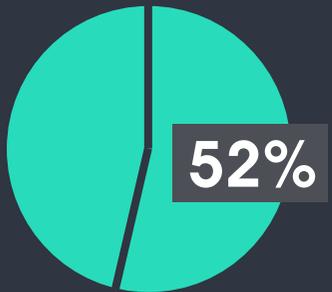
NETHERLANDS

81% ACCEPT AV TECHNOLOGY

GERMANY

78% ACCEPT AV TECHNOLOGY

UK



52%

IN UK HAVE POSITIVE VIEWS REGARDING AV (UNI OF MICHIGAN)

92% FEEL IN THE DARK ABOUT THE TRIALS

6%

BELIEVE THE GOVERNMENT IS RUNNING SUFFICIENT TESTS

4 in 10 (43%) WOULDN'T TRUST THE CAR TO DRIVE SAFELY WITHOUT A DRIVER

16%

HORRIFIED BY THE IDEA

PEOPLE CONFUSED OVER CAR ACCIDENT LIABILITY, WITH 26% BELIEVING FAULT LIES WITH AV MANUFACTURER

35%

EXPECT THE INTRODUCTION TO DRIVE UP THEIR INSURANCE PREMIUMS

ANALYSIS ON PEOPLE'S VIEWS ON THE MEDIA

A list of the national & international media which was used to analyse public commenters' and journalists' views

TechRepublic

BBCNews

The Telegraph

DEZEEN

Daily Mail

Core77

Techcrunch

The Wall Street Journal

Independent

Motherboard

The Engineer

WIRED

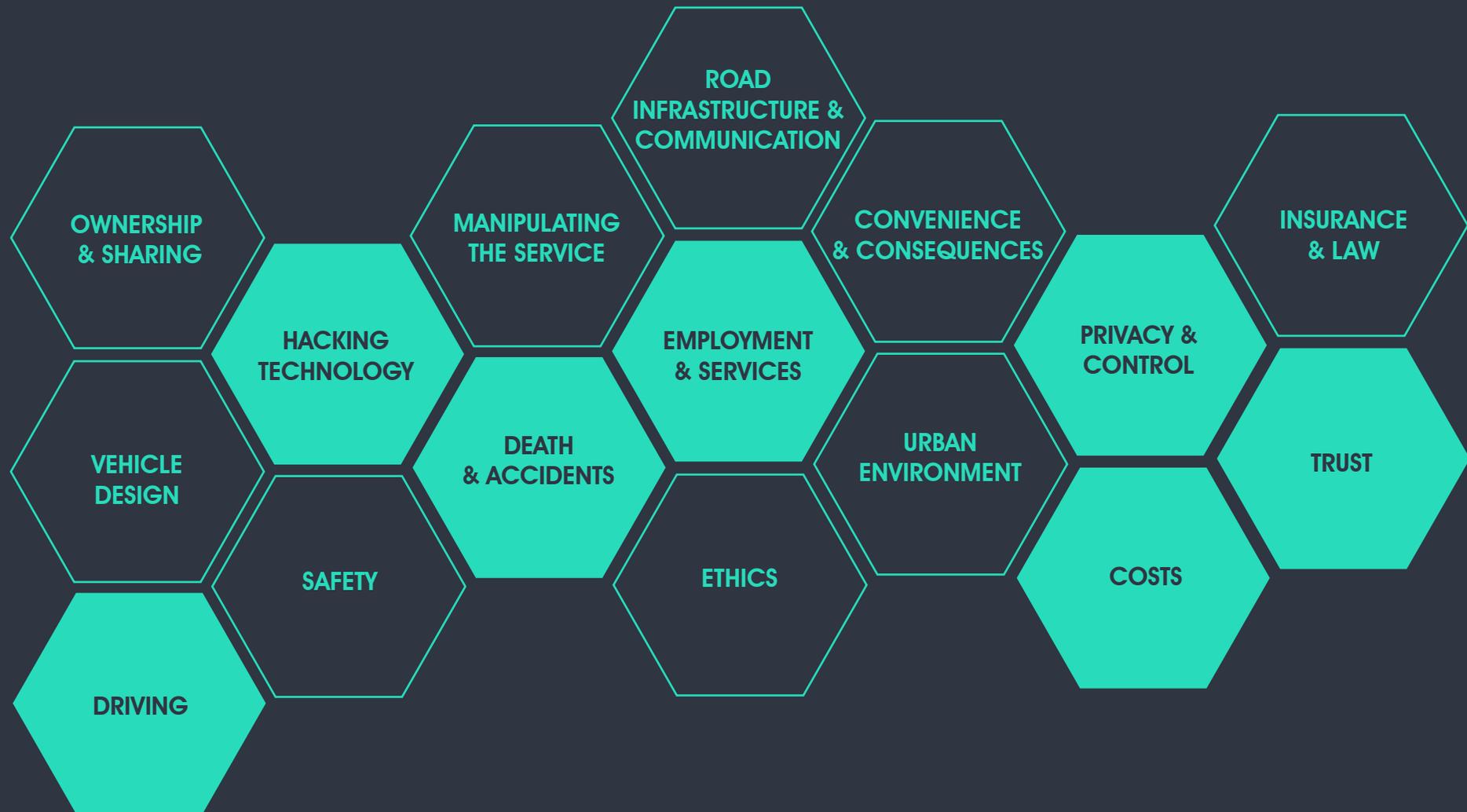
The Atlantic

Fast co Design

Mail online

KEY THEMES OF CONCERNS & BENEFITS OF AUTONOMOUS CARS

Key themes from the media review of journalists' and public perspectives, and understanding towards autonomous vehicles



MANIPULATING THE SERVICE

Attitudes towards crime, anti-social behaviour and illegal activities

JOURNALIST

POSITIVE:

NEGATIVE:

"People can 'trick' safety mechanisms, e.g. if 'have to be holding the wheel'"

"Back in 2009 one expert warned that urban pods could become a magnet for criminal and anti-social behavior."

PUBLIC

POSITIVE:

NEGATIVE:

"What about people intentionally trying to manipulate cars for fun eg. by stepping in front of them (and then if that car can respond, what of the driven car behind it?)"

"After a drunk crash could you switch on the feature after to avoid blame?"

"All good until pranksters cover those sensors up with duct tape and you end up with driverless EVs in a lake"

"Imagine this going down a street in crime-ridden neighbourhoods."

"A driverless car could be used for all kinds of illegal activity including carrying bombs."

"People will be stealing everything!"

"What about effects of malicious acts or increasing number of variables due to increasing number of cars"

CONVENIENCE & CONSEQUENCES

Attitudes towards convenience & consequences of using autonomous vehicles

JOURNALIST

POSITIVE:

"We can program it to make a little bit of profit, so it's got some money for a rainy day. We can make it the most moral, socially minded capitalist possible."

"You would be using an app that goes onto Tradenet and says: 'Here I am, this is where I want to go, give me your best offers.'"

