

The Future Lies Ahead—and It's Automated!

Are we ready for the changes technology is creating in transportation?

BRENDA WALKER

Powerful economic players are currently engaged in a twenty-first century Gold Rush to see who comes out as the winners in the self-driving vehicle sweepstakes, which will set the table for a new transportation infrastructure in America. Detroit got blindsided a few decades back by the Japanese incursion of smaller, less gas-guzzling cars into the market, and the automakers don't want a replay of that failure. However, the competition among companies is speeding the adoption of technologies that may not have been thoroughly thought through, including the effect on the economy and society generally.

The U.S. Department of Commerce has found that driving jobs employ a substantial number of Americans; in fact, one in nine U.S. workers are employed as drivers, a total of 3.8 million. Yet captains of industry intend to make all those drivers unemployed—is that an acceptable price for progress?

Plus, transportation is just one industry facing an automated future: few will escape.

Make no mistake—big investments are being made that show the automotive industry's serious planning for a future in which few or no human drivers are needed. PricewaterhouseCooper's 2016 study on the sector found the top five original equipment manufacturers spent \$46 billion in research and development in 2015.

- In early 2016, General Motors bought Cruise Automation, a San Francisco self-driving startup, for \$1 billion to power its move into the technology.

- In February 2017, Ford announced its \$1 billion investment in Argo AI, a startup run by Carnegie Mellon engineers, with the aim of launching a fleet of self-driving cars by 2021.

- In May 2016, a Barclays analyst predicted that vehicle ownership could fall by forty percent over the next 25 years if shared self-driving cars become com-

mon. So it makes sense for the big automotive companies to get in on the robot taxi action, which explains GM's \$500 million investment in Lyft to develop self-driving cabs. Lyft, in turn, is teaming up with NuTonomy to fine tune its self-driving approach.

And it's not just the big Detroit automotive manufacturers who have their eyes on the prize: it's also technology companies that have high hopes. One is Google, whose Waymo car subsidiary has accumulated 3.5 million miles in 20 U.S. cities over the past seven years. The company also took over an abandoned Air Force base in Merced County, California, where it manages controlled testing of the vehicles navigating crosswalks, dodging errant bike riders, and sorting out all the mysterious objects that they encounter. The amount of testing sounds reassuringly thorough, but that's what's needed in the complex task of training computers to drive cars in chaotic human environments.

Interestingly, the Uber cars being tested in Pittsburgh and Arizona are apparently not doing as well. Recode.net reported in March 2017 that a human intervention was needed around once per mile. It must be noted that Uber is just starting out compared with Waymo, which has been doing car training since 2009. In comparison, Waymo cars in California drove more than 635,000 miles in 2016 and needed a human to take control just 124 times. Clearly the years of experience matter, and Uber got a late start in autonomy, although it is a powerhouse in ride hailing. But the financial prize is so enticing that late-comers still hope for a billion-dollar payoff.

Meanwhile in the real world, polling shows the public is concerned about the automated future. A Pew Research report titled "Automation in Everyday Life" from October 2017 observed, "Americans generally express more worry than enthusiasm when asked about these automation technologies." Asked about a future where computers and robots can do many jobs, 72 percent of respondents were counted as Worried. The development of driverless vehicles was less negative, with 40 percent feeling Enthusiastic versus 54 percent Worried. (Perhaps the more positive response about self-driving vehicles came from the idea of getting to one's house

Brenda Walker is publisher of the websites LimitsToGrowth.org and ImmigrationsHumanCost.org. A resident of the San Francisco Bay area, she is a frequent contributor to The Social Contract.

after a night of carousing by just pressing the car’s Home button.) Still, 81 percent expect that many people who drive for a living will suffer job losses as a result.

Waymo CEO John Krafcik has remarked, “This technology has the potential to be transformative”—right, that’s what makes people nervous.

A poll conducted by the insurance company AIG in October found that three-quarters of the 1,000 respondents thought there was a danger from hackers,

and favorability was pretty evenly split on sharing the road with self-driving vehicles, with 42 percent generally positive and 41 percent had reservations.

A survey from AAA released March 1, 2017, found a more basic negative response—fear, with the headline reading: “Three-Quarters of Americans ‘Afraid’ to Ride in a Self-Driving Vehicle.”

So the industry has a lot of convincing to do. Perhaps some of its investment should go to educating the

A wholesale shift

One in 9 U.S. workers are considered on-the-job drivers. Of these, 3.8 million are motor vehicle operators and could be displaced by self-driving vehicles. Another 11.7 million use cars to deliver services or travel to work sites, and could see a boost in productivity.

