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SHARED-USE MOBILITY

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REFERENCE GUIDE

Contents

THE TRANSPORTATION SHIFT IS UNDERWAY.

Introduction

The United States is currently experiencing a seismic shift in transportation norms. Breakthroughs in mobile technology, an influx of new urban mobility options and changes in travel behavior have significantly altered today's transportation landscape — a trend that is likely only to accelerate in the years ahead.

The use of new, shared forms of transportation —from carsharing and bikesharing to dynamic, IT-enabled shuttle services and carpooling apps—has increased exponentially. At the same time, drivers' licensing rates among younger generations have declined as the national perspective shifts from "I own and use my own transportation" to "I access a menu of mobility options to meet my needs."

These new services also offer opportunities to:
- Provide more mobility choices
- Offer first and last mile solutions to help riders connect with transit
- Reduce traffic congestion, vehicle miles traveled and greenhouse gas emissions

- Lessen parking pressures and free up land for new uses [1]
- Create independence for those who cannot afford to buy and maintain a vehicle
- Reduce transportation costs for households
- Provide new opportunities to earn extra income by renting out excess vehicle capacity
- Increase efficiency and convenience, especially when these modes are linked together

This disruption in the transportation industry has also raised important new questions about how we get from point A to B, with far-reaching implications for auto manufacturers,

shared-use mobility
MODES

BIKE SHARING · SCOOTER SHARING · RIDE-SOURCING · TAXIS & LIMOS · RIDESHARING · CARSHARING

tech companies, cities, transit agencies and communities.

The **Shared-Use Mobility Center** (SUMC) was founded in 2014 to document and explore new solutions related to shared mobility. SUMC is a public-interest organization working to foster collaboration and help connect the growing industry with transit agencies, cities and communities across the nation. Through piloting programs, conducting new research and providing advice and expertise to cities and regions, SUMC hopes to extend the benefits of shared mobility for all.

In its first year, SUMC's work has included designing carsharing pilot projects in Los Angeles and Chicago; hosting shared mobility conferences and workshops; developing interactive tools to help cities benchmark and expand shared mobility systems; and conducting national studies exploring the relationship between shared mobility and traditional fixed-route public transit.

By creating the **Shared-Use Mobility Reference Guide**, SUMC hopes to provide government, business, and community leaders with an introduction to shared-use mobility and help prepare them to address the rapid changes currently taking place in cities across the nation.

The guide includes:
- Recommended definitions for new shared modes of transportation
- Updates on the latest industry trends
- Analysis of shared-use mobility's potential and impacts
- Evaluation of changing local government roles and policy choices
- Suggestions for ways to better connect shared-use mobility with transit
- Recommendations for growing shared mobility services to serve all residents

It is also important to note that this document represents a snapshot in time. As the industry continues to evolve, SUMC will update this reference guide with new information on the benefits of shared-use mobility, opportunities for integration, service gaps in specific cities, ways to ensure equitable access to transportation and more. Additional information about the reference guide and SUMC's work are available online at **SharedUseMobilityCenter.org.**