"Another concept on display was an i3 city car that can navigate a parking garage, find an open spot, and park itself, all without human interaction. Naturally, this auto-valet feature is controlled with a smartwatch."

"The home office of the future may be the backseat of a self-driving car."

"Driverless cars' potential to reduce crashes, cut back on energy consumption and pollution, and provide "last mile" mobility to disabled, elderly, or poor people who aren't able to drive. minimize the "cost" of congestion"

NEGATIVE:

"If driverless cars became super popular, that could mean more people are on the road in general because it's easier and more fun to travel, which would make congestion worse and make energy emissions—and fuel prices—shoot up."

PUBLIC

POSITIVE:

"No traffic jams and no driving = free time > economic benefit"

"For most, cost, safety and convenience will win out. 4 hrs driving vs 4 hours doing sthg else in an AV."

"I like driving but would also like to drink then summon my car."

"Delivery vehicles will be able to be scheduled based on traffic loads"

"I want to see showers on wheels. Don't want to exercise during lunch because your work doesn't have a shower?"

"My job used to be in rail and let me tell you, it sucks. Hit a cow? Hit a person? Tree falls? Rail warps due to heat? Haven't done maintenance lately?"

NEGATIVE:

"How will it know whether it needs a clean? Will it auto-detect and drive itself to a car wash"

"They also look to be a trip hazard for the blind."

"I also fear the loss of the experience of driving..Even now I think driving standards are pretty shocking."

"By your logic we ought to get rid of housing as well. Perhaps we can sleep in the automated cars?..."

"I dont think its technology thats pushing the boundaries. Its handing over another freedom."

HACKING TECHNOLOGY

Attitudes towards private data & autonomous technology

JOURNALIST

POSITIVE:

NEGATIVE:

"By refusing to release a safer technology to the public until it is "perfect," these parties are telling us that they don't want to be responsible for having made the decision to kill one person."

"How susceptible would robot cars be to hacking? So far, just about every computing device we've created has been hacked."

"Fears about accidental crashes and insurance problems, others have warned that the cars could be used by terrorists and hackers bent on causing chaos on the roads."

PUBLIC

POSITIVE:

NEGATIVE:

"Imagine a malicious hacker taking over a car (or worse, a whole collection of cars) and programming it to drive at high speed into the nearest large collection of people?"

"Humans can't be hacked, re-programmed, infected with electronic viruses, or loose connection to a satellite-based map system. Can the same be said for computers?"

"What if the person writing the code has been drinking?"

OWNERSHIP & SHARING

Attitudes towards owning and sharing vehicles in the cities and rural areas

JOURNALIST

POSITIVE:

"Many benefits '1 shared autonomous vehicle could replace 11 conventional cars'. Designers shift to considering other activities. Commuters will recover time to be productive, connected or entertained in news ways"

"For one, it will mean an end to personal car ownership, except in rare circumstances. From the user's end of things, this means you will just summon a car with your phone, and it will take you where you're going"

"The first place we will see smaller autonomous vehicles likely will be in the growing networks of ridesharing and carsharing ventures such as Uber, Lyft and ZipCar."

"There will still be strong demand for privately owned, human driven vehicles."

NEGATIVE:

PUBLIC

POSITIVE:

"Will there be different vehicles for different uses (e.g. skip) or would some still choose to own car for these occasions"

"In the longer term driverless cars will mean we won't bother to buy one. They will roam the streets and we will simply call one from our mobile to take us wherever we want to go. No parking problems, no garage needed etc. Private cars will probably be just for enthusiasts and the like. Bad news for manufacturers though - there will need to be far fewer made to satisfy the shared demand."

NEGATIVE:

"People own cars now even though it's not economically sensible"

"Sitting 'idle' is not a reason to give up ownership - toasters sit idle, but are owned for convenience. Privilege of ownership."

"Self-ownership will be priced out of reach for many"

"How will it work outside densely-populated areas where public transport can pick up slack?"

"Decision over ownership like to depend on where you live - harder to have fleets in countryside"

"Central network would be slow and wouldn't work in existing scenarios"

DEATH & ACCIDENTS

Attitudes towards the number of accidents and mortality rate

JOURNALIST

POSITIVE:

"Desire to end the carnage from road accidents — about 90% of which are caused by driver error — the race is on to transfer control from people to computers that never doze at the wheel, get distracted by text messages or down too many pints at the pub."

NEGATIVE:

PUBLIC

POSITIVE:

"Greatly reduced accident and mortality rate - Besides the obvious savings of life, the amount of money, time (commute and other), and productivity."

"Over a million people die each year from car accidents. Humanity needs self-driving cars asap!"

"Over 37,000 people die in road crashes each year. Humans are lousy drivers. This car only has to be a better driver than we are. It does not have to be perfect or able to handle all situations it encounters. Just better than us ."

NEGATIVE:

"Won't save thousands of lives unless everyone switches. I've never had accident so why would I switch with all its limitations?"

"Traffic deaths are our own damn fault. And that is uncomfortable."

SAFETY

Attitudes towards safety, weather conditions & emergency scenarios

JOURNALIST

POSITIVE:

"Connected cars can 'see' round corners and drive closer - better use of road space"

"Public safety is our first priority as we adapt to advances in motoring technology. People also need to be reassured about safety."

NEGATIVE:

"People can 'trick' safety mechanisms, e.g. if 'have to be holding the wheel'"

"It's clear that, in an emergency humans, are more effective than automatic pilots. We can reduce this kind of error substantially, but not completely. Drivers of automated vehicles take, on average, five times as long to apply emergency braking than manual drivers."

"Can't drive -and now 'reflexes too aberrant, tendency to daydream'"

"Humans have experience, intuition, can use friction - better in emergencies"

"People think AV can go anywhere - need s good weather, GPS signal (no multistorey car parks)"

"A tougher problem, is teaching the car how to respond "the long tail of unlikely events", obvious challenges such as intersections or rain-slicked roadways."

PUBLIC

POSITIVE:

"Sensors superior to human senses. No swerving as no delay between seeing and acting"

"Makes sense for safety to allow connectivity with other cars"

"A robot cannot harm a human. Does this mean drive-by shooting will end?"

"I can see self-driving cars being much safer, though if you lose a child to one, it would be hard not to question the decision making."

"Additional safety could come from equipping cars and trucks with Wi-Fi-like vehicle-to-vehicle (V2V) radios, which would allow them to warn each other of dangerous situations such as a car running through a red light."

"AVs do not get drunk, fall asleep, get road rage, get distracted"

NEGATIVE:

"Driver assist already available, but if car does 90% of braking, how focused is driver when required for other 10%? Does concentration lapse?"

"AVs won't stop idiot drivers unless driving was banned which isn't the intention"

ETHICS

Attitudes towards ethical decision making & responsibility in an emergency situations

JOURNALIST

POSITIVE:

NEGATIVE:

"Who's ethics will AV follow? Can their ethics be chosen or adjusted?"

