

PUBLIC PERCEPTIONS: DRIVERLESS CARS.

Institution of
**MECHANICAL
ENGINEERS**



Improving the world through engineering

Introduction

For over 50 years, the 'car of the future' which is able to transport its passengers from one destination to the next without any human intervention or control, has sat more in the realms of science fiction than science fact. However, over the last two decades, car manufacturers and technology companies have been working to make such an idea a reality.

In recent years, many companies have been developing and advancing the technologies to allow safe and reliable driverless functionality, as well as creating detailed mapping of our roads and their real-time conditions. The UK Government, recognising the advantages that these technologies may have in reducing emissions, easing congestion and increasing accessibility and mobility for all, has encouraged and supported these developments through the creation of technology competitions and catapults. It has also introduced the necessary legislative framework to allow these vehicles on the road.

For many, the prospect of driverless cars could change the way we own and use vehicles in the future. Concepts of shared ownership, progressing towards Mobility as a Service (MaaS) could offer low-cost and accessible travel to people, while maximising the usage and efficiency of the car. Furthermore, current trials of driverless cars, such as Google's Waymo in the United States, have averaged only one accident per million miles of testing caused by the vehicle, compared to the average of 1.85 accidents per million miles on our current roads. In the UK, small-scale trials of driverless cars have been successfully tested, demonstrating the vehicles' ability to cope reliably with external factors, such as people and other cars. Furthermore, in 2018 small convoys of partially self-driving lorries will be trialled on major British roads.

Many of today's cars are already being fitted with technologies which can assist or assume control of basic vehicle functions, from wiper, light or reverse sensors, to self-parking and collision avoidance functionality. However, as technology and legislation progress to make driverless cars a very real possibility in the near future, their success will ultimately be down to consumer adoption.

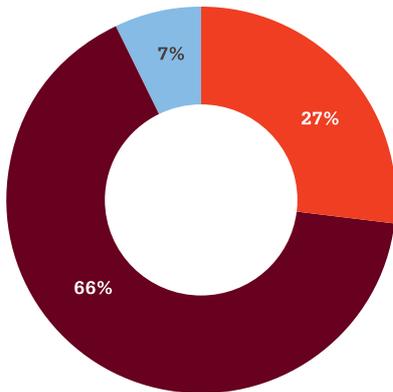
The Institution has long supported the vision of driverless cars. Therefore, as discussion of the technology grows ever more common in the mainstream press, IMechE commissioned some public-focused research on the awareness and public acceptability of driverless cars. Although the results provide only a snapshot of opinion, they are consistent with earlier research undertaken by the Institution in 2016, which found only 21% of people comfortable with the idea of being an occupant of a driverless car.

The Institution commissioned ICM Unlimited in July 2017 to ask six questions to 2,053 members of the public regarding driverless cars. For most, the overall results from the polling has been used. However, where the results between age or gender have varied considerably, these results have also been published. The questions covered key issues of:

- Acceptance of the technology
- Specific concerns regarding driverless technology
- Trust and capabilities of human drivers
- Liability in accidents

01

How comfortable would you be travelling in a driverless car at 70mph with no human intervention?

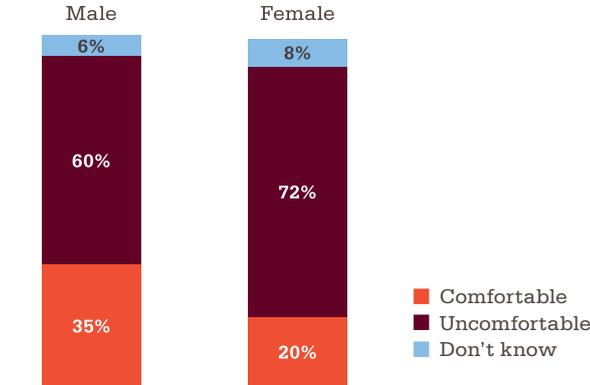


- Comfortable
- Uncomfortable
- Don't know

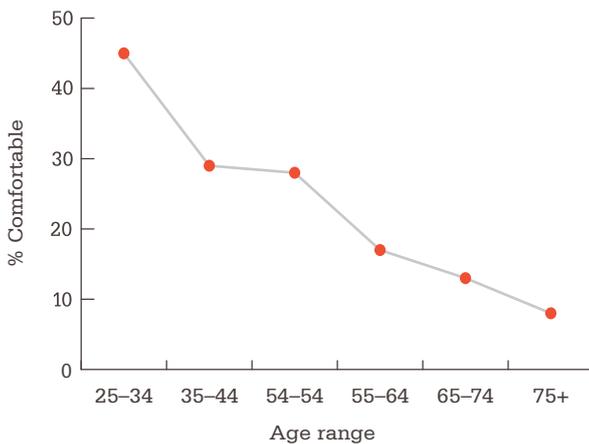
Commentary

Although the overall results show that a large percentage of people are still uncomfortable with the thought of a car driving itself with no human intervention, deeper analysis of the results highlight some interesting variations. By gender, men are more comfortable with the concept of a driverless car than women (M:35%/F:20%). However, of more interest is acceptability by age demographic, with results showing younger age groups more accepting of the technology concept. At the age group 25–34, 45% are comfortable with the idea of a driverless car. This percentage gradually drops to 13% for those aged between 65–74 and 8% for 75 and above.

