Auto industry: Look no hands

By Henry Foy and Richard Waters

Robotic cars offer untold advantages but they might not be enough to convince people to give up driving

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It is just after 11 o'clock on a warm July morning in Parma, Italy, and a silver Hyundai sedan is cruising the city's ring road in light traffic. As the car turns towards the centre of the city, the two men in the front are in animated conversation. Neither has his hands on the wheel or is watching the road.

The car slows to a stop as a pedestrian steps out into the road. The men in the car gesture to him to cross. He hesitates, bemused that the car brought itself to a stop. The man in the driving seat gets out, walks over to the pedestrian and moves him to the pavement.

Then something amazing happens. The car accelerates off along the now clear road. The man previously in the driving seat stands on the pavement and watches the future drive by.

Autonomous cars have become the hottest new thing in the industry as technology companies and carmakers face off in a race to build vehicles that will revolutionise the way we travel, commute, work and own cars.

The idea may sound futuristic but proponents contend the benefits are tangible and will come soon. Carmakers say self-driving vehicles will prevent 90 per cent of car accidents. Industry experts say they will make traffic jams a thing of the past. And marketers are looking to a world where the front seat becomes an office, dressing table, breakfast bar and cinema.

"There are no limits. We're pushing cars beyond anything people thought before," says Alberto Broggi, a self-driving pioneer and the man behind the Parma project.

These cars, it is claimed, could drop workers at their office or children at school and then pick up others, rendering the traditional taxi obsolete and changing the concept of ownership. "It's a new world," says Alan Mulally, chief executive of Ford.

As with all such sweeping technological advances, though, there's a catch. With capabilities racing ahead, authorities are applying the legislative brakes and marketers are grappling with the costs.

Carmakers may dream of providing hour-long commutes spent replying to emails or school runs where parents help their children revise their times tables, but lawyers and insurers have nightmares about crashes for which responsibility lies with a defective microchip rather than a person.

"Driverless cars will be on our roads by 2020," says Mike Woodward, automotive partner at Deloitte, the professional services firm. "But there's a storm brewing . . . Who exactly will be responsible if someone gets killed?"

Carmakers say these difficult questions will not stop them. "There are many things that have to be solved," says Mr Mulally. "[But] we're absolutely committed to the technology."

Prof Broggi has been driving autonomous cars for more than 15 years without mishap. But for most of that time the technology has been an outlier. "The first test we did was back in 1998 when no one was talking about autonomous cars . . . The media was treating it as one of those strange things that crazy professors do," says Prof Broggi. "When we made it to the national news here in Italy, our drive was broadcast after the news of the fattest cat in the world."

It was Google's demonstration of its self-driving technology in 2010 that brought serious attention. That event, says Andy Palmer, Nissan's head of product planning, "put a rocket up the industry". The starting gun had been fired on the race to market.

Component manufacturers such as Bosch and Continental began to flex their technological muscles in cars packed with cameras and sensors. Brands such as Mercedes-Benz have demonstrated road-ready vehicles while Nissan threw down the gauntlet by promising a mass-market driverless car by 2020. Elon Musk, head of Tesla

Motors, the electric car maker, has also entered the fray. Having shaken the industry with the first luxury electric sedan to turn a profit, he has said he will have a vehicle on the road within three years than can operate without human control for 90 per cent of the distance it covers.

Given the current capabilities, many say that ambition does not sound excessive. Mercedes' new S500 model drove 100km through Germany by itself last month, navigating roundabouts, traffic lights and around the odd errant cyclist.

Much of the technology is present in many cars today, from parking cameras to lane-detection systems, electronic steering assistance to advanced cruise control.

The impact in social, economic and personal terms promises to be far-reaching. If the industry's visionaries are to be believed, it will precipitate nothing short of a complete rethink of the car – many people's second most valuable possession after their home, an important expression of identity and an emblem of the materialism and personal freedom that spread through the developed world in the 20th century.

The most obvious effect of letting cars control themselves is the time to be reclaimed for drivers. Americans who commute by car spend about 50 minutes a day at the wheel, says Ragunathan Rajkumar, a professor at Carnegie Mellon University. Saving those dead hours "enhances the productivity of the individual", he says.

A second effect could be a big reduction in the deaths and injuries caused by car accidents. More than 1m people are estimated to die on the world's roads each year, with many millions more maimed or injured. Most of the accidents are caused by human error.

"Our vision is very simply that cars should not crash," says Toscan Bennett, vice-president of product planning at Volvo, which builds cars programmed to spot and avoid moose. "And one of the ways to prevent cars from crashing is to actually take the human out of the equation."

Despite a capacity to save many lives, automated cars may still struggle for social acceptability. Even a small number of deaths would raise difficult questions about the technology. "People are not comfortable with robots killing them," says Bryant Walker Smith, a fellow at Stanford Law School's Center for Internet and Society.

Another significant benefit could come with quicker travel. No longer under the control of errant and slow-reacting humans, cars could organise themselves more efficiently, navigating the streets in tight, fast-moving formations. "The majority of jams are caused by the mismatch of speeds between different vehicles," says Prof Rajkumar.

"Autonomous vehicles don't have to speed up or slow down." Also, by driving closer together in narrower road lanes at constant speeds, autonomous cars could pack themselves far more tightly into the same amount of road space.

This could also have a telling impact on urban planning and reduce the need for new roads as the world's population rises, particularly in cities in developing countries in danger of being throttled by traffic.

The long-term effects on society are likely to be even more far-reaching, if difficult to predict. The effects on car ownership, for instance, could be profound. In the early days, high costs will mean few people can afford the vehicles. Ford's self-driving prototypes cost about $500,000. Although these costs would fall once a vehicle goes into production, most buyers would be priced out of the market.

To spread the cost, autonomous cars will simply have to work harder, says Paul Saffo, a Silicon Valley commentator, plying the streets endlessly to justify their costs by ferrying more people around.

Ultimately, there may be no reason to own such a vehicle, no matter how low prices fall. If it can be summoned with nothing more than the tap of a smartphone app, then discarded after dropping a passenger off, why bother to own a car outright? "People will not buy robotic cars, they will subscribe to them," says Mr Saffo.

This should give the car industry pause for thought. Family driveways packed with cars and multi-storey car parks with ranks of immobile vehicles are symbols of motor industry prosperity. Such sights may one day come to be seen as wasteful inefficiencies.

But it will be humans who determine whether driverless cars become the norm. Habits and cultural norms do not change quickly – particularly when they concern an object that has become a conspicuous part of daily life. A study by the UK's Automobile Association found that 65 per cent of people liked driving too much to want an autonomous car.

It may take generational change to overcome such deeply ingrained beliefs. Mr Saffo, who came of age in California in the 1960s – the golden age of the car – says: "For my age cohort, freedom was a car." But of the students he teaches now at Stanford University, he says: "For them, freedom is a smartphone."

The desire to be liberated rather than enslaved by a technology will be the decisive factor. The average American spends 38 hours a year stuck in traffic. Cars spend more than 90 per cent of their lives idle. That is an inefficiency that carmakers say would be eliminated if cars ruled the road, and passengers could get on with their lives. "They're on the way," says Deloitte's Mr Woodward. "It's all a question of time."