'Humans would swerve more for a pet than a similar sized wild animal'

"Journalists questions such as, "will a self-driving car decide in an emergency that it is best to kill the driver rather than kill a pregnant mother?"

"Ethics are compared to Trolley Problem: Should you throw the switch, killing the one person on the sidetrack (who otherwise would live if you did nothing), in order to save five others in harm's way?"

"This dilemma isn't just a theoretical problem - a robot train might someday need to make such a decision. But it would be an unreasonable act of faith to think that programming issues will sort themselves out without a deliberate discussion about ethics, such as which choices are better or worse than others."

"Humans not only drive but make ethical decisions as they drive everyday"

PUBLIC

POSITIVE:

"The priorities that will need to be programmed into automated vehicles. With my philosopher's hat on, I would respond by saying that either way, someone is making a choice, whether it is the normal/ drunk/tired"

"There will be more situations where the car doesn't know what to do than situations where a human driver wouldn't know what to do." If **all** cars are driverless, reduces ethical scenarios, except in set-up period, and interim when driven cars are in use."

NEGATIVE:

"Will they be programmed to decide how many liberal lives are worth one conservative life?"

"If the self driving vehicle has to choose between running over a child or head on hitting a truck and killing the passenger what happens ? Someone has to program those choices."

"The question is not which values we need to program into our machines, the critical question is whether we want or don't want machines to make decisions for us concerning life and death."

EMPLOYMENT & SERVICES

Attitudes towards disappearance of driver jobs and new type of service opportunities

JOURNALIST

POSITIVE:

"Health care robots whizzing about, ready with their cameras, first aid kits, advice, and direct lines to emergency services if anything unfortunate happens."

"In the automated vehicle future, "mobile retail" won't mean buying things from your phone: it will mean buying things from stores on wheels."

"The driverless future will transform both the literal landscape and the startup landscape. Just like the iPhone created a whole new ecosystem for startups with the App Store."

"A significant portion of the 50 minutes an average commuter spends in traffic each day could be used to work, relax and be entertained."

"Some Volvo cars already allow their drivers to activate de-icers remotely from their home. Also sound their horn and flash their lights to help locate vehicle"

"Increased complexity and software coding will require much more technical training for service technicians."

NEGATIVE:

"Predictable worries about the disappearance of jobs that currently require human drivers."

PUBLIC

POSITIVE:

"I would sleep or actually have the time to eat breakfast on my commute to work."

NEGATIVE:

"Queues of unemployed professional drivers at the job centre."

ROAD INFRASTRUCTURE & COMMUNICATION

Attitudes towards road infrastructure, vehicle to vehicle & vehicle to infrastructure communication

JOURNALIST

POSITIVE:

"The cars would communicate with people and the surrounding infrastructure via a new internet-based commerce system."

"The car, in turn, would communicate with the sensor-equipped roads it drives on, offering its passengers the ability to pay extra to go in faster lanes or unlock access to shortcuts"

"1: driverless car equipped with GPS, enable the vehicle to travel at higher speeds while communicating with other cars, constantly making on-the-road adjustments for the benefit of its occupants and the network as a whole. also allow vehicles to travel closer together, improving the aerodynamics of the fleet resulting in fuel savings."

NEGATIVE:

"Utilities would lose revenue because traffic lights would no longer be needed, and highways and streets wouldn't need to be lit—after all, the cars can see in the dark."

"Interestingly, the study pointed out that, down the road, eliminating the driver from vehicles could change the way land space is developed. One, because people may be more willing to commute further to work, pushing out suburban sprawl; two, because the considerable space currently tied up for parking in cities could be freed up and used for development if cars could drop off their passenger and go park themselves further away."

PUBLIC

POSITIVE:

"Presumably, cars would talk to one another so if one had a problem it would inform others of where it was and to avoid it."

"Imagine it having a city-wide nervous system. All vehicles moving at the same time and speed when the lights turn green."

"In more populated areas, roads could be sunken or elevated to prevent a lot of the unforeseen types of accidents mentioned."

"Can't think of anything better than a driverless community, with cars sticking to the speed limit and logically sorting out traffic rather than the random selection of numpties on our roads right now."

"That 'mapping' of the potholes could also serve as a public service for the authorities to work on fixing the roads."

NEGATIVE:

"Can they cope with roadworks, changes, temporary markings?"

"There's too much focus on the development of the cars themselves, no-one is talking about the roads.."

"Real 'reshaping' of transport whether urban or extra -urban will require a rethink and reshaping of ROADS"

"The only way they'll catch on is by creating special roads, and linking them together to save space, congestion between fixed destinations, These things exist today we call them railways."

URBAN ENVIRONMENT

Attitudes towards how the urban environment will be affected by autonomous vehicles

JOURNALIST

POSITIVE:

"Interestingly, the study pointed out that, down the road, eliminating the driver from vehicles could change the way land space is developed. One, because people may be more willing to commute further to work, pushing out suburban sprawl; two, because the considerable space currently tied up for parking in cities could be freed up and used for development if cars could drop off their passenger and go park themselves further away."

"Major cities won't need as many large parking decks. McKinsey estimates that by 2050 up to 5.7 billion square meters of parking space could be converted to other uses."

"When you look at some of our large metropolitan areas they will develop more green spaces and parks, but there also will be new commercial uses."

NEGATIVE:

"Parking lots, which cover a third of the ground in some cities, would pretty much disappear, while freeing land and reducing property values."

PUBLIC

POSITIVE:

"Great if it means fewer cars parked on pavements, but then how will delivery companies deliver if they xcan't park anywhere?"

"Reduced traffic related noise - As vehicles will be driven much more consistently and emotion free, the amount of noise from brakes, horns, collisions, speeding, etc will significantly lower traffic noise level in concentrated areas like cities"

"A big health implication will also be cleaner air. These vehicles will almost exclusively be electric"

"With low noise and emissions, perfectly suited for large pedestrian areas, such as campuses, hospitals and theme parks"

"Awesome. While I hate the concept of self driving cars, I look forward to being able to cross the road when and where i please knowing that the driver doesn't have a choice and the car will stop and let me cross. Wonder how the laws will be changed to combat that one."

NEGATIVE:

"Zero environment impact',? Firstly the manufacturing impact, then the slowing of vehicles, driving around them and finally the dumping of them and the batteries into waterways by thieves."

COSTS

Attitudes towards how cost in mobility will change

JOURNALIST

POSITIVE:

"Take the burden off governments and cities (costing spent on mobility accidents)"

"Autonomous vehicles will have a gradual step-by-step adoption," Kaas said in an interview. "First, there will be pay-per-usage models. These vehicles will be alternatives to cars. They will make mobility available in smaller incremental units."

"Optimistic predictions expect insurance prices to drop if the cars prove to be safer. A recent report found self-driving models would cost \$5,000 to \$20,000 more than conventional vehicles, plus higher maintenance costs."