By gender

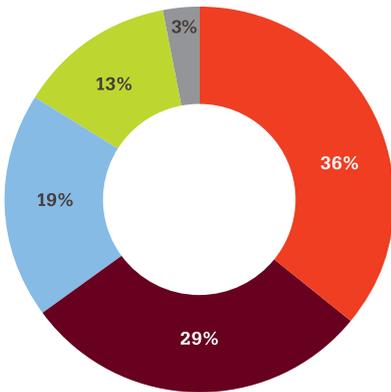


By age



02

What would be your biggest concern travelling in a driverless car?



- Having no overall human control of the car
- The car not being able to deal with an external situation (such as an accident on the road)
- Trusting the ability of the car travelling at speed
- Someone being able to hack or disrupt the car
- I have no concerns regarding a driverless car

Commentary

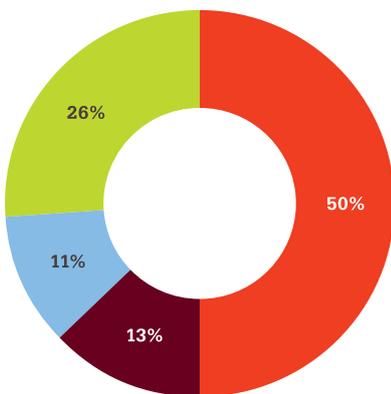
The results for this question remain fairly consistent when reviewed by sex or age profile, with only a few percentage differences between the overall results.

Although the top concern is the lack of human control when the car is in motion, an underlying concern is trust in the ability of a car/computer when either moving at speed or dealing with an external situation (48% of the answers given). Recent accidents in the USA by Tesla (a partial self-driving vehicle) may have raised public concern about the full ability of these vehicles.

The result for 'no concerns' is unsurprisingly low, as people have not been exposed to the technology to choose this option with any certainty.

03

Who do you believe are better drivers of cars?



- Humans
- Car/computers
- Both equally good
- Not sure

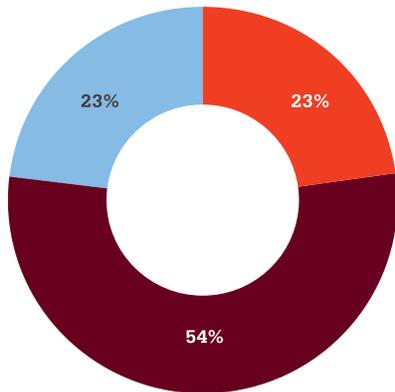
Commentary

Again, these results remained fairly consistent if viewed by age or gender. However, the clear public belief is that humans are the better drivers, although statistics clearly demonstrate that driver (human) behavioural error accounts for over 90% of all accidents on the road.

Although the car/computer scoring remains low, whatever way the results are viewed, there also remains a large percentage of people choosing the 'not sure' option, possibly showing that people are open to the idea that driverless cars could offer a more secure method of transportation in the future.

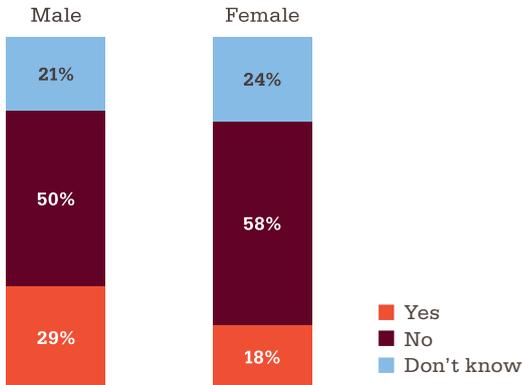
04

Do you believe a person who is sight-impaired should be allowed to be the sole occupant of a driverless car?



- Yes
- No
- Don't know

By gender



Commentary

For many, the idea of a driverless car opens up the possibility of increased accessibility and mobility to many groups of people, such as those who are sight-impaired or otherwise could not drive a standard or modified car.

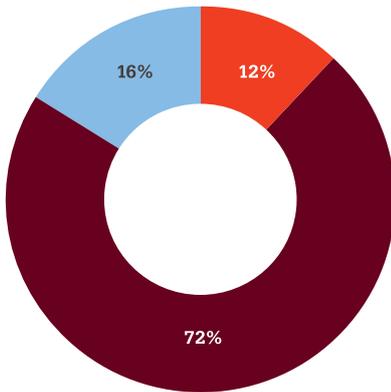
The question was therefore posed, whether a sight-impaired person should be able to be a sole occupant of a driverless car, therefore being 100% reliant on the ability of the vehicle to perform its task of getting to the destination safely and reliably.

The results showed that overall, between gender or age profile, the answers were fairly consistent, with a majority not being in favour of this idea. More research would be needed to establish why there is such a resistance to the idea that could allow greater freedom of movement to people who are unable to drive a standard or modified car.

