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Experiencing Pilot Demonstrations Helps Individual Acceptance of Self-Driving Shuttles

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Issue

Higher-occupancy self-driving shuttles could bring about the benefits of vehicle automation—improved safety, parking cost savings, greater mobility to those who cannot drive, and stress relief for drivers. At the same time, these shuttles would not bring the potential drawbacks of self-driving vehicle ownership, such as increases in vehicle miles traveled and associated energy use. Because they can only currently operate in relatively simple and closed environments, self-driving shuttles are likely to be deployed earlier than personal self-driving vehicles in open road environments. However, acceptance of the new technology remains uncertain. Whether people will use these services will be largely influenced by their attitudes toward self-driving technology.

Researchers at the University of California, Davis surveyed residents and employees of the West Village area of the UC Davis campus during the three-month pilot deployment of a self-driving, electric shuttle

(Figure 1) to understand attitudes toward self-driving technology. The researchers then applied existing theories of technology adoption to model how attitudes of residents and employees influenced their acceptance of the shuttle service.

Key Research Findings

Survey results indicate positive attitudes toward and high acceptance of self-driving shuttles. More than 75% of respondents reported that they liked the idea of having an electric, self-driving shuttle in the area, and about 70% said they would be somewhat or very likely to ride in such a shuttle if it had a wider service area.

Familiarity and riding experience with self-driving vehicles facilitate acceptance of shuttles. Modeling suggests that if consumers lack awareness of and physical experience with self-driving vehicles, they tend to perceive the vehicles as less useful, more difficult to use, and higher risk. On the other hand, people who know about or have ridden in self-driving vehicles perceive them

as more useful and easier to use. These perceptions all contribute to increasing trust and confidence in the technology (Figure 2).

Experience with riding in a self-driving vehicle can reduce perceived risks of the technology. Perceived risks include concerns related to sharing the road with self-driving vehicles, vehicle technology, software system privacy, and pooling with strangers for shuttles specifically. Respondents in this survey were more concerned about vehicles' operational and security risks than privacy and pooling with



Figure 1. The self-driving, electric shuttle that operated in UC Davis' West Village from March to May 2019.

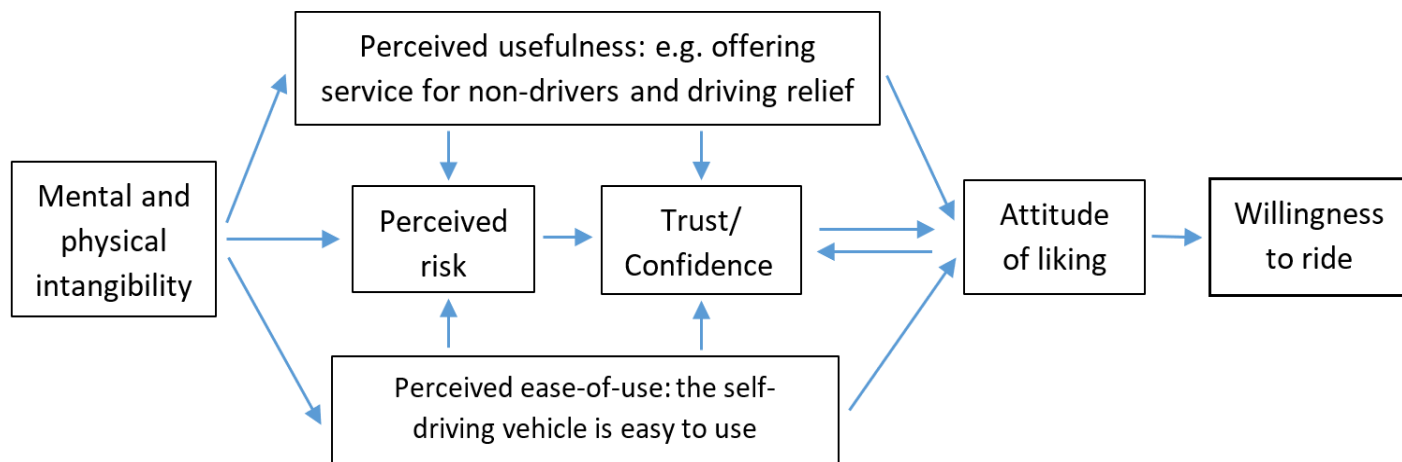


Figure 2. A simplified conceptual model of the factors that influence willingness to ride in a self-driving shuttle.

strangers. However, modeling results show that experiences of having ridden in a self-driving vehicle and of perceived usefulness of a self-driving vehicle both help to significantly reduce perceived risk. Reducing perceived risks of the technology is a key factor in one's ultimate willingness to ride.

Enthusiasm for or liking self-driving shuttle services is an important factor in a person's acceptance of these services, according to modeling in the study. While the formation of attitudes such as enthusiasm are complex, trust and confidence in the self-driving technology appear to play an important role in shaping attitudes toward the shuttle services.

Socio-demographics influence the acceptance of self-driving shuttles. Model results show that younger people, people of color, and women are likelier to ride in shuttles. This contradicts previous research indicating that women are less likely to adopt self-driving vehicle technology. However, since more women tend to ride transit than men in the U.S., this finding may reflect the existing gender gap in transit ridership rather than technology adoption.

Policy Implications

These results suggest that if local governments would like to increase acceptance of self-driving

shuttles, they should consider pilot projects to stir public awareness and interest. Although the cost of pilot demonstrations is high, this study suggests their importance and necessity in promoting acceptance of self-driving technology through two channels. First, pilot demonstrations can reduce mental and physical intangibility; that is, they give people knowledge of and experience riding self-driving vehicles. Tangible knowledge and experience can reduce perceptions of risk and increase perceptions of usefulness and ease-of-use. Second, the presence of these vehicles can indirectly increase potential riders' trust based on these changes in perception.

More Information

This policy brief is drawn from "Exploring the Role of Attitude in the Acceptance of Self-driving Shuttles," a report from the National Center for Sustainable Transportation authored by Yan Xing, Susan Handy, Giovanni Circella, Yunshi Wang, and Farzad Alemi of the University of California, Davis. The full report can be found on the NCST website at <https://ncst.ucdavis.edu/project/examining-role-attitude-plays-adoption-automated-electric-shuttle-west-village-and-after>.

For questions and comments, please contact Yan Xing at yxing@ucdavis.edu.

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