Occupation	Employment, 2015
Heavy and tractor-trailer truck drivers	1.68 million
Uber, Lyft drivers	1 million (estimated)
Light truck and delivery service drivers	826,510
Bus drivers (school or special client)	505,230
Drivers and sales workers	417,470
Taxi drivers and chauffeurs	180,750
Bus drivers (transit and intercity)	168,140
Ambulance drivers and attendants	19,730

Source: U.S. Department of Commerce

John Blanchard / The Chronicle



UPPER RIGHT: An Uber self-driving car navigates one of Pittsburgh’s bridges. The old city’s hills and tunnels are also challenging for cars without drivers. BOTTOM: A Waymo self-driving car is being tested in a controlled environment in Central California.

public about the supposed desirability of its product.

And what will the driving public think about sharing the highway with autonomous big rigs? Concerned citizens probably hope that 80,000-pound self-driving 18-wheelers will not be loosed on the public highways any time soon—a software malfunction could be catastrophic. A reasonable (and hopefully long-term) introductory step could be the “platooning” strategy where a human driver pilots one truck with a small number of other vehicles hooked up electronically to the leader.

Furthermore, the political blowback may be stiff when the public begins to see society transformed in ways nobody asked for, and the driving environment looks to be just an early harbinger of change. The big deal breaker will be massive job loss due to technological improvements. The Oxford study that got everyone’s attention in 2013 predicted that nearly half of occupations in the U.S. were likely to be automated within the next 20 years.

Keep in mind that the worst level of joblessness in the Great Depression was 25 percent. Yet Washington remains asleep to the danger, as demonstrated by Treasury Secretary Steve Mnuchin’s clueless remark last spring that big automation was 50 or 100 years away.

In the future, a prosperous family might own one car and also use automated taxis. Or maybe most people won’t own at all eventually, and will rent vehicles from the mega-companies that rule the new transportation universe. These scenarios are just possibilities—reality could be quite different.

Plus there’s no discussion of the cost to consumers. Car ownership and maintenance are rather expensive now, and the industry may expect the drivers to keep paying through the nose just because they are used to it. Naturally the industry will expect proper compensation for its billions of dollars spent in research and development.

It won’t be all bad. The original idea for autonomous vehicles came from Google co-founded Sergey Brin who thought the 40,000 deaths annually from car crashes was outrageous and could be fixed by smart machines. And indeed, the future of road safety looks to be much improved because of technology. Also, self-driving cars will help many disabled people get around more easily. Driving drunk in a self-driving car will be guilt free, although there may be collateral liver damage as a result of reduced inhibition.

Of course, the automated future of decimated employment suggests that it is insane to continue importing immigrant workers as if nothing has changed from 1910. Immigration should be understood as now being obsolete, like homesteading. When America ran out of free land to be given to farmers, homesteading ended; in many cases today, machines are already cheaper than the most desperate illegal alien worker. We should end immigration without allowing the unskilled foreign underclass to grow even more.

In fact, there’s not much more that can be done in preparation for the automation revolution since the economic forces are so strong and determined to transform the world for their profit. ■

Driverless: Intelligent Cars and the Road Ahead (an excerpt)

Hod Lipson and Melba Kurman (MIT Press, 2016), Chapter 4: “A mind of its own,” pp. 65-66

There’s an old joke that made the rounds on the Internet back in the 1990s. One version of the joke has Bill Gates (at that time the CEO of Microsoft) boasting that if Microsoft were to build operating systems for cars instead of computers, cars would be transformed into high-tech miracles that, among other things, would get 1,000 miles to the gallon.¹ The joke continues with the CEO of GM angrily firing off a detailed, multipoint rebuttal in response, laying out several reasons why Microsoft should stick to building operating systems for computers, not cars.

According to the joke, if Microsoft built operating systems for cars:

1. Automobiles would frequently crash for no apparent reason. This would be so common that motorists would simply accept it, restart their car, and continue driving.
2. Occasionally all the car’s doors would lock, and motorists could enter their vehicle only by simultaneously lifting the door handle, turning the key, and holding radio antenna.
3. Vehicles would occasionally shut down completely and refuse to restart, requiring motorists to reinstall their engine.
4. Every time a car company introduced a new model, car buyers would have to relearn to drive because all controls would operate in a new manner.
5. Whenever roadway lines were repainted motorists would need to purchase a new car that could accommodate the new “operating system.”
6. Cars could carry only one passenger unless the driver paid extra for a multipassenger license.
7. Oil, water temperature, and alternator warning lights would be replaced by a single, all-purpose “general car fault” warning light.
8. Airbags would ask, “Are you sure?” before deployment. ■