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[1] McKinsey Consulting, for example, suggests that carsharing will lead to fewer cars on the street and free up space in city centers. See Dr. Andreas Cornet et al, "Mobility of the Future: Opportunities for Automotive OEMs," McKinsey & Company, February 2012.
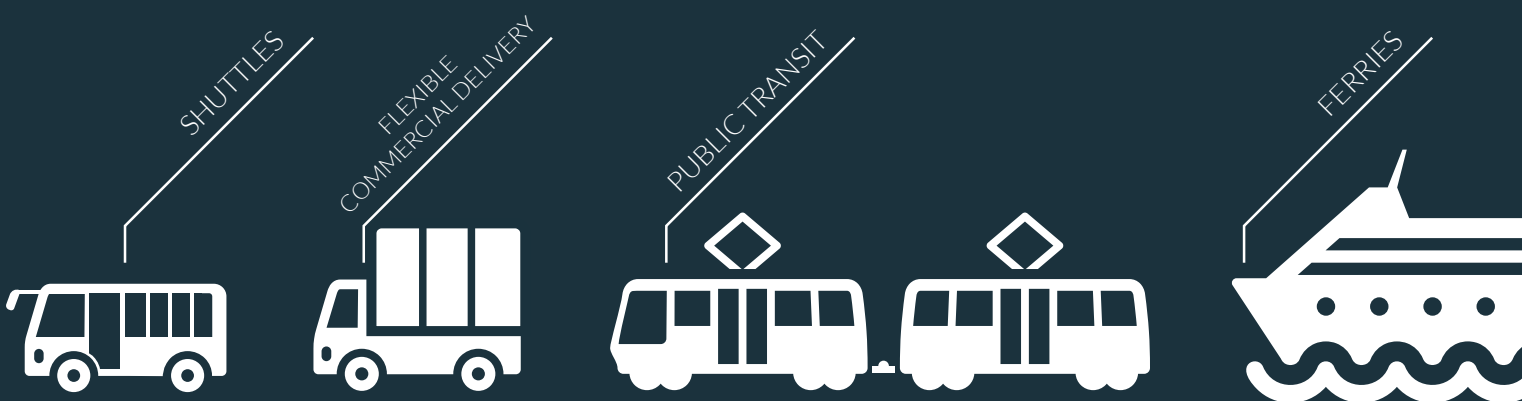
Shared-Use Mobility Definitions

Part I

As the shared mobility industry grows—and becomes more complicated and complex—establishing definitions for common terms and issues has become increasingly vital.

Definitions are especially important because they are often codified in public policy and determine standing for incentive programs and regulation. Understanding the various modes also helps cities and providers collaborate and determine what services work and where. Following is an overview of definitions for common shared mobility modes.

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[2] Perry Stein, "Bike-share programs are expanding worldwide. Are they successful?" Washington Post, May 22, 2015.

1. Bikesharing

Bikesharing is growing incredibly rapidly. In 2004, there were only 13 bikesharing systems. Today, there are more than 855 systems worldwide[2]. The greatest growth is in IT-enabled public bikesharing, which provides real-time information and uses technology to assist in rebalancing demand for bikes at docking stations throughout a community.

Bikesharing comes in a variety of forms:

- **Dock-based systems** allow users to pick up and return bikes from IT-enabled docks or stations located throughout a service area. This is the most widely recognized form of public bikesharing.

- **Dockless or GPS-based systems** put GPS technology directly into the bikes themselves as opposed to docks. The bikes often also have their own locks, allowing users to secure them to any public bike rack within a predetermined service area.

- **Low-cost, tech-light systems** do not place technology in the bike or the dock. Instead, users often sign up online and then receive a text or email with a code to open the bike's lock or access a lock box with a key.

- **Peer-to-peer bikesharing** allows users to rent or borrow bikes hourly or daily from individuals or bike rental shops. While growing in popularity, peer-to-peer bikesharing has not yet proven itself to be an effective mode of shared transportation.

Unlike most other new forms of shared mobility, bikeshare systems like New York's Citibike and Chicago's Divvy are often publicly owned and contractor operated through the use of public-private partnerships. In other cities like Minneapolis, the systems are run by nonprofit organizations. Perhaps because of its close connection to the public sector, bikesharing is viewed as a form of public transit much more commonly than other forms of shared mobility.

2. Carsharing

Carsharing is a service that provides members with access to an automobile for short-term—usually hourly—use. In 2014, U.S. carsharing membership reached approximately 1.34 million people.[3]

Types of carsharing include:

- **Traditional or round-trip carsharing**, which requires customers to borrow and return vehicles at the same location. Round-trip is the most common model of carsharing operation.

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[3] Susan Shaheen, Innovative Mobility Carsharing Outlook, July 2015.

[4] Taylor Soper, "Car2go reaches 1M users; Seattle has highest U.S. membership base with 59K drivers," Geekwire, December 10, 2014.

- **One-way or point-to-point carsharing**, which allows customers to pick up a vehicle at one location and drop it off at another. One-way is the fastest growing carsharing model. For instance, after launching in Seattle in 2012, one-way carsharing provider car2go now has 59,000 members in the city.[4] Use of one-way carsharing in some ways resembles bikesharing, with drivers relying on it for first and last mile connections to transit and providers working to rebalance vehicles in areas where demand is high.