The results may also be a continuation of people's trust in letting a driverless car take full control of transporting people, as seen in questions **02** and **03**. It also did not open up the possibility of the car being able to operate in collaboration, by providing data to the occupant to allow them to make decisions.

05

Do you believe a person who is intoxicated should be allowed to be the sole occupant of a driverless car?



- Yes
- No
- Don't know

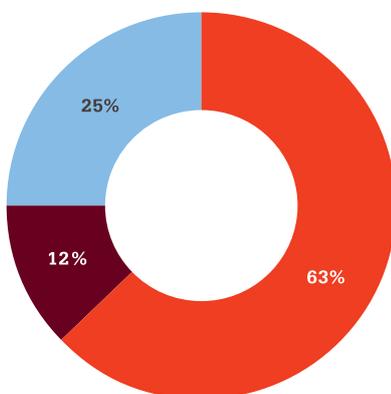
Commentary

Over the last 30 years, the UK has moved to making drink-driving socially and morally unacceptable. This question was therefore specifically asked to establish if the public could realise any benefit in a driverless car taking an intoxicated person home safely.

As the results show, quite clearly, the vast majority of people were strongly opposed to this question's premise. Much of this negativity may rest in decades of heavy promotion that people should not drive cars (or be in charge of a vehicle) while intoxicated. In addition, with the public's low scoring on a car's/computer's ability to drive a vehicle unaided (as seen in question 03), it could simply be that many still believe that a sober person is required if any action or judgement is required when the car is in motion. Further research into driver ability and attention should be conducted, specifically asking views on occupants doing work, talking on phones, reading a newspaper, or even sleeping when the car is in motion. The assumption seems to be that a human driver needs to be ready at all times to take over control should it become necessary.

06

If your driverless car had an accident which was clearly the fault of your car, do you think liability for the accident should lie with?



- The car manufacturer
- The owner (primary occupant of the vehicle)
- Shared between the owner and car manufacturer

Commentary

The question of liability has been discussed by Government, manufacturers and insurance providers for some years. However, this public research clearly places the liability on the car manufacturer. In many ways this is understandable. If manufacturers are purporting to offer a driverless car and the occupant(s) abide by the rules given, why should they be at fault when the vehicle makes an error? In many ways this shows a logical thought process, as a passenger on a bus or in a taxi would not be held liable for an accident that they have no control over.

Discussion: Issues around acceptance of the driverless concept

The possibility of driverless cars being on our roads is fast becoming a certainty. However, like many new technologies, their success will only really be measured by the consumer, who must accept and adopt change. Although manufacturers are introducing ever more aspects of assisted and autonomous functions into today's cars, this research seems to indicate the public still have significant concerns over the concept of a car retaining total control of itself.

This research also highlighted significant differences on the acceptability of driverless cars when analysed by age demographic. People who have been driving quite successfully, and without incident for decades, may need some convincing that a driverless car can undertake such a complicated task safely and efficiently.

It is therefore clearly necessary for the manufacturers and Government to begin a comprehensive public campaign selling the benefits and advantages of driverless technology if it is to become a reality. This campaign must recognise that different groups of people have different concerns. They need to define the social, environmental, transport and, most specifically, personal advantages that driverless cars could offer.

In the next few years, realistic driverless technology demonstrators, that people will expect to be on sale in the near future, will need to be in trials, sharing our normal roads, allowing people to see these vehicles in action. This should perhaps be highly recognisable concept cars (by colour or design) driving around our major cities, allowing people to become aware of, accustomed to and accepting of the technology.

Finally, it is probably safe to say that a person born in 2017 will have little problem with the idea of a vehicle transporting them while they watch TV or surf the internet. However, the transition for current drivers to simply becoming occupants may be a harder problem to solve. We need to collect data to assess the value and overall safety of driverless cars, and to help us decide early on if this technology change really is delivering the safety, pollution and cost benefits it promises. If it does and the number of accidents from driverless cars remains very low, should we even think about governments instructing all vehicles to become driverless by a given date?

This may be an unpopular proposal with sceptics or people who simply like the freedom to drive a vehicle; however, the more important issue for society will be the overall safety of both passengers and pedestrians that driverless vehicles may present. We must not forget however, how generally unsafe road transport remains in comparison with rail and air travel. Surely any changes that lead to improvements are worth active research and debate?

Top Three Points

1. The public has low awareness and acceptability of driverless cars, and concerns about the technology's ability and functionality (albeit younger generations are more accepting of the concept).
2. Industry must undertake greater public engagement and access of driverless cars to highlight the social, environmental, safety and personal benefits that this technology could offer in the near future.
3. The public needs to see, and become accustomed to, driverless technology in action, traveling around our towns and cities safely and reliably.

**Institution of
Mechanical Engineers**

1 Birdcage Walk
Westminster
London SW1H 9JJ

T +44 (0)20 7304 6862
F +44 (0)20 7222 8553

media@imeche.org
imeche.org