DRISI
Caltrans Division of Research, Innovation and System Information

Research Results

Shared Mobility Policy Playbook and Workshop

Current Practices and Guiding Principles

Planning, Policy & Programming

APRIL 2019

Project Title:
Shared Mobility Policy Framework and Workshop

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WHAT WAS THE NEED?

Shared mobility – the shared use of a vehicle, bicycle, scooter, or other travel mode – is an innovative transportation strategy that enables short-term access to transportation services on an "as needed" basis. The term shared mobility includes various forms of carsharing, courier services, micro transit, ridesharing (carpooling and vanpooling), shared micro mobility (bike sharing and scooter sharing), transportation network companies (also known as TNCs, ride sourcing, and ride hailing), and other shared services, such as public transportation.

A number of environmental, social, and transportation-related benefits have been documented from the use of shared mobility, although the impacts may vary based on a number of factors such as the shared mode, the built environment, urban density, public transit accessibility, and other factors. Several studies have documented reduced vehicle use, ownership, and vehicle miles traveled. Cost savings and convenience are frequently cited as popular reasons for shifting to a shared mode. Shared mobility can also extend the catchment area of public transportation, potentially helping to bridge gaps in existing transportation networks and encouraging multimodality by addressing first- and last- mile challenges commonly associated with fixed-route public transit access. Shared mobility can also provide economic benefits in the form of cost savings, increased economic activity near public transit stations and multimodal hubs, and increased access by creating connections with origin points not previously accessible via traditional fixed route services.

Recognizing the growing importance of shared mobility, Caltrans funded the development of a Shared Mobility Policy Playbook. This project was made possible due to the generous support of the State of California, and by the public and private stakeholders who participated in workshops and webinars, small

group discussions, expert interviews, and surveys throughout the course of this project. It is important to note, however, that shared mobility is rapidly evolving, and this project represents current understanding at the time of publication.

WHAT WAS OUR GOAL?

The primary goal of the project was to develop a Shared Mobility Playbook that presents an overview of current practices, lessons learned, and guiding principles for public agencies to advance shared mobility policy and planning for the State of California. The Playbook is intended to provide public agencies:

- Access to shared mobility resources, such as opportunities and best practices for deploying shared mobility across California and the United States;
- A strategic guide for incorporating shared mobility into public policy, transportation planning, and modeling; and
- A quick reference to aid in public policy development.

WHAT DID WE DO?

The project was comprised of six components: 1) expert interviews; 2) small group discussions with public agency representatives; 3) a survey of California public agencies; 4) a webinar; 5) a workshop; and 6) the Shared Mobility Policy Playbook. The expert interviews helped provide insight into the extent to which shared mobility has been integrated into transportation modeling. Between April and June 2018, researchers held four small group discussions across California including: the San Francisco Bay Area, Sacramento, the Central Valley, and Southern California. At each discussion, up to 20 participants (consisting of local officials, planners, and staff of public agencies) discussed their agency's experience with shared mobility, policy actions, perceived benefits and drawbacks, equity, and data sharing. For the webinar, Dr. Susan Shaheen and Adam Cohen of TSRC discussed the latest developments in shared micro mobility policy and Ronald West of Cambridge Systematics discussed ongoing efforts to incorporate shared mobility into transportation models.

WHAT WAS THE OUTCOME?

The workshop facilitated a dialogue of approximately 100 participants representing local, state, and regional governments; private companies; non-profits and community-based organizations; and educational institutions. Key goals of the workshop included: 1) enhancing public agency preparedness for enabling mobility solutions and technologies (both public and private); 2) learning about opportunities for public-private collaboration to deliver shared transportation services; 3) advancing the incorporation of shared mobility into transportation planning and modeling; and 4) preparing for the growing role of shared micro mobility and shared automated vehicles in the transportation ecosystem.

The final report summarizes key findings from the expert interviews, small group discussions, online survey, and a literature review. The final report focuses on the impacts of shared mobility on communities and public agencies; the experiences of the public sector planning, implementing, and monitoring service deployments; and practices for incorporating shared mobility into transportation planning and modeling.

The Shared Mobility Policy Playbook is a resource for local governments and public agencies to assist in planning, modeling, and public policy development for shared mobility services. The Playbook provides an introduction and definitions to shared mobility services, provides mode specific resources for agencies looking to develop mode specific policies in their community, and policy specific tools designed to address an array of issues impacting multiple communities and shared modes.

WHAT IS THE BENEFIT?

Common themes identified throughout the project included the need for shared mobility operator data; the need for additional research on the impacts of shared mobility on travel behavior, curb space management, the environment, equity outcomes, and existing transportation systems; and the critical need to plan and guide policy for a shared micro mobility and shared automated vehicle future.