- **Peer-to-peer (P2P) carsharing**, which allows car owners to monetize the excess capacity of their vehicles by enrolling them in carsharing programs. While P2P represents the smallest share of the carsharing market, it has evolved significantly in the past year. Rental service by the day is quite widespread. New technology that allows renters to access cars using their mobile phones—as opposed to exchanging keys with the car owner in person—has also helped its growth.

- **Niche carsharing services**, which include Flightcar—a company that allows travelers to rent out the private vehicles they've left behind in airport parking lots—and closed-network carsharing systems that serve specific communities, such as apartment complexes or universities.

Car rental companies and manufacturers are increasingly playing a major role in this sector. Avis Budget Group (buyer of Zipcar), Enterprise (buyer of IGO Carsharing) and Daimler, BMW, Toyota, Ford and Volkswagen are all active in carsharing markets across the globe. In many ways, carsharing is becoming an expected part of the urban fabric. Zipcar, once only familiar to 20-somethings, has become a household name. However, it too continues to innovate through testing new models such as Zipcar ONE>WAY to stay ahead of the curve.
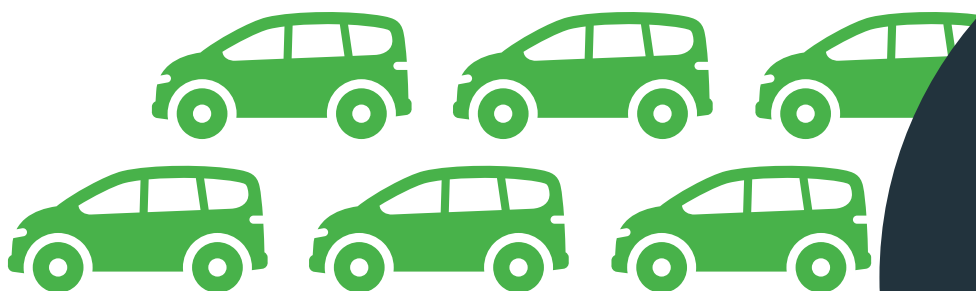
U.S. Carsharing Memberships

1.34M

in 2014

3. Ridesourcing

Ridesourcing providers such as Uber and Lyft —codified in California law as **Transportation Network Companies (TNCs)**—use online platforms to connect passengers with drivers who use personal, non-commercial, vehicles. Ridesourcing has become one of the most recognized and ubiquitous forms of shared mobility. Uber, for example, is currently valued at more than $50 billion and operates in 60 countries and approximately 300 cities worldwide.[5] Because, at least initially, they have been less regulated than the traditional taxi and limo services they compete with, TNCs have also generated some controversy and have been banned by some governments.

Recently, several cities—including Los Angeles, New York City, Washington, D.C. and Chicago —have begun developing their own universal e-hailing apps to help level the playing field between cabs and TNCs. New, specialized ridesourcing services have also emerged. These include Shuddle, which focuses on providing safe rides for children, and Lift Hero, which uses certified medical personnel to safely transport elderly passengers.

It is also worth noting that TNCs such as Uber and Lyft have begun providing services in select cities such as San Francisco, New York and Los Angeles that combine fares to reduce vehicle trips and generate cost savings. UberPOOL and Lyft Line allow drivers to add additional passengers to a trip in real-time. These services are known as **"ride-splitting"—**since the passengers split the cost of the trip—and are continuing to evolve as companies experiment with various models.

[5] Uber.com/cities as of September 1, 2015

UBER

SIGN IN

REGISTER

4. Ridesharing

At its core, ridesharing involves adding additional passengers to a pre-existing trip. Such an arrangement provides additional transportation options for riders while allowing drivers to fill otherwise empty seats in their vehicles. Unlike ridesourcing, ridesharing drivers are not "for-hire," but may be compensated for their time and mileage. Traditional forms of ridesharing include:

Carpooling

Carpools typically involve travelers riding together to save on fuel and vehicle operating costs. Often used for commuting, carpools can be arranged between known or unknown parties. For instance, "slugging"—a common practice in cities such as Washington, D.C.—involves drivers adding additional passengers through an informal arrangement to meet high occupancy vehicle minimums.

Vanpooling

Vanpooling is often run by public transit systems and allows groups of commuters (often co-workers) to share a ride. Vanpooling is similar to carpooling, but on a larger scale.

