Fostering Social Equity with Automated Vehicles

> "Shared autonomous vehicles have the potential of enabling smart and connected communities where everyone benefits."
>
> *-- Yingling Fan, Professor, Humphrey School of Public Affairs*

Why was the study needed?

The emergence of autonomous vehicles (AVs) offers the potential to transform transportation services—but caution is needed. Without careful design and planning, these new technologies may exacerbate the equity issues plaguing the existing transportation system rather than solving the issues.

This research aims to help transportation practitioners understand the potential of shared autonomous vehicles (SAVs) to mitigate existing transportation inequities while identifying policies and strategies that could guide an equitable rollout of the new technology

How was the study conducted?

This study used a rich and varied dataset to examine equity concerns and considerations around the rollout and regularized use of a hypothetical SAV system in the Twin Cities metropolitan area. This system would likely be a fleet of shared driverless cars or buses funded through a public-private partnership and integrated into already-existing public and private regional transportation networks. The three main components of the project were a literature review, qualitative research, and data analysis.

Literature review

Researchers conducted a survey of the literature surrounding equity considerations and SAV technology. While studies on SAV and social equity are currently limited, researchers found relevant work is being done on transportation equity and autonomous vehicles and the determinants of autonomous vehicle adoption. This study contributes to the limited literature available on SAV to help practitioners guide awareness campaigns and better plan for equitable rollouts of SAV technology.

Qualitative research

Interviews were conducted with several public agencies in the Twin Cities to gauge their priorities and concerns about the rollout of an SAV system. Through these interviews, researchers identified three groups of people who should be considered as equity stakeholders when designing and implementing SAV programs: people who are not well served by the current transportation system, people who may be negatively affected by SAVs, and people who may benefit from SAVs. The interviews also suggest three important principles for engaging these equity stakeholders: continuity, co-creation, and community leadership.

Data analysis

Three originally designed surveys gauged public attitudes and preferences around SAV systems and identified differences in opinion and concern based on demographic factors including race, age, household structure, gender, income, and health. The first online study targeted Twin Cities metro area residents, a second online study targeted users of the ABC Ramps in downtown Minneapolis, and a third survey expanded the research scope with an in-person survey of participants visiting the 2021 Minnesota State Fair.

An electric driverless system was demonstrated in Yellowstone in June–August 2021.

Booth at 2021 Minnesota State Fair

> "This research provides valuable insights into creating a shared, autonomous transit service that is not only functional, but popular."
>
> *-- Frank Douma, Director of State & Local Policy and Outreach, Humphrey School of Public Affairs*

Key findings

- **Spatial mismatch:** SAVs have the potential of addressing the serious transportation equity issue of spatial mismatch—not only between home and work but also between home and other activity destinations.

- **Racial equity:** SAVs could promote racial transportation equity. Black and Hispanic individuals in the Twin Cities currently face the highest rate of transportation difficulty and expressed the highest valuation of an SAV service compared to other groups.

- **Technology access:** SAV systems should be designed to ensure flexibility in booking and paying so that populations without smartphone access can use the systems.

- **Gender equity:** Vehicles should have robust security features to ensure SAV systems promote gender equity in transportation. Women significantly preferred security cameras or onboard attendants to no security option.

- **Widespread deployment:** State agencies should consider the extent to which SAV systems could serve people outside of the Twin Cities urban core.

Conclusions

If well-designed, communities employing pools of SAVs of varying sizes with efficient connections to high-quality public transit could bring about far-reaching societal changes—providing inexpensive mobility services to all people, building stronger family and community ties, and boosting economic productivity and equity by removing mobility as a constraint.

Ultimately, an SAV system could transform the Twin Cities transportation infrastructure. However, public agencies must carefully consider different uses of the system and the specific onboard features of vehicles to ensure maximum use and positive equity outcomes.

About the Research