NEGATIVE:

"A major concern with driverless systems is the cost of the sensors, which stand at £38,000 on the LUTZ Pathfinder Pod."

"With ecommerce continuing to grow consumers expect to have more convenient options for delivery –but at a cost that suits them"

PUBLIC

POSITIVE:

"Driving! (AVs) should cost less than cars if in use all day - Cars parked most of the time, cost MOT/tax and depreciate."

"Akin to smart-meters - high charges during higher demand. Those that can then use low-peak to save money (which also improves system efficiency)"

"Each ride becomes cheaper if the vehicles are autonomous rather than owned and run by major corporations."

"To be cost effective the delivery charge would have to be less than the cost of going to the store yourself."

NEGATIVE:

"Without income from driving penalties, Gov will charger per mile. Already know location in new cars through EU 'emergency assist'"

"AVs will charge more when demand is highest (to balance latency). This would reduce if people could work when available but many can't."

"Costs won't reduce without sacrificing flexibility and personal choice which many is not an option"

INSURANCE & LAW

Attitudes towards the vision and implications for insurance & law

JOURNALIST

POSITIVE:

"The report states insurance companies might need to radically shift the risk they cover from human error to technical failures."

"Some commentators believe an automated car should undergo a much more rigorous test than a new teenage driver"

"Should robot cars never break the law in autonomous mode? If robot cars faithfully follow laws and regulations, then they might refuse to drive in auto-mode if a tire is under-inflated or a headlight is broken, even in the daytime when it's not needed."

"Auto insurers, would initially see profits rise as accidents declined and payments to customers dropped but would eventually see something like 90 percent of premiums disappear"

"Health insurers would also have to give up revenue as car-related injuries plummeted."

"Governments would lose fines, because cars would obey all traffic laws, but police forces would need fewer officers on the road, and prisons would need less capacity as drunk drivers kept their freedom."

NEGATIVE

"This will be the challenge in creating laws and policies that govern automated cars: We need to ensure they make moral sense."

"Even if we could figure out how to do the programming, the rules might be too restrictive"

PUBLIC

POSITIVE:

"Insurance on self-drive cars will be much lower, as safer"

NEGATIVE:

"The legal problem here is that whenever a company programs a car to make a decision whoever is influenced by the decision will sue the company for millions."

"Insurance won't reduce - they'll find new ways, e.g. telematics to see if used car in adverse conditions"

TRUST

Attitudes towards the technology benefits and concerns

JOURNALIST

POSITIVE:

"Driverless cars always know exactly where they're at and always know what's happening around them."

NEGATIVE:

"The hope is that the software will be as safe as a human driver — and eventually much safer. How long that will take remains an open question."

"Autonomous car technology needs to be perfected before we can bring it to the market. 99% isn't good enough."

"Current technology exists. However aren't likely for the foreseeable future; public perception, adapting train workers jobs and (UK) government not encouraging. However indifferent in US"

"They're unlikely to outstrip the progress made in the wider automotive industry, or indeed fundamentally reshape our public transport infrastructure."

"There's no indication that it's capable of handling the road with far more skill than a human."

"Programmers still will need to instruct an automated car on how to act for the entire range of foreseeable scenarios, as well as lay down guiding principles for unforeseen scenarios."

PUBLIC

POSITIVE:

"Hands off driving will work when a non driver is sitting in the car who has no experience in driving."

"I could envisage a kind of driverless taxi replacing park and ride schemes in city centres. Once they're visible in that kind of role I think we'll see a gradual adoption over perhaps a couple of decades as people encounter them and get used to the idea."

NEGATIVE:

"I am a software engineer by trade and I have seen too many system failures to rely on a complicated network that would control my vehicle."

"For me, computers and GPS have taken me places I never intended on going""Not to mention when new roads are built it takes a while for updates to come through."

"ABS - something to reduce braking reaction time, I'd accept, but not control over the steering or accelerating, too much can go wrong"

"How can the complexity of driving in a pedestrian rich urban environment be automated, whilst the simpler challenge of automating our railway system hasn't been completed, and these still require driver back-up?"

"I would never hand over my life to a robot car." "I won't be putting my kid inside that car alone to go to school."

"Until we get technology and processors that work in the same way as the human brain then this driverless technology will not be full scale adopted."

PRIVACY & CONTROL

Attitudes towards control of autonomous vehicles and concerns over privacy of personal data

JOURNALIST

POSITIVE:

"The operators at Starship can take control of the device and view the world through the robot's eyes, even talking to people around it if necessary."

"But with these connected cars come swathes of new data. And not even our own vehicle will protect us. The success of the "smart" connected car is dependent on people parking their data privacy concerns and signing up to sharing information about themselves, their journey, the car's performance and their fellow passengers. In return, car owners will receive enhanced in-car connectivity and a more personal vehicle experience."

"I'm convinced that it won't be too long before we accept the need for an email or social media account to login to a car's dashboard or entertainment console"

NEGATIVE:

"There is a potential nightmare scenario whereby robotic driverless cars are fighting for space with cars with humans behind the wheel and indeed semi-autonomous cars with no-one totally in control".

"It seems drivers of the future will be held responsible for something over which they have little or no control."

"Left unchecked, driverless cars offer the opportunity for manufacturers to sell driving data to insurance companies, to play personalized, in-car advertisements, and to track consumers' movements."

PUBLIC

POSITIVE:

NEGATIVE:

"Data on your movements/shopping habits/visits/malls/hospitals/relatives/lovers etc will be sold to the highest bidder."

"Government don't want this for safety but for control and new taxation revenue streams"

"What if you leave your keys and phone in it and see it driving off round the corner"

"My wife and I enjoy nothing better than getting away on strange roads and making impulse decisions which roads to take"

"Pretty soon if you don't have an iPhone App you won't be able to participate in this world."

"Can you tell it which direction to park in (e.g to have picnic out the back)"

"What would AV make of request of couple to park for an hour in a shady lane?"

"There should be a built-in override, in which case would people be paying attention to surroundings to activate it?"

VEHICLE DESIGN

Attitudes towards how the vehicles exterior and interior should be designed

JOURNALIST

POSITIVE:

"Designers shift to considering other activities. Commuters will recover time to be productive, connected or entertained in new ways"

"Designing a new type of space 'third space' exist between the home and work. Require new interaction for both work and play. Mix of shared and owned third spaces"

"I got it up to 15-20 mph, so not exactly fast, but fast enough in a tight area—the system took over and yanked the car to a stop without a problem."

"In China, a very high percentage of these vehicles, the people who own them sit in the back." The roomy backseats feature calf rests, coolers to chill drinks in, and tables that pop out of the arm rests for eating or working in comfort."

NEGATIVE:

PUBLIC

POSITIVE:

"People will still want to be transported in vehicles that meet their specific need(s) and fit the image they want to project so I don't see a future where all vehicles look the same."

"This actually could work in town. Being from snow country in USA, it will be important to have self cleaning lenses on Lidar and other positioning devices, both for snow cover and road residue like mud, ice melting substances and other splashing liquids."