The Shared Mobility Policy Playbook will be of value to individuals, public agencies, and communities who want to know more about shared mobility and to communities interested in incorporating shared mobility into their transportation ecosystem. The Playbook is a practical guide with resources, information, and tools for local governments and public agencies seeking to incorporate innovative and emerging services, or to manage existing shared modes.

IMAGES

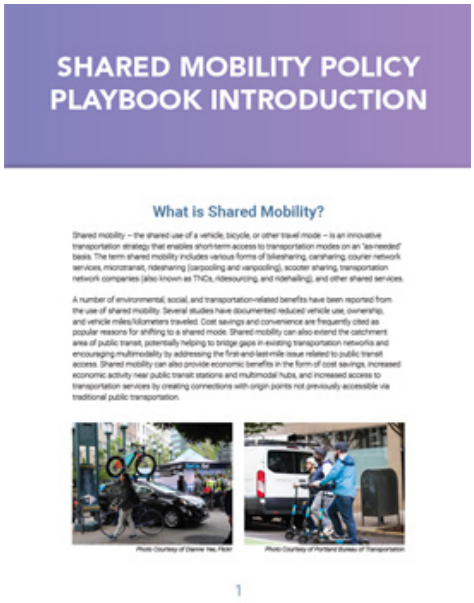
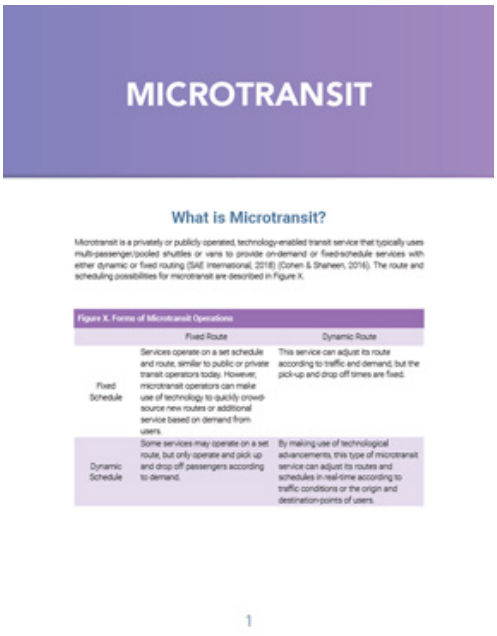


Image 1

Image 2

Image 3


MICROTRANSIT

What is Microtransit?

Microtransit is a privately or publicly operated, technology-enabled transit service that typically uses multi-passenger/pooled shuttles or vans to provide on-demand or fixed-schedule services with either dynamic or fixed routing (SAE International, 2018) (Cohen & Shaheen, 2016). The route and scheduling possibilities for microtransit are described in Figure X.

Figure X. Forms of Microtransit Operations

	Fixed Route	Dynamic Route
Fixed Schedule	Services operate on a set schedule and route, similar to public or private transit operators today. However, microtransit operators can make use of technology to quickly crowd-source new routes or additional service based on demand from users.	This service can adjust its route according to traffic and demand, but the pick-up and drop off times are fixed.
Dynamic Schedule	Some services may operate on a set route, but only operate and pick up and drop off passengers according to demand.	By making use of technological advancements, this type of microtransit service can adjust its routes and schedules in real-time according to traffic conditions or the origin and destination points of users.

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Image 4


MULTI-MODAL TOOLS AND TRIP PLANNERS

What are multi-modal tools and trip planners?

With recent developments in both hardware and software features of smartphones, mobile applications for shared mobility services have also paralleled its growth. Mobile applications are improving accessibility to shared mobility services and enhancing travel planning.

Multi-modal tools aggregate various locally available travel modes, such as carshare, bus, and light rail, onto a digital platform that can provide real-time status updates. Multi-modal tools can be as simple as a menu listing various transportation options, while more advanced tools will incorporate a unified payment mechanism that functions across modes and public agencies.

Trip planners help users navigate to their destination based on their travel objectives, such as finding the fastest route or taking public transit. Multi-modal tools often include a trip planning component, determining which mode or modes fit the user's objectives and preferences. Smartphone usage has reduced the hassle of trips through the efficiency and reliability of new digital services, mobility models, and real-time information (Shaheen, Martin, Cohen, Muxunuri, & Bhattacharyya, 2016).

This toolkit presents case studies from public agencies that have deployed their own multi-modal trip planning apps and highlights issues of fare integration, public agency data sharing, and app accessibility relevant to public agencies considering their own multi-modal trip planning app. For an overview of the types of smartphone apps impacting transportation choices, refer to the **Definitions Toolkit**, pages 4 - 6.

