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# Would you drive an autonomous car?

## Use the word 'drive' loosely

When we talk about 'driving' autonomous cars, it's anything but.

Some people will be thrilled at the opportunity of being freed from the responsibility of driving. For those of us who love driving - at least on the open road if not in rush hour - we might not be awaiting driverless cars with such eagerness. But people still like riding horses in the 21<sup>st</sup> century; we just don't use them for everyday transportation any more.

So could cars driven by humans become a niche pleasure activity like horse-riding, replaced by the mass consumer adoption of autonomous cars? There are a whole host of reasons why it could.



## Buckle up

The number one concern with autonomous cars is safety, and rightly so.

It's not just getting your head around the very concept of handing over control to a machine. There are worries that accidents could happen as a vehicle is switched from system driving mode back to human control. Humans may require a period of adjustment before taking the helm and over time, a lack of practice could dull driver skills.

Some autonomous car makers are planning to solve this problem by bypassing this stage altogether. By jumping in autonomy stages from assistance in level 2 to levels 4 and 5 [see box], they could skip this possible problem area.

Hacking and terrorism are other concerns. But neither is novel nor restricted to autonomous cars. Any connected objects including factory machinery, power plants, drones and the wider internet of things - even items in the home - could be turned into potential hazards by malicious hackers.

All things considered even with the occasional system breach, autonomous driving may still save many lives compared to the way we get around streets at the moment. Ironically, humans are what make cars dangerous. Cutting them out of driving, would eliminate concentration lapses, road rage incidents, misjudgements, sensory limitations, drink and drug-affected driving and any other excuses we have for crashes.

*Fidelity industrials analyst, Mark Wilson, predicts fully autonomous cars could start being rolled out in just five years' time. And models may only initially cost around USD 5,000 more than their non-autonomous counterparts, with the premium eroding over time.*

## How autonomous is your car?

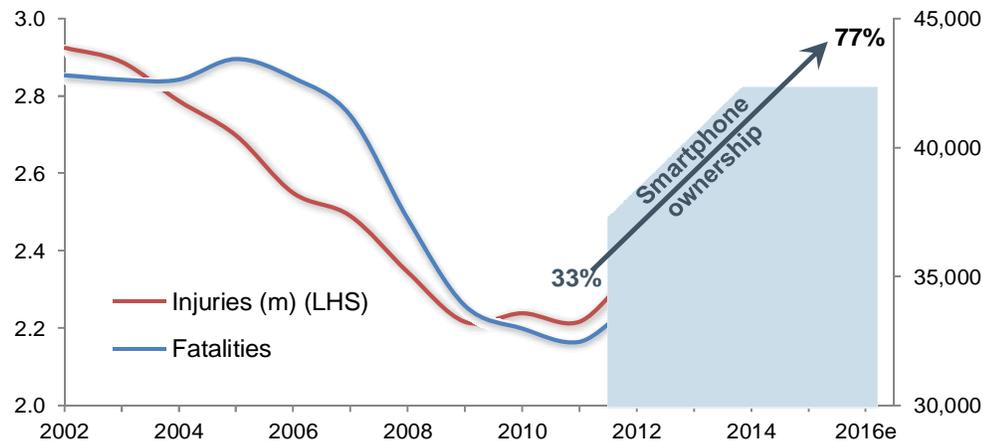
- **Level 0:** No automation.
- **Level 1:** Car assists with steering or acceleration/braking (eg ADAS).
- **Level 2:** *Hands off* - car assists with steering and acceleration/braking.
- **Level 3:** *Eyes off* - car assists with all aspects of driving with the expectation that a human will respond to a request to intervene.
- **Level 4:** *Mind off* - car assists with all aspects of driving, even if a human does not respond to a request to intervene.
- **Level 5:** *Driver off* - car takes control of all aspects of driving in all conditions.

