Policy Brief

Can We Advance Social Equity with Shared, Autonomous and Electric Vehicles?

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In November 2016, the Institute of Transportation Studies at the University of California, Davis (ITS-Davis) convened leading academic, government, private industry, and public interest stakeholders to explore science-based policies that could steer the three transportation revolutions- shared mobility, electrification, and autonomous vehicles, toward the public interest.

This policy brief reflects the opinions of the authors and not UC Davis. This brief is one in a series that presents a range of policy concepts, recommendations and research needs discussed at the Three Revolutions Conference.

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Summary

A future with shared, electric autonomous vehicles holds many promises. But without an intentional focus on equity, it may exacerbate existing barriers and increase inequality. Policymakers must consider not only how to deploy this technology quickly and safely, but also how it can be used to improve the lives of those who need it most.

Introduction

For more than half a century our transportation system has largely focused on moving cars, in part to support increasingly sprawling land uses. Over-reliance on vehicles has come at a high expense to personal budgets, public health and the environment. Very low-income families spend, on average, over 30% of their income on transportation. For those without a private vehicle, limited access to jobs, education, health care and other

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opportunities is a barrier to self-sufficiency. Pollution from vehicles leads to asthma and a host of diseases that fall hardest on communities of color.[1]

As shared mobility and autonomous vehicles (AVs) reshape our transportation system, they offer a critical chance to redress these inequities. Without smart policy and planning, however, they may instead widen the access and inequality gap. This brief focuses on solutions that can benefit the following disadvantaged communities:

1. Low-income communities
2. Mobility-challenged people, including people with disabilities, seniors and youth
3. Other historically disadvantaged communities, including people of color, immigrant communities (including those with language barriers) and rural communities

Some early patterns already raise equity concerns, such as much longer wait times and cancellation rates for transportation network companies (TNCs) like Uber and Lyft in people-of-color communities, especially for black men.[2] [3] Even more concerning are public agencies that are cutting bus lines and replacing them with TNC subsidies, but often without analysis of cost to low-income riders.

The convergence of autonomous, shared, and electric vehicles will have a profound impact on society. Unlike our current transportation system, this new system may be largely designed and driven by the private sector. This makes it all the more urgent to put forward a framework that lifts social equity to the top of the policy agenda. It is critical to begin immediately exploring strategies and overcoming barriers for policies and practices that improve equity, including shared vehicles, shared rides, and equal access for people of every age, ability, and income.

Background

Equity Priorities
Dozens of measures and indicators can be used to evaluate the impact of transportation and land use on social equity. For this high-level analysis and discussion of different transportation futures and potential policy interventions, we propose four primary performance measures:

1. **Cost:** Low-income households spend a large proportion of their income on transportation, primarily because of reliance on vehicles for many trips. These transportation costs are much higher in sprawling areas.

   For each new policy change or project involving fleets of autonomous vehicles that are electric and shared (FAVES), what is the impact on transportation costs for low-income households, in absolute terms and relative to others?

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1   http://www.who.int/kobe_centre/publications/hiddencities_media/who_un_habitat_hidden_cities_web.pdf?ua=1

2   https://www.theatlantic.com/business/archive/2016/10/uber-lyft-and-the-false-promise-of-fair-rides/506000/

3   https://economics.stanford.edu/sites/default/files/zoepf.pdf

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2. **Access:** Access to destinations is one of the main factors in lifelong earning potential, and unequal access is a major cause of overall inequality. About 70% of regional jobs, retail, and other opportunities are now outside of downtown centers. Lack of access to vehicles, reliable public transit, and safe active transportation options decreases those opportunities.

   For each new FAVES policy change or project, what is the change in access to jobs, education, health care and other destinations?

3. **Public Health:** Disadvantaged communities often suffer the worst impacts of our current transportation system, from higher levels of air pollution to greater numbers of injuries and deaths from car crashes.

   For each new FAVES policy change or project, what are the likely health outcomes on disadvantaged communities?

4. **Employment:** There is a growing income gap, with a dearth of middle income jobs. For example, TNCs disrupted the taxi industry in many communities, and AVs may have more profound impacts including on freight transportation including trucking. Advocates argue that FAVES will create jobs but it is important to consider the changes in not only the number of jobs by region but also the types of jobs and skills needed for those positions.

   For each new FAVES policy change or project, what is the impact on employment, particularly on access to stable, well-paying jobs?

Findings and Policy Recommendations

This section outlines several problems to achieving equity in costs, access, public health and employment, and proposes policy solutions. These solutions can be further prioritized at various geographic, political and temporal scales.

1. Problem: **Disadvantaged communities are not strongly engaged in issues of shared mobility, and have difficulty affording electric vehicles (EVs) or accessing the infrastructure for them.** As we enter into a period of faster change and disruption, these communities need to be part of the planning process to ensure solutions are tailored to community needs.

Possible Actions for Local Government and Transit Agencies:

   a) Expand efforts to engage and include disadvantaged communities in transportation planning, especially regarding shared mobility.

   b) Use the four equity priorities described above (cost, access, public health, and employment) as a

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framework for evaluating equity goals and impacts of policy interventions.

c) Support demonstration projects and spread case studies, best practices, model policies and pro-grams.

d) Create or support networks focused on overcoming barriers to shared mobility.