"Would be cool to see something like San Francisco cable cars where you can just jump on or off without it stopping."

"Make them larger and you can fill them with your trash for the return journey"

NEGATIVE:

DRIVING

Strong views & attitudes towards autonomous vehicles and current driving experience

JOURNALIST

POSITIVE:

NEGATIVE:

"Humans can find limits of machine - eg racing drivers"

"AUTOMATED CARS WON'T KILL DRIVING"

"I think it'll always be important for people to have that sort of connectivity with a vehicle, that comes with actually being behind the wheel, McGovern explains."

"Common criticism is that many people, especially petrolheads, love getting behind the wheel and putting the pedal to the floor"

PUBLIC

POSITIVE:

"People would rather do something else than drive during commute"

"Drivable cars are NEVER going away completely, because most people ENJOY driving a car. They just don't enjoy sitting in bad traffic/slowdowns..."

"Most people will think it won't work/never take off such as changing from a horse and cart to the very first automobile, look where we are now. Its nature, driverless cars are the next step"

"My children or grandchildren may never experience the same pleasure, the same enthusiasm for a particular make or model of car that has turned me into the car nut I am."

NEGATIVE:

"Not automated trades (house painting, decorating, carpentry) - is driving akin to a craft?"

"In a world that appears to be governed by a combination of stupidity, we may find ourselves slowly and gradually forced out of the cars we know and love."

"To say automated vehicles will be a sea-change is a huge understatement. They will likely have a bigger impact on society than the actual invention of the automobile itself."

"What about motorsports?"

"It will further the class divide"

EXPERT INTERVIEWS

Expert input from partners within the project as well as people outside the project with expertise and knowledge on autonomous cars. Each expert reference were asked questions on their vision for autonomous vehicles. What opportunities and issues that their belief important.



Transport for London (TfL) is a local government body responsible for most aspects of the transport system in Greater London in England. Its role is to implement the transport strategy and to manage transport services across London.



Telefónica is a Spanish broadband and telecommunications provider with operations in Europe, Asia, and North, Central and South America. Operating globally, it is one of the largest telephone operators and mobile network providers in the world. Telefónica brand, it also trades as O2, Vivo and Movistar.



Rica is a UK consumer research charity, who provides practical unbiased information based on research with older and disabled people.



RSA Insurance Group plc is a British multinational general insurance company headquartered in London, United Kingdom. RSA has major operations in the UK & Ireland, Scandinavia and Canada and provides insurance products and services in more than 140 countries through a network of local partners.

EXPERTS' INTERVIEWS

OPPORTUNITIES

Car Sharing is increasing

"There has been an increase in the use of car sharing and car clubs available."

Trusting the brand

"To a certain extent there's the trust in the brand that they're involved with. Maybe there's a little bit of distrust with the car manufactures at the moment"

Reclaiming road space

"Reclaiming road space for other things, whether cycling, better walk ways or just pleasant environment."

Day and Night services

"Delivery and servicing in London is the growth in terms of vehicle traffic, more vans as people demand more within-the-hour deliveries. It's not just next-day deliveries,. There's tension between what makes a city livable and pleasant during the day. Which, maybe the automation might enable some of that to take place more at night."

CONCERNS

The Pace of Tech

"There's a real dilemma about what does the public sector invest in going forward, on the basis that it could be quite expensive and which you may have to pay for over a 10-15 year period"

Urban Sprawl

"In terms of commute it actually increases what is an acceptable commute time. Increases urban sprawl"

City Mobil 2 vehicle

"Which is not a million miles away from Greenwich concept. Well, it worked, but was the point? Because they couldn't connect it up to the tram service, because they didn't have enough shuttles. It had to take a slightly circuitous route to get somewhere, and it was actually quicker to walk."

Other road users

"A car is driving along and it's got AB fitted to it and there's a cyclist behind it, and the car in front of the car with the AB stops suddenly. The car with the AB stops very quickly, but cyclist behind can't and crashes onto the back of the car."

Lack of experience

"The vehicles are being built by people who haven't got experience of public service vehicles the same way the OEMs do. Have to go through learning curves. More concerning than the actual physical automation of the vehicles is the actual systems that operate it and run in background in that wider context."

Dangers in residential areas

"A large increase in trips in residential areas, because vehicles are shuttling between different jobs. Instead of being parked up, the vehicles are moving around all the time. It actually might make residential areas more dangerous or certainly less pleasant if that's not constrained"

Personal security

"Original Equipment Manufacturers OEMs have a low level understanding personal security. You only have to look how easy it is to hack key fobs, and the levels of encryption that may have been fine 10, 15 years ago, but just really aren't up to date for the modern technology."

TFLs MENTAL MODEL

Iain Macbeth's mental model of how the systems could work

Service models

"A small mini bus or something like that could be more attractive than a full-scale bus. Demand-responsive bus services, without necessarily fixed routes or fixed bus stops, and picks you outside the door, like Uber. That starts to be interesting on the more marginal services now to London. Concerns over the economic impacts of these things on traditional bus services. There's a number of advantages on automation for buses. Enables a 24/7 bus service, because they're on more or less on fixed routes."

Different level of services

"I would expect any driverless shared vehicle to be able to reflect your personal preferences to a certain extent. For instance you pay for a premium service which is ad free, versus maybe in the low-cost option you get."

"There needs to be a balance of level of services and how deployed. There will be different service operators in things. Interesting conundrum for authorities to regulate. Those who have the ability to pay for premium service might expect more road space than those who've got utility service."

Data Privacy

"I think the reality is most people share data all the time. Yes, you probably need to be given the option to opt out if you want to, but you perhaps wouldn't necessarily expect to get the premium service then."

Technology

"Existing roadside infrastructure will need to change. Not necessarily the roads themselves, but the communications and the roadside furniture etc. Quite a lot of the traffic management kit is actually quite old-fashioned, for example SCADA are effectively 1960s technology. There is a dilemma in what the public sector should invest in because of the pace of tech."

Traffic Levels

"Some of the early modeling stuff that we've seen to date suggest that actually there wouldn't be much difference on the key arterial roads and that traffic levels probably wouldn't change that much. What you might see is a large increase in trips in residential areas, because the vehicles are shuttling between different jobs. Instead of being parked up, the vehicles are moving around all the time."

EXPERTS' INTERVIEWS

OPPORTUNITIES

Communication: pedestrians and other road users

"Who else is that car communicating with and what is that communication for? Road infrastructure, traffic signals, roadside telemetry. For example when there is a burst water main or a traffic collision, we close roads and have a policeman directing traffic. It's possible that in the future, TFL could transmit that information to the driver through the car in real time."

