



Why Effective Government Regulation Matters to Win Public Acceptance for Self-Driving Cars

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Grand promises are being made about the economic, environmental, and social value autonomous (self-driving) vehicles. Yet most Americans remain highly skeptical that such vehicles are safe, and the technology will eventually have to win public acceptance to advance. How safe do autonomous vehicles have to be to gain widespread public acceptance? No consensus has been reached, but so far the debate is proceeding simply in terms of projected numbers of accidents and fatalities.

Experts agree that to gain public acceptance, autonomous vehicles must be perceived as safer than today's vehicles and drivers. How to document "safer" is murky. Some claim that the promise of cutting annual road fatalities in half (from 40,000 to 20,000 annually) would be sufficient. Others feel that, given public fears of any brand new technology, autonomous vehicles must appear to be far safer — perhaps projected to reduce annual fatalities as low as double digits. There is likely no magic number that could flip the switch in public perceptions. And even if a specific number could be named, proponents of self-driving vehicles would be hard-pressed to project whether safety aspirations can actually materialize. Although debate over numbers is a dead end, this does not mean that public acceptance cannot be won. The conversation should turn to the ways government can facilitate progress in autonomous vehicle safety and simultaneously expand public acceptance of the new technologies.

Public Views about Autonomous Vehicles

Both Congressional and executive branch proposals about the autonomous vehicle industry have sought to temper government involvement in the hope of fostering speedy technological advancements. Investors have poured billions of dollars into autonomous vehicle development, but governmental reluctance has fostered a "wild west" atmosphere in testing and competition.

Public tolerance for technological risk is tempered by perceived benefits. The greater the benefits, the greater the willingness to accept risks, as the airline industry shows. Travelers have not totally lost their fear of flying, but the benefits — in time saved and convenience — have convinced a critical mass of customers to put their concerns aside. Moreover, Federal Aviation Administration regulations and thorough accident investigations by the National Transportation Safety Board lead the public to believe that flying is becoming safer all the time.

Do autonomous vehicles present an equally compelling proposition? For society as a whole, probably yes. But for most individuals right now, the answer is no. The risks may feel remote to most individuals, but the benefits of switching to autonomous vehicles, remain uncertain at best. What is more, autonomous vehicles also operate in ways that undermine the joy of driving that has long supported the auto industry's commercial

appeal. Hence, public fears are likely to remain paramount until the public gains greater assurance of the benefits of autonomous vehicles. At some point, it should become apparent that private and public interests need not collide, because government regulation could help the industry establish credibility and win the public trust. Given negative public reactions to recent highly-publicized fatalities associated with Tesla and Uber accidents, this moment may already have arrived.

How Regulation Can Help Win Public Acceptance

Government could help spur the autonomous vehicle industry's growth by creating an independent accident investigation unit. More importantly, the National Highway Transportation and Safety Administration could ensure that commercialization advances in stages, with the industry's advance contingent on safety performance each step of the way. Usefully, the Society for Automotive Engineers International has already established a widely-cited scale to describe progressive levels in driver reliance on advanced automation and the Self-Driving Coalition for Safer Streets provides indicators.

Level 0, No Automation — Human driver performs all driving tasks

Level 1, Driver Assistance — Driver-assist feature to steer or control speed

Level 2, Partial Automation — Driver-assist features but driver still performs most tasks

Level 3, Conditional Automation — Vehicle is mostly autonomous but driver may be expected to take the wheel

Level 4, High Automation — Vehicle handles all functions in controlled roads and environments

Level 5, Full Automation — Vehicle handles all driving functions under all conditions

At levels one and two, it makes sense to first ensure that all cars and drivers have access to fully-proven technologies such as adaptive cruise control, emergency braking, and lane-keeping assistance. Public surveys show that many in the public views these technologies favorably, but they have yet to be fully-tested and installed in most cars. That could save 10,000 lives per year. As vehicles move to levels three through five, active regulation will be needed. Companies could first be allowed to work toward acceptable safety levels in restricted environments with short, well-marked, routes (such as shuttle services on college campuses or at airport terminals). Once proven safe in these environments, companies could then apply to gradually move forward to prove automated vehicles can safely operate anywhere under all conditions.

Advancements in artificial intelligence are to be lauded, but Silicon Valley's unofficial "move fast and break things" approach to bringing devices to market is completely inappropriate when applied to automobile safety. A skeptical public needs to be reassured that people are not being used as guinea pigs for technological and commercial motives. A vigilant government devoted to regulating and documenting safety can become the industry's best friend, therefore, by legitimizing advances toward autonomous vehicles, reassuring the public each step of the way.

Read more in Jack Barkenbus, "**Self-Driving Cars: How Soon is Soon Enough?**" *Issues in Science and Technology*. 34, no. 4 (2018).