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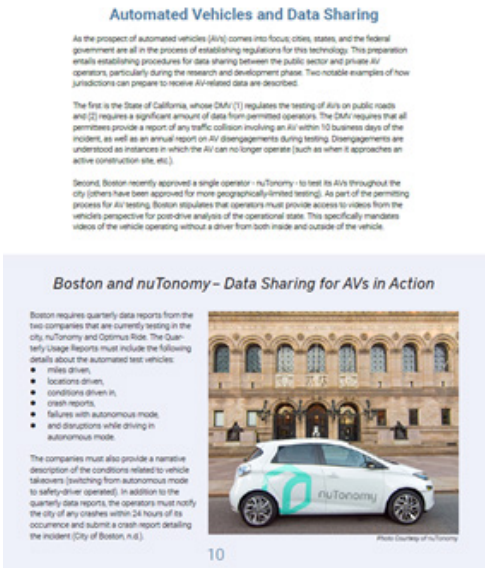
Image 6


Automated Vehicles and Data Sharing

As the prospect of automated vehicles (AVs) comes into focus, cities, states, and the federal government are all in the process of establishing regulations for this technology. This preparation entails establishing procedures for data sharing between the public sector and private AV operators, particularly during the research and development phase. Two notable examples of how jurisdictions can prepare to receive AV-related data are described.

The first is the State of California, whose DMV [1] regulates the testing of AVs on public roads and [2] requires a significant amount of data from permitted operators. The DMV requires that all permittees provide a report of any traffic collision involving an AV within 10 business days of the incident, as well as an annual report on AV disengagements during testing. Disengagements are understood as instances in which the AV can no longer operate (such as when it approaches an active construction site, etc.).

Second, Boston recently approved a single operator - nuTonomy - to test its AVs throughout the city (others have been approved for more geographically-limited testing). As part of the permitting process for AV testing, Boston stipulates that operators must provide access to videos from the vehicle's perspective for post-drive analysis of the operational state. This specifically mandates videos of the vehicle operating without a driver from both inside and outside of the vehicle.

Boston and nuTonomy – Data Sharing for AVs in Action

Boston requires quarterly data reports from the two companies that are currently testing in the city, nuTonomy and Optimus Ride. The Quarterly Usage Reports must include the following details about the automated test vehicles:

- miles driven,
- locations driven,
- conditions driven in,
- crash reports,
- failures with autonomous mode,
- and disruptions while driving in autonomous mode.

The companies must also provide a narrative description of the conditions related to vehicle takeovers (switching from autonomous mode to safety-driver operated). In addition to the quarterly data reports, the operators must notify the city of any crashes within 24 hours of its occurrence and submit a crash report detailing the incident (City of Boston, n.d.).

Photo Courtesy of nuTonomy

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Image 5


Conclusion

Shared mobility requires thoughtful policymaking and planning to help maximize the potential societal benefits. Rural, suburban, and urban areas are all confronting the challenges and opportunities created by the rapid expansion of shared modes. Municipalities will have to develop policies that fairly manage a diversity of shared modes including carpooling, carsharing, micromobility, microtransit, and TNCs. Through public policy, public agencies can ensure that shared mobility supports a range of social and environmental benefits by: (1) developing equitable public policies that enhance accessibility; (2) encouraging competition and modal choice; (3) supporting multimodality; and (4) ensuring fairness among operators and modes. Understanding the impacts of shared mobility can aid planners in achieving short- and longer-term goals and policies. The policy tools covered in this toolkit, if implemented, could yield the following benefits:

- **Public Transit Integration.** Close last-mile gaps by making shared modes complementary with existing transit, increasing ridership and system revenue.
- **Equity.** Promote social, interregional, and intergenerational equity to meet the basic transportation needs of travelers.
- **Rights of Way Management.** Allocate scarce curb space more efficiently and maintain safe access for the public.
- **Incentive Zoning.** Maximize the ability of shared mobility to ameliorate the need for cars by coordinating transportation planning with housing policy.
- **Open Data and Data Sharing.** Improve understanding of transportation behaviors and refine management practices of shared mobility impacts.
- **Integration into Planning and Modeling.** Enhance policy effectiveness through more accurate understanding of real-world variables, such as adoption rate and mode choice.
- **Multi-modal Tools and Trip Planners.** Simplify transportation options and develop a more user-centered transit experience, with attention to accessibility by un/underbanked households and physically or cognitively impaired individuals.
- **Pricing and Taxation.** Control the proliferation of shared modes and create a more equitable framework for road access.
- **Electrification.** Advance the convergence of zero-emissions shared autonomous vehicles, which are an ongoing topic of research and conversation at all levels of government.

Transportation is on the verge of rapid transformation. It is important to note that the policies discussed in this toolkit reflect the current understanding at the time of writing, which will continue to evolve. Collaboration between policymakers, planners, and modelers, informed by research and best practices, will be crucial to realizing an equitable and environmentally sound future for shared mobility.

Image 7