Technology

"There is implication of the technology for the city. The vehicle tech, ownership model and use model should be kept separate. How that car is used, for example I own an autonomous car but lease it out through some car-sharing app, or enormous executive saloon that drives itself in from the home counties to West End with its passengers having a snooze in the back has a very different implication for the city than a tiny, electrically driven thing that takes you from a suburban railway station to your house. "

Safety

"Autonomous vehicles will be better at avoiding some sorts of collisions than human beings. If you can reduce kind of non-casualty shunts, and therefore reduce amount of time the road is blocked and substantial amount of congestion is caused...I've seen some amazing stuff around automatic emergency braking, cars being able to detect people stepping out from behind parked vehicles."

CONCERNS

Very diverse fleet of vehicles on the road

"Different degrees of autonomy, different manufactures will create vehicles with different types of autonomy. Manufactures may choose different distance settings between vehicles."

Investment

"London need to avoid spending substantial sums of public money on roadside kit that will almost certainly be redundant by the time it's been installed. What they've got to do is make sure that they can communicate with the vehicles through the vehicles own communication technology. Traffic feeds are broadcasting in a way all the tech in the car can pick up and interpret."

Urban Sprawl

"Increase in the attraction to travel by car, which is not a good thing."

Mobility Services

"What if a private company brought five thousand turned into an autonomous taxi service. What affect will that have on traffic levels? On the city's bus network? Would they be driving round the street empty?...The research should focus on changes travel behaviour that may arise. How would we make an assessment of the net effect at a large scale? What would that do to the city's bus network and the walking, cycling we're currently spending a lot of money trying to encourage."

TFLs MENTAL MODEL

Ben Plowden's mental model of how the systems could work

Technology

"Who else that car communicating with and what is that communication for? It's possible that in the future, TFL could transmit that information to the driver through the car in real time. Keep separate the difference between the vehicle tech, ownership model and use model. How that car is used, own an autonomous car but lease it out through some car-sharing app."

Car Sharing is increasing

"Use model, ownership model, vehicle tech looked at separately. I don't necessarily think that owning the thing is very important anymore. What car companies know is that the pattern of car ownership is changing very fast. People are increasingly not interested in owning a car."

Diverse fleet

"Next 15-20 years we will see a very complicated mix of vehicles in the fleet. Highway and traffic authority and a strategic transport authority life TFL will be managing a much more complicated situation, whereby some cars are driven completely by their owners or their users, some partly and fully automated. Highly autonomous vehicles the better everything will be. TFL's job to work out how the system will work. In my view quite a long way off. 16-20 years until London will be fully autonomous i.e. driverless"

Urban Sprawl

"Increase in the attraction to travel by car, which is not a good thing."

EXPERTS' INTERVIEWS

OPPORTUNITIES

Door to Door Service

"Going from the Tube to the hotel, from the hotel, maybe through to the new affordable flats at the end of the Valencia. That is good because people get off the Tube and they've got luggage and they need to get to the hotel. For instance, an elderly lady who wants to be mobile, walking a mile and a half, 2 miles from the affordable flats down to the Tube is actually daunting"

Taking the Public on a Journey

A lot of the negativity comes through education, it's the not knowing, that they don't know. What about security? Who's going to manage these? Who's going to manage the updates education. When the government launched GN Crops, the whole country went up in uproar, because they weren't taken on the journey. It was like, this is happening, this is what we're doing and you're going."

CONCERNS

Manipulating the service

"The software has learning algorithms so it knows when things are going to fail before it fails. The technology's there but people will always try and break the technology, they'll always try and do something, you've just got to try to eliminate as much as you possibly can"

MENTAL MODELS

Vinnett Taylor's mental model of how the systems could work

Acceptance from younger generation

"You will find that people will have a fear of actually getting into an autonomous vehicle. From a psychology standpoint you won't be able to overcome that. My son who is 16, having a vehicle that does everything for him, won't be a shock because he hasn't learned, he hasn't gone into that subconscious, conscious behavior. Children that are just entering school today, just accept autonomy because it will be there. It's about education"

Technology

"Technology's there, it really is and it's forever improving. The technology that we'll use today in the research will be different in 12 months time, will be different in 5 years time, because it's forever moving and we can either say we're not moving with it and wait for it to happen and all switch off

We're partly through level 3 so we're going to go through level 3, level 4, the technology depends on how much people have invested into what they're doing today to actually how quickly they move forward. Technology has moved on so much that actually again, the battery power in my iPhone is more powerful than the battery within those first cars 100 years ago that Henry Ricardo manufactured the engines for. Actually technology's always going to be evolving but the research has got to make sure, and regulation and everything else that actually it has to meet a certain standard and there's only certain times you can upgrade and stuff

There's got to be that upgrade-ability because actually we can't carry on being a throw-away society either and we are. In the old days we used to wait for something to break before we replaced it. Now, we actually think, it's 18 months, this is really old, I can't proceed with this, I've got to have a new one..."

Manipulating the service

"Like having buses and trains, I believe, you will have to have, designated times, designated lanes and stuff like that. It's a journey we're going on. You know if you take Oxford Street, it's closed off to traffic at different times of the day. Maybe that's the way to look at it, we'll allow autonomous driving on the inside lane or it's not allowed on the fast lane. Certain things that need to be thought through but actually the technologies there and although people think not, but probably the safest place for it to be, would be actually on motorways and major roads because actually people tend to use their cruise controls, their brakes, their lane detection side of things"

Diverse Fleet

"There is going to be a point where we will have mixed vehicles on the road because you can't just switch everyone off manual and say Right, you're all going autonomous, or semi-autonomous"

Telefonica



EXPERTS' INTERVIEWS

OPPORTUNITIES

Freeing up urbanisation

"Cars are only used 5 percent of the time, 95 percent of the time a motor vehicles sit, not moving, in a world which is becoming increasingly urbanized. All those things are all problems, and the thing is we've now got technology which can begin to solve those problems"

Saving cost

"They'll obey the rules of the road, the local authorities and government losing money on speeding fines etc. Autonomous emergency breaking systems will reduce collisions by around about 20 percent. Then it will also be having a significant impact on collisions, and injuries, and deaths. That's got a massive saving, the saving on the NHS would be huge. Those cost to local authorities of having lots of road furniture in place to tell drivers about things that are coming up"

Data

"We all make day-to-day the product will only work if people are comfortable with the level of data privacy. It might mean that some data is shared, but it'll need to be transparent about what data is shared, and what customers get in return. If people think they're getting enough information in return, or enough benefit in return for, then they'll still share it decisions subconsciously"

Benefits for individuals

"Why do I need to own a car, I only use it 5 percent of the time anyway, it's a depreciating asset. In a future world of driver-less cars I can just call one, hail one. The benefits, on an individual level, are enormous. There are segments of society who are much less mobile. This just opens up mobility for them We're in an aging population, we'll have people living a lot longer who will be wanting to be mobile, but maybe not safe to actually drive themselves, or want to drive themselves"

CONCERNS

Diverse fleet

"There will be lots of futures that will exist together, the future just isn't linear. All these things will exist together, there will be cars that can pretty much drive themselves on the same road space as cars that are fully manual."

