Could robo-taxis kill public transportation?

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Credit: Pexels

When driverless cars become mainstream—which could happen sooner than you're expecting—it will change everything.

In mid-November, transportation thought-leaders gathered at Columbia University to discuss the future of mobility in the fall symposium of the

American Geographical Society. Hosted by the Earth Institute, the event painted a hopeful picture of the world in 2050: Hyperloop pods will carry us farther and faster; drones will patrol our infrastructure to keep roads and bridges safe … and also deliver our favorite tacos; geocoding systems will help ambulances respond to emergencies anywhere on the planet. But the innovation that kept coming up again and again was the self-driving car.

Specifically, "robo-taxis"—electric, shared, autonomous vehicles—are gearing up to completely change how we live, work, and design our cities, just as human-operated cars transformed the 20th century.

Before we had cars, it took six days to get from New York to Georgia, and three weeks to get to Chicago. After the horseless carriage arrived, what had taken a week would now only take a day. "People could get around so much more quickly than they had in past that it necessitated all kinds of alterations in our mental makeup," David Kaplan, a Kent State geography professor, said during his talk. "This is the kind of disruption that happens because of transportation, and I think it's the kind of disruption that we may be on the cusp of today."

However, just as the automobile had unintended consequences—such as climate change, air pollution, and urban sprawl—robo-taxis will create new problems as well. Several conference speakers expressed concern that public transportation will end up taking the backseat on the road to the future.

Visions of the Future

When it comes to "game-changing" mobility innovations, "[t]here are three words that you need to keep in mind," said Antoinette WinklerPrins, a program director at the National Science Foundation. Those three words are: "Electric, shared, and automated."

Electric cars are considered key to the future of transportation because they generally produce fewer greenhouse gas emissions than their gas-guzzling counterparts. (Exactly how they stack up depends on what's being used to generate electricity at the power plant, which varies from state to state.) The other great thing about electric cars is that they have fewer moving parts, which means there's less that can go wrong. James Arbib, a technology investor and founder of RethinkX, said that electric cars are already running for 500,000 miles without needing major repairs, and he expects they'll eventually be able to reach a million miles—about five times farther than a typical gas-powered car. That long life expectancy means we'll need to replace our cars less often, which would cut down on resource extraction, manufacturing, and distribution.

But even with an electric car, you've still got to drive it and park it, and it still sits idle 95 percent of the time, said Arbib. The real disruption, he said, is "the replacement of car ownership itself." He thinks that the growth of ride-sharing and automation will be driven purely by economics; the average American doesn't need a car that drives 500,000 miles, because she only drives 13,500 miles per year—the car would be obsolete long before it fails mechanically. But ride-sharing companies can push the lifetime of the cars until each mile travelled costs only one-millionth of the car's original price tag. Plus, these cars will cost less to maintain and insure, so the cost per mile will be much lower than owning your own car.

Making the car self-driving will increase safety as well as quality of life. Patrick Hertzke of McKinsey Automotive estimated that about 2 to 4 percent of cities' GDP is lost due to the health effects of pollution and the productivity that's lost while we're stuck in traffic.

Self-driving cars are already operating in cities around the U.S. Credit: Google

With the growth of automated, shared, electric vehicles, "the whole value chain here gets disrupted," said Arbib. As car ownership drops, we won't need car dealers, personal car insurance, or massive parking lots. "We think there [will be] three San Franciscos freed up in L.A., parking spaces that come back if these cars don't need to park," said Arbib.

We may be able to take back our streets, too, said David Kerrigan, author of Life As A Passenger: How Driverless Cars Will Change The World. About a hundred years ago, "streets were for people," he said. "They weren't for cars. That was a change in our mentality that came in the 1920s. And I think you'll see streets returning, possibly, to a social position."

Challenges and Opportunities

Change is never easy, and not all of the changes that come along with robo-taxis will initially be positive.

"When the car arrived, nobody had a clue how to deal with it," said

Kerrigan. "Nobody knew what was coming. There were no rules of the road, there were no traffic signals, there was no starting point." Similarly, the U.S. is still working out the rules and regulations for self-driving cars and ride-sharing. Jobs will be lost. Oil production will plummet, which will affect the economies of many nations. Cities will be forced to adapt.

Another risk, said Linda Bailey from the National Association of City Transportation Officials, is that we'll "go whole hog toward the idea that vehicles are going to be so great we don't need anything else," forcing public transit to shutter in many American cities.

In fact, ride-sharing is already taking passengers away from public transportation, said Carlos Hernan Mojica, an urban transport specialist at the Inter-American Development Bank. Stephen Buckley from WSP Parsons Brinckerhoff calculated that if ride-sharing companies charge 50 cents per mile (which is in line with current projections for 2030), and the average trip is less than five miles, then it will be about the same price or cheaper than a ride on the New York City subway—but with faster, door-to-door service that arrives on demand. Shared mobility could "significantly undermine transit as we know it," he said.

But ride-sharing is not likely to out-compete all forms of public transit, says Mojica. In dense cities, subways and buses are here to stay. Ride-sharing simply couldn't match their capacity, even if we expand roads—though transit will lose customers, especially in suburban areas, says Mojica. "But it is up to the transit agencies to adapt and embrace new technologies." He suggests that opening up their real-time data, making digital payments available, integrating and cooperating with other modes of transportation, and testing autonomy in buses and trains are a few ways that transit companies can adapt to this brave new world of mobility.

Projections for how soon robo-taxis could take over the streets ranged from a few years to a few decades. The transition won't be easy, just as the evolution from horses to cars took decades and faced its own opposition. But we can learn from the past to help steer these new forms of transportation toward a better future.

Buckley encouraged cities and public transit to get involved and help shape the future of autonomous vehicles, instead of just leaving it up to the companies and consumer demand.

"It doesn't have to happen to us," he said. "We have to take this technology and run it through the ringer of 'What are we trying to achieve?' We need to increase the potential of [autonomous vehicles] to help us create the cities that we want."

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