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User Acceptance and Public Perception Regarding Automated Driving Systems

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Issue

Fully Automated Driving System (ADS) is one of the most innovative and fundamentally disruptive changes in transportation. This technology has the potential to resolve or mitigate current transportation problems, including reducing traffic accidents, congestion, energy consumption, and pollution. However, the extent of these impacts will depend heavily on public perception and widespread adoption of ADSs.

Research Findings

To gain a better understanding of user acceptance and public perception related to ADS, extensive interviews were conducted with Tesla end-users who have experience using partial ADS (i.e., Autopilot) as well as with transportation experts to identify policy gaps related to ADS deployment and adoption. Several focus groups with different stakeholder groups were also organized and an online survey was administered to engage the broader public on these issues. Key findings from this research are presented below and offer insights public agencies can use to develop policy that benefits road users as well as the general public.

Safety, compatibility, and trust are critical factors that influence user acceptance. Perceived usefulness, trust, and compatibility are more important to a consumer in regard to using a personally-owned fully ADS compared with using a shared-use fully ADS. However, perceived ease of use is more important for a consumer when considering a shared-use fully ADS compared to a personally-owned fully ADS.

Universal ADS terminology needs to be developed and consistently used among policymakers, manufacturers, and researchers. Terminology can greatly affect the public perception of ADS capabilities and limitations. Consistent messaging among key stakeholder groups will greatly improve the public's understanding and acceptance of ADS.

Consumer education and training is needed to shape realistic expectations for ADS technologies. ADSs are changing traditional mechanical driving tasks and will require drivers to interact with new technologies. Drivers must learn how and when the new technologies work as well as understand the system's directions and warnings. Two types of training are recommended: 1) general training on ADS technology, and 2) safety training that covers ADS limitations and what to do in emergency situations.

Providing consumer incentives that support ADS adoption may be justified. Although some ADS benefits are directly related to the owner or driver, many of the benefits will be shared with others and provide broader public benefits. For example, if ADSs result in the reduction of congestion, then this will help everyone on the road, whether or not they have an ADS. Consumer incentives to consider include:
- Providing access to High Occupancy Vehicle lanes or Dedicated Lanes which will reduce travel time and increase safety at early stages of deployment,
- Offering insurance policies that protect consumer benefits and decrease consumer costs,
- Providing financial incentives for personally owned fully ADSs that are also zero-emission and/or shared-use, and
- Scaling up infrastructure (i.e. charging stations that support zero-emission ADS).

Research Findings (continued)

Shared-use, electric ADSs have the potential to deliver significant consumer and social benefits but will require supportive policy. Shared-use ADS fleets have the potential to provide the same level of mobility consumers are accustomed to but at a fraction of what it costs to own and maintain a personal vehicle. Additionally, shared-use, electric and fully ADS fleets show promise in providing significant social benefits, such as reduced emissions and congestion. However, there is no widespread policy agreement about encouraging fully ADSs to be electric and deployed as part of shared-use fleets. Considerations for policy include:

- Give priority access to shared-use fleets by designating curb space and rights-of-way for pick-up and drop-off,
- Develop public safety protocols in the absence of human drivers on board,
- Establish sanitation standards for vehicles to ensure high quality of service for users,
- Develop cyber security requirements to project consumers' privacy and protect against cyber terrorism,
- Combat anti-discriminatory practice by developing policies to ensure services benefit all users regardless of gender, age, race, ability, and/or location,
- Provide additional Zero-Emission Vehicle credits to operators who place an electric vehicle in a shared context, and
- Limit access of single and zero occupant vehicles in specific locations.

Policy is needed to ensure consumer privacy is protected. Americans are not confident about the privacy of their personal data and how their data is shared without their knowledge. In the ADS context, policy should be put in place to: 1) require the development of data ownership agreements between manufacturers and consumers, 2) make companies legally obligated to protect consumers' privacy and the security of consumer ADS-related data, and 3) require manufacturers to obtain consent from owners or riders for using their data for non-safety purposes.

Additional guidance on consumer and manufacturer liability needs to be developed. One of the most serious and complicated policy challenges is ADS liability. Liability policy will have a significant effect on both consumer acceptance of ADSs and the rate of ADS deployment. Additional guidance should be developed that that addresses liability between consumers and manufacturers under specific circumstances. Platforms, such as a black-box device, should be considered to collect evidence for defining the responsibility of accidents.

Further Reading

This policy brief is drawn from the research report "User Acceptance and Public Policy Implications for Deployment of Automated Driving Systems" prepared by Sanaz Motamedi, Pei Wang, and Ching-Yao Chan with Partners for Advanced Transportation Technologies (PATH) at the University of California, Berkeley. The full report can be found here: https://escholarship.org/uc/item/5570537f.