Car Sharing is increasing

"Actually the journey between now and then will throw out a whole load of winners and losers, because it will be about who can harness the data, and technology to try and figure out how to better underwrite the risks, and lay the right bets to be a winner in the future"

Personal liability to product liability

"Today, which is people take personal liability for driving a car. The future is it will be a product liability. That's a long, long way away, and it's the bit in the middle that's really hard. If I hail a driver-less car at some future point in time, I've got no liability, or responsibility about the safety of that car. If that's a Volvo car, then Volvo are providing me with a product, and Volvo's product is that this car will take me safely from A to B. If that car does something wrong, then my claim will be against Volvo. Or whatever damage is done, the owner of that property's claim will be against Volvo, because it's Volvo's product that will have failed"

Safety

"The manufacturers will have to overcome any concerns, material concerns around hacking and safety. The cars wouldn't sell, people wouldn't want to use them if they're not safe, or they can be easily hacked"

Accidents

"This is an insurance market that's going to shrink. It won't disappear, because accidents, collisions will still happen. There will not be a collision free future. I bring that to life, if a car's got a stopping distance of a certain speed of 30 meters, if something suddenly appears in front of that vehicle at 25 meters, the car can't magically stop. Things will still happen. Software will go wrong, there'll be cyber attacks or punctures"

MENTAL MODELS

Kenny Leitch's mental model of how the systems could work

Vision

"The reality is we don't really know how it's all going to play out. The facts are that this technology is coming. It's almost coming off production lines today, we're pretty close with some cars that are actually on the road today. Before the end of this decade there'll be cars coming off the production lines that can pretty much drive themselves. Creating vehicles that don't crash. That's a big strategic challenge for us as an industry. We, as insurers, we have to make decisions about that. It's happening, it's coming. The business case for it is compelling, there's a 1.2 million debt globally a year"

Longer journeys

"They may well be more cautious, they probably will be more cautious than vehicles are at the moment. Journeys might take longer, but those journeys, the time will be handed back to. Volvo, for instance, Volvo will talk about their whole push being to create cars where it gives people back time, and it gives them connectivity. Their vision is that that's what people really want when they travel. Yes, there's an insurance saving, but actually with people in their vehicles, to have time back, where they can do other stuff, and to give them connectivity. Those are two things that they're looking at as a benefit to give back"

Not everyone will accept

"It will not be for everyone. There will be some people who will, regardless of what's done, because of a perceived hacking risk, or a perceived safety risk, or a perceived issue around data security, they will just choose not to go down this route. That's why we'll have this mixed economy"

Diverse fleet for a period of time

"There will be lots of futures that will exist together, the future just isn't linear. All will exist together for a period of time. A world which is, or even a little bubble, a city center that's fully driver-less, It will come in individual vehicles, it will just come piece by piece. It will come where it makes economic and practical sense. We'll have a mixed car park for many, many years to come"

Less insurance companies

"In the UK alone, in motor insurance, personal and commercial motor insurance, is about 15 billion pound a year turnover industry. I think the insurance industry will not be as big in 10, 15 years time, as it is today, for vehicles. It will just be smaller, because there are less claims. This is an insurance market that's going to shrink. It won't disappear, because accidents, collisions will still happen."

New jobs

"Jobs will disappear, but new ones will come out. As a nation, and as a world, we keep reinventing ourselves. The jobs that people do, and the value that's added from those jobs, the shape and nature of those change over time Economies just have to keep reinventing themselves to move into the value adding jobs of the future For him, having a vehicle that does everything for him, won't be a shock because he hasn't learned, he hasn't gone into that subconscious, conscious behavior and I say that very carefully"

EXPERTS' INTERVIEWS

OPPORTUNITIES

Older generation will benefit

"People who are older typically carry disabilities or gradual decline. Getting in and out of the house are particularly problematic for a lot of people, with mobility, unfortunately the infrastructure out there to support such designs isn't really there. I do think old and disabled people will benefit. Definitely potentially benefit, because older people as their cognition declines, and their sight declines, and their dexterity declines get to a point that is typically quite as driven when they give up their license."

Design for anxiety

"Anxiety often comes with people who have 1 disability or have disabilities then driving is often along side many disabilities. So things like information could be a real benefit of someone with anxiety"

Design of controls

"The distraction of a lot of control interfaces is a nuance to especially older people who have a gradual decline in cognition, where you would have thought externalizing cognition through having nice displays that have the information to your bottom left would be really helpful, but it can be overly complex and overly distracting. A better solutions might be to have displays on the screen."

CONCERNS

Suspicious of Tech

"People are suspicious of technology, especially older people that have been brought up not using technologies, especially driven technologies that fail. This familiarization with a failure culture is something that older people carry with them."

Manufactures excluding the older markets needs

"That's almost a marketing questions, so much as can you ever imagine Ferrari making an autonomous vehicle? They talk about emotional design, they design vehicles for the emotional connection. If you take that away you don't have a Ferrari, you have maybe a Volvo, or worse, a more sensible car. and very rarely do they put the persona in of a 73 year old person, or a disabled person. Most vehicles are aspirational, and who wants to aspire to be a disabled 34 year old? anybody who has a disability, they don't want to be stigmatized. They don't want that vehicle that looks like ... they want something ... they want the Ferrari."

Value in bus stops

"I've done some research where you see the real value of bus stops, where people are meeting each other and they have this chance that they wouldn't have before. They look forward to that. That's keen in a playful way, and someways"

Infacture in countryside

"A lot of older people live in rural settings that they have a decent living, and let's go off into the countryside, and they live where the infrastructure's not so good. If autonomous systems need an active infrastructure to support them, which I think they do, then it's not going to tie to a lot of older people."

LITERATURE REVIEW & EXPERT OPINION

IN-CAR SAFETY TECHNOLOGY

BACKGROUND

"European figures that show an increase in the percent of the population over 65 from 17.5% in 2011 projected to be 30% by 2050. Alongside this we are all living longer, in 2012 the mean life expectancy of a 65 year old man is to live a further 18 years or until he is 83 and a woman to the age of 86. By 2062 a 65 year old man can expect to live until 90 and a woman to 92 years old. These later years will increasingly be lived managing health concerns, seeing a 32% increase in older people with moderate or severe disability and a 32%-50% rise in over 65s with chronic diseases"

"Additionally we know that older drivers will regulate their driving behaviour to avoid stressful times of the day or potentially dangerous situations. This further supports the conclusion that many older people are driving whilst experiencing reduced physical or cognitive functions"

"In the UK when a driver reaches the age of 70 years old they are obliged to reapply for their driving licence. This they can do by filling out a form and declaring that they meet the minimum eyesight requirements. The new licence is only valid for 3 years after which the driver will need to reapply again. There is currently no legal age at which a driver must stop driving."

"These technologies span: passive information systems to alert the driver of potential hazards (night vision or blind spot detection), semi-autonomous systems which assist the driver by offering to take control (assistive parking or automated cruise control), through to fully autonomous systems that take direct control from the driver to avoid or minimise the effect of accidents (Intelligent speed adaption or collision avoidance)."

