

Driverless vehicles could bring out the best – or worst – in our cities by transforming land use

Written by Tan Yigitcanlar, Associate Professor of Urban Planning and Development, Queensland University of Technology

The convergence of [technology and the city](#) is seen as a possible remedy for the challenging issues of urbanisation. Autonomous vehicles are among the most popular of many [smart city solutions](#)

. Also known as [driverless car technology](#), it could reshape our cities.

One recent [prediction](#) is that by 2040 these vehicles will account for up to half of all road travel. A growing number of studies are exploring autonomous-vehicle-induced transport disruptions – “[trip generation impacts](#)”. It’s suggested these vehicles could:

- decrease private motor vehicle ownership, congestion and air pollution;
- increase ride sharing, road safety, access and mobility;
- redesign or eliminate traffic signals; and
- improve mobility for people who are “[transport-disadvantaged](#)”.

Further reading: [*It’s pedal to the metal for driverless cars*](#)

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Less research has been done on the effects on [urban landscapes and the development patterns](#) of our cities. Every change in transport technology – from horse cart to coal-powered train to street car to automobile – has great impacts on our cities.

So, what might autonomous-vehicle-induced changes look like? What are their likely rebound effects on mobility?

Freeing up road space for other uses

Road networks on average occupy about [30% of a city's land area](#) in developed countries.

In theory, autonomous vehicles can use road networks more efficiently and thus free up some road space if trip generation rate and population growth are held constant. This space can be redesigned for a whole new spectrum of social functions, street trees, walkways or bike lanes.

However, it is likely these vehicles will enable previously suppressed trips to be taken. The resulting increase in traffic volume will reduce the potential to free up road space for other uses.

Turning parking lots into social uses

Autonomous vehicles will reduce and potentially eliminate the need for the significant amount of space [set aside for parking](#) in high-demand urban areas.

In these areas of high-value property, mandatory parking supply requirements will have to change. A reduction in parking lots has the potential to transform urban cores, as these spaces can be used for other activities — such as parks, more high-value activities, or affordable housing.

Business uplift resulting from higher-density activities is then entirely feasible (akin to [agglomeration economies](#) in cities). This can create more mixed-use and transit-oriented development, accelerate a trend

towards inner-city living and make these areas more efficient, productive and liveable.

Redesigning building and street interfaces

With an autonomous-vehicle-dominated city, buildings and development will have to adapt to new patterns of traffic flow. They will need to be designed for door-to-door services – mainly accommodating the drop-offs and pick-ups at each and every site.

High-volume sites will need a bespoke interface for multiple autonomous vehicles, while lower-volume sites will no longer need kerbside parking for each development.

This scenario offers much potential to free up kerb space for other uses.

Transforming fuel stations into new land uses

Autonomous vehicles are largely envisaged as electric vehicles charged at their overnight parking spaces. The implication is that eventually, once these vehicles dominate road transport, fuel stations will not be needed on the streets.

These locations will require remedial environmental treatment for conversion to other land uses. But once that's done, this will open the way to alternative uses for the former fuel stations in all neighbourhoods — more convenience stores or online shopping click-and-collect locations?

This raises the question of what would be an optimal productive use for such high-profile, highly accessible sites.

Converting domestic garage spaces in suburbia

Some visions of pooled/shared ownership of autonomous vehicles suggest we will have no need to own private motor vehicles. So we will no longer need to park and garage vehicles in residential dwellings.

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This could transform a substantial share of housing stock, with garages converted to other uses such as studios, rented short-term lodging, or granny flats.

In theory, driveways will no longer be needed either. These could be turned into greened front yards, spaces for children to play and residents to walk and meet their neighbours.

Alternatively, however, if the space once used for garages and access ways becomes available for buildings, this could exacerbate the trend toward [larger environmentally inefficient homes](#).

Increasing urban sprawl

Autonomous vehicles have the potential to induce more urban sprawl, as more effortless travel becomes available to more people. This may lead to a rethinking of the convenience of proximity to the city and major employment centres.

Low-cost housing on the urban fringes has been a major driver of sprawl in cities.

By making travel cheaper and more convenient, autonomous vehicles might make the economics and practicality of sprawl more attractive.

Changing property values, planning controls and land supply

While “location, location, location” will remain relevant, autonomous vehicles should act to inflate property values in some neighbourhoods and depress values in others.

Easier commutes in particular will have an impact on residential property prices, and might shift preferences from properties in urban centres to those in suburban areas.

While suburbanisation might speed up, densification of urban cores might also be enhanced. We might see people with very distinctive lifestyles preferring these different locations.

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Planning controls and land supply will be key instruments to control the balance between greenfield and infill developments. We need to consider how these controls are applied in this new environment to maximise social and economic benefits.

Further reading: [*We must plan the driverless city to avoid being hostage to the technology revolution*](#)

How planners will manage the disruption of land use

Through the convergence of automation, electrification and ride-sharing technologies, autonomous vehicles could significantly reshape real estate, urban development and city planning — as the automobile did in the last century.

This transformation also creates an opportunity for planners to make our cities more citizen-centred by bringing back the [human-scale](#) and [walkable city](#) practices that motor vehicle domination removed.

Urbanist Jeff Speck discusses how we can make our cities more walkable and more pleasant.

How well prepared are urban planners, however, to mitigate the disruptive impacts on our cities? Do we yet even understand what these disruptions and their implications are?

Further reading: [*A future world full of driverless cars … seriously?*](#)

Urban planning as a profession is largely unprepared for autonomous vehicles. Planners need to be aware, smart and proactive about the potential impacts, particularly in terms of the potential for renewed urban sprawl.

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A future involving widespread use of autonomous vehicles presents both land-use opportunities and challenges. Progressive outcomes will require an objective assessment of their complex land-use, economic and community influences on our evolving cities.

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