2. Problem: **Disadvantaged communities face barriers to using shared mobility including financial, technological, and language and cultural barriers.** This creates unequal access to many services. Since many new technologies rely on scaling up the number of users in a given area, this may mean services, such as carpooling and car-sharing, are simply unavailable.

Possible Actions for Local Government, Regional Agencies, Transit Agencies, and Private Sector Part-ners:

a) Support demonstration projects that overcome obstacles to shared mobility or EV penetration. Ex-amples include the new low-income electric car-sharing project in Los Angeles called Blue California and Oakland's new Shared Mobility for All project.

b) Develop platforms for households that don't have bank accounts, credit cards or online payment systems to access shared mobility, and for platforms to include multiple mobility providers (e.g. Chi-cago's Ventra card and app).

c) Create new revenue streams to support equitable access to new mobility. For instance, Oakland sells permits for car-sharing curb space. These funds go to reduce car-sharing cost for low-income communities.

d) Reduce parking requirements for multi-family homes and commercial centers that include car- and bike-sharing, distribute transit passes or provide other trip reduction strategies. (See GreenTRIP Connect[4] for additional strategies and their impacts).

3. Problem: **Shared mobility does not always get priority in planning or infrastructure.** A critical way to promote both public transit and FAVES is to ensure that shared vehicles are faster and more convenient than solo driving trips. This is both an equity issue, since low-income commuters are more reliant on transit and other shared modes, and one of increasing transportation efficiency overall.

Possible Actions for Local Government, Regional Planning Agencies, Caltrans:

a) Enforce HOV lane laws to reduce growing congestion. Cite cheaters and increase carpooling to 3+ where appropriate.

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4   http://www.transformca.org/greentrip/connect

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b) Allow conversion of mixed-flow general purpose lanes to Express Lanes to allow priority for shared vehicles and to close gaps in the HOV/Express networks without requiring wider roads.

c) Provide priority for shared vehicles in urban areas, including designating curb space or shared mobility lanes (including Bus Rapid Transit).

d) Analyze how widespread use of shared mobility, and especially connected AVs, may be able to make more efficient use of road and parking space, freeing up space for other forms of transportation (such as BRT and bike lanes). This could lead to reduced spending on roadway expansion and justify additional investment in shared mobility. This should be an integral part of Regional and County Transportation Plans.

4. Problem: **Shared mobility may replace transit in some areas** without accounting for the barriers to disadvantaged communities (e.g., Dublin, CA). [5]Shared mobility can be a great complement to public transit, and even improve access by replacing inefficient public transit, especially in suburban or rural areas. However, this strategy may increase cost or diminish access for populations that have structural or language barriers.

Possible Actions for Transit Agencies:

a) Re-examine transit routes and possible alternatives, coupled with subsidies, to serve populations more efficiently at lower costs. Create subsidy structures that specifically account for low-income riders, and work to keep their costs from increasing over current costs.
b) Account for travel time, cost implications, and other barriers as agencies implement first- and last-mile partnerships focused on increasing access to transit.

c) Encourage public-private partnerships between transit agencies, TNCs, car-sharing and bike-sharing, to create multi-modal transportation hubs in low-income communities.

d) Develop requirements for ADA access, especially as transit and taxi service are reduced in areas.

5. Problem: **Shared autonomous vehicles may increase driving and local air pollution,** impacting disadvantaged communities that already suffer from higher rates of asthma and other medical conditions.

Possible Actions for Local Government and State Agencies

a) Offer greater benefits or incentives to encourage shared AVs that are also zero emission vehicles.

b) Increase incentives and resources for implementing EV infrastructure, with a focus on low-income

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5   http://www.wheelsbus.com/news/wheels-partners-uber-lyft-desoto-cab-offer-demand-real-time-travel-convenience-dublin/

communities.

6. Problem: **Higher rates of bicycle and pedestrian collisions in disadvantaged communities.**

Possible Actions for Local Governments

a) Utilize AVs to set pedestrian- and bike-friendly speed maximums, safe buffer zones, and standardized signalization for human-vehicle interface.

b) Ensure priority is given to repurposing parking and other infrastructure into activity and opportunity centers, such as parks, trails, bike paths, or affordable infill development, in disadvantaged communities. Such land uses have been demonstrated to increase physical activity and decrease health risks and costs.

Opportunities for Future Research

Insufficient data on impact of new technologies, or of potential policy interventions. It is important to keep information open and widely available for the broadest benefit, while protecting customer and driver privacy.

Possible Actions for Local, State and Federal Agencies

a) Ensure data reciprocity from private sector players when they benefit from public policies or open public data.

b) Analyze data for accessibility of services to low-income, disabled and other populations, and use it to plan for policy interventions.

c) Evaluate possibilities for repurposing parking for public benefit.

Conclusion

All new technologies, when distributed rapidly, create new inequities. Just as public agencies intervened to ensure electricity got to rural areas and phones are affordable to more, it is imperative we find ways to ensure that the promise of FAVES improves the lives of those who now face the most serious transportation barriers. Doing so successfully will require a clear framework to approach social equity, bold experimentation, and sharing successes across the private and public sectors. It will take constant vigilance.