RESEARCH

"However the actual public health impact on other road users is relatively small. Drivers in the USA under the age of 20 are responsible for more than twice as many deaths of occupants of other vehicles and non-motorists as drivers aged 70 or over."

"What can be said is there is an increase in accidents for the over 70s. That increase is more significant after reaching 80. These accidents occur often at low speeds and are most common at road intersections, suggesting vision and cognitive issues as a possible cause."

LITERATURE REVIEW & EXPERT OPINION

IN-CAR SAFETY TECHNOLOGY

DESIGN & DEVELOPMENT

" We were told by just under half of the companies we approached that they do carry out usability tests and user centred design, but not specifically for older people."

" Another approach taken by the automobile industry is to have younger designers use age simulators such as the Third Age Suit, which provides the designer a visceral glimpse into the lived perspective of an older person. Euro NCAP (European New Car Assessment Programme) have gone some way to recognising older people as needing consideration when designing safe car environments. They state in their strategic road map recognition of an increasingly older (and female) driving population in terms of dummy stature and biomechanical limits as well as the state-of-the art in crash avoidance technologies."

" Whilst there has been recognition of the need to include older people in the design of in-car safety technology features, there has been little evidence of user centred design or usability tests, designed and undertaken specifically for this user group."

" This work cited the key driving issues for older drivers to be distraction, keeping to the speed limit, fatigue/tiredness, reactions, glare and luminance."

OPINIONS AND ATTITUDES

" This work seeks to add context to the in-car technology debate for older people, putting the needs and perspectives of this group at the centre."

" Three systems were cited as potential targets for future testing: head-up display (with optional audible cues) of current vehicle speed, intelligent speed adaptation and head-up and dashboard display of road signs. These findings were broadly in line with Bradley et al who also found speeding of concern and put emphasis on reverse parking being of particular interest."

SAFETY PROBLEMS

"They are nonetheless at an elevated risk of being involved in an accident after the age of 70. This risk is more significant after 80 years old"

" Studies in the USA show older drivers are commonly involved in collisions at junctions, often through the misjudgement of speed and distance of other vehicles. Although these accidents often happen at low speed, due to their more fragile health and physical condition, older drivers are more likely to suffer injuries when they crash."

LITERATURE REVIEW & EXPERT OPINION

IN-CAR SAFETY TECHNOLOGY

GAPS IN A RESEARCH

"Car manufacturers seek to sustain any advantage their technology might provide over their competitors and as such will keep performance data to themselves. Likewise car manufacturers are also sensitive to protecting the marketing position of their brands, few of which wish to be seen as producers of an older person's car."

"On the other hand there is emerging data from the insurance industry in the USA which indicates that certain in-car safety technologies are having a positive impact and reducing the number of accidents."

"about distractions within the vehicle such as music and phone calls. Other work at MIT AgeLab argues the need to adopt these new technologies in a structured and considered way. It highlights the need for vehicle interfaces to be optimised to support driver attention and not fight for it."

SURVEY REVIEW

IN-CAR SAFETY TECHNOLOGY

SUMMARY

Older drivers continue to use their vehicles long into their later years with 50% of our 85+ year old respondents stating they are not thinking of giving up driving. Many older people are concerned about safety whilst driving, citing their physical decline alongside the increased demands of busy roads as particular worries.

The majority of our respondents were:

- Not very aware of available technologies that might support safer driving in later life
- Welcoming of in-vehicle information systems
- Suspicious of fully autonomous technologies, except when used in an emergency

BACKGROUND

These later years are increasingly being lived by people managing health concerns: we will see a growth of 32% by 2022 in older people with moderate or severe disability, and a 32%-50% rise in over 65s with chronic diseases¹.

The path towards the autonomous vehicle is being made possible through developments of a series of in-car safety technologies, which can be classified under the following headings.

- Passive information systems to alert the driver of potential hazards (night vision or blind spot detection).
- Semi-autonomous systems which assist the driver by offering to take partial control (assistive parking or automated cruise control).
- Fully autonomous systems that take full control from the driver to avoid or minimise the effect of accidents (Intelligent speed adaption or collision avoidance).

METHODS

Survey active from: 14th May 2014 through to 11th September 2014 Formats available: online, telephone and paper based (on request) Responses: 471

Research Questions

1. What do people know about in-car safety technology?
2. What do people want from in-car safety technology?
3. What are people's stories for giving up driving?
4. What do people feel about in-car safety technology?

SURVEY REVIEW

IN-CAR SAFETY TECHNOLOGY

KEY FINDINGS

- 59% of those people surveyed could not name an in-car safety technology that might keep them driving for longer.
- Once the technology was explained 91% named one or more technologies to help keep them driving for longer.
- Technologies of most interest to our respondents were: collision avoidance, blind spot detection / monitoring and night vision.
- Majority of respondents prefer technologies where they retain some control.
- Those who have most concerns about in-car safety technology have little or no experience of them – those who have the technology are largely very positive.
- The bulk of respondents who were considering giving up driving cited restricted body movement as their reason.

RESULTS

- it does indicate these technologies are not at the forefront of people's minds.
- 85+ year olds, who showed an increased preference for parking assistance and intelligent speed adaptation technologies.
- For all age groups: blind spot detection (22%), collision avoidance (21%) and night vision (20%), were all more popular than parking assistance (13%).
- For 85 + years old: night vision (25%), parking assistance (19%), intelligent speed adaptation (19%) were the most popular.

REASONS FOR GIVING UP DRIVING

- eyesight as the reason for doing so
- restricted body movement, other, roads too busy and traffic too fast.
- the 'other' option recorded conditions such as Multiple Sclerosis, Parkinson's or fatigue
- Unaware of this technology before being informed of it by this survey.
- public transport as being not very easy to use
- He gave up driving 29 years ago and uses a powered wheelchair to get about. He would like a joystick controller for a car, which would make driving accessible for him.
- ceasing to drive and has a friend or partner who drives for him.

SURVEY REVIEW

IN-CAR SAFETY TECHNOLOGY

WHAT DO PEOPLE THINK ABOUT IN-CAR SAFETY TECHNOLOGY?

“If the driver is not capable of driving without these aids then they shouldn't be driving”

“I think I would probably consider myself unfit to drive if I needed any of the aids listed”

“Impressive but more like an aircraft cockpit than a car when it comes to all the bells, buttons and gismos which I think can be a distraction and hinder safety”

“My only concern is too much technology can sometimes get very confusing, especially for older drivers”

CONCLUSION AND RECOMMENDATIONS

It is notable that the concerns mentioned about in-car safety technology came from people without experience of these technologies. Those who currently have the technology were a lot more positive towards it.

A way of ensuring such designs successfully align themselves with the older community would be to undertake usability studies with older people as a cohort in their own right. This is increasingly done in other spheres of product design especially where the products are used by significant numbers of older people.