Real-time or dynamic ridesharing

Real-time ridesharing matches drivers and passengers based on destination through a mobile app before the trip starts. The passenger is usually expected to pay a share of the trip cost. Ridesharing apps such as Tripda and Blablacar have become immensely popular in Europe, but have been slow to attract users in the U.S.

At its core, ridesharing involves adding additional passengers to a pre-existing trip.

Ridesharing is one of the most visible and rapidly evolving areas of shared mobility, and therefore one of heightened importance. As suggested by the U.S. Department of Transportation's Volpe Center, ridesharing has the potential to help us reach the tipping point at which the full suite of transportation options—including shared mobility—becomes "reliable, convenient, affordable and otherwise attractive enough to compete with single occupant automobile travel." [6]

5. Public Transit

Transit—publicly owned fleets of buses, trains, ferries, facilities and rights of way, with fixed route local and express service—is the foundation for much of shared-use mobility. Not only could transit be considered the original form of shared-use mobility, but it also plays a vital role in creating an environment where newer shared modes can thrive. There is also great untapped potential for transit agencies to integrate with or offer new shared-use travel options to increase access to transportation and lower costs.

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[6] Moving Together in the 21st Century: How Ride-sharing Supports Livable Communities, U.S. Department of Transportation, Research and Innovative Technology Administration, John A. Volpe National Transportation Systems Center, June 2013.

6. Ebike & Scooter Sharing

Several cities have begun testing bikesharing systems that feature electric, pedal-assist bikes, a trend that is expected to continue in coming years. Scooter sharing, popular in some European cities, makes fleets of motorized scooters available to users by the minute or hour. Companies have also begun experimenting with sharing systems using new, compact electric vehicles such as Renault's Twizy two-seater and Toyota's iRoad that are expected to work well for short, 2-3 mile trips.

7. Microtransit

Most recently, IT-enabled private shuttle services such as Bridj, Via and Chariot have emerged that serve passengers using dynamically generated routes. Because they provide transit-like service but on a smaller, more flexible scale, these new services have been referred to as "microtransit." In general, they draw customers who are willing to pay somewhat more for greater comfort and service. The dynamic route-generating technology used by many of these services also has tremendous potential for transit and paratransit services.

8. Shuttles

Traditional shuttle services include corporate, regional and local shuttles that make limited stops, often only picking up the employees of specific companies. One example is the Google Bus which, along with bus services owned by several other technology companies, drives San Francisco-based employees to and from Silicon Valley.

9. Taxis and Limos

Taxis and limos are regulated for-hire vehicles that pick up passengers via street hails or pre-arrangement. With taxis, the fare is typically meter-based.

10. Jitneys

Jitneys are privately-owned vehicles that operate like taxis or buses, but often without official licenses. Jitneys traditionally have been used for transportation in low-income neighborhoods, which often have limited access to public transportation and poor taxi service. Jitney vehicles are typically smaller than buses and usually take passengers on a fixed or semi-fixed route without timetables.

11. Aggregators

Aggregation companies are focused on building entire bundles of services along with apps for integrating them. For instance, in 2012 German auto manufacturer Daimler launched Moovel, a smartphone and online mobility platform that shows users the best way to reach their destination using a variety of modes (including car2go, Daimler's one-way carsharing service).

Mobile apps such as RideScout (also now owned by Daimler), Transit App and CityMapper also aggregate information to provide users with a menu of real-time transportation options—including transit, taxi service, carsharing, bikesharing and ridesourcing—to get their destination. Many of these companies are also working on ways to integrate mobile payment into their service. For instance, in June 2015, RideScout acquired Globe Sherpa, a company that provides mobile book-and-pay ticketing systems for public transportation in several major U.S. cities.

12. Flexible Commercial Delivery

Shared-use mobility also has great potential for the commercial delivery sector. Shared trucks, electric vehicles and light electric-assist cargo bikes can deliver goods at a lower cost than trucks in many situations. This is a niche that could take off quickly due to growing demand for immediate deliveries. For instance, Internet retailer Amazon and the grocery delivery company Instacart both recently announced one-hour delivery in some markets. Meanwhile, new app-based services such as Dolly