Car sensors would cope with nearly all weather conditions except the most extreme when the vehicle computer decides that it's too dangerous to set off. Data sharing could allow each mile of experience gained and every lesson learnt by one autonomous vehicle to be shared with all the rest, making driverless cars the swiftest of learner drivers.

The Pew Research Center estimates that US road deaths for 2016 numbered 37,548, which is equivalent to a fully loaded Boeing 747 crashing without survivors every five days. Given these alarming figures it's not a surprise that regulators may be willing to accept the occasional car accident or security breach for the overall greater safety record that autonomous vehicles can offer.

In the last two years, car accidents have spiked sharply in the US (chart 1), most likely caused by the increasing adoption of smartphones which can distract drivers. Short of banning smartphones, autonomous cars could help save thousands of lives every year.

**Chart 1: Rising car injuries and deaths amid growing smartphone use**



Source: Federal Highway Administration, NHTSA, ISI, GS, Pew Research Center, January 2017

The way autonomous cars are to be deployed should also ease safety concerns. They are likely to be launched in well mapped areas, such as major cities, through taxi service companies such as Uber, which stand to make significant savings by removing the cost of expensive human drivers. This period of gradual adoption will allow for more data to be collected and the technology to be refined before autonomous cars are made more widely available.

As a side note, the staggered uptake of autonomous cars should also be a comfort for us driving fans. Human drivers will comprise the majority of road users for many years, possibly decades after the introduction of self-driving cars, and the spectre of autonomous vehicles squeezing human drivers off the road is remote. The idea of lawmakers banning human drivers altogether is pure speculation.

### Complex ethical issues are not new

Ethical issues surrounding driverless cars are yet to be resolved or even fully investigated. What rules should an autonomous car follow when choosing between two undesirable options, such as colliding into a pedestrian who is crossing the road during a 'don't walk' sign or, swerving away from the pedestrian and crashing into a wall, potentially threatening the lives of the vehicle's passengers?

These types of moral dilemmas are not restricted to autonomous cars. Everyday complex ethical judgements around the relative value of lives are made in the fields of medicine, firefighting, policing and armed conflict. As a society, the onus is on us to resolve these issues and academics are already busy researching them. The Massachusetts Institute of Technology (MIT) has a website actively collecting data on public opinion on these kinds of moral questions regarding autonomous driving.

## Don't blame the traffic for being late

Imagine a world where traffic becomes an after-thought as vehicle computing power regulates speeds to within government limits and economises every detail of journeys, including start/stop motion and traffic congestion.

Road works, unfolding accidents and other obstacles are monitored and instantly incorporated into route planning by the car's command centre, which connects to an external centralised traffic database sharing up to date information with other vehicles.

If a journey is going to be delayed for some reason, the car could alert you by sending a message to your phone. It could even adjust your morning alarm to ensure you get into work on time. Unfortunately, you won't be able to blame the traffic for being late to work anymore.

Vehicle power and speed considerations may fade into the background as autonomous cars have internalised speed and acceleration limits. Instead, the new competitive battlegrounds for car makers will be entertainment, smart functionality, versatility and comfort. Branding will remain crucial.



## Conclusion

There's a lot of excitement surrounding autonomous cars. A regular stream of articles and reports are helping to educate the public about the development of self-driving. Academics, corporations, and regulators are taking it very seriously, directing considerable technological, intellectual and financial resources towards building our collective understanding. And crucially, this is fostering public trust and familiarity with the technology.

New technologies often follow a trust-diffusion model where there are waves of adoption by consumers. Tech-savvy 'early adopters' engage with new products and act as opinion leaders. They educate other consumers through reviews and testimonials. The hype around autonomous cars has made this party relatively large and influential. 'Fast followers' engage with these reviews and start to adopt the innovation themselves. Finally the mass market embraces the product.

If you love driving though, don't feel threatened. You will be in the majority for many years yet, and sharing the road with autonomous cars could actually make your life easier given the greater predictability of machine drivers. However, it's not yet clear whether a robot would thank you for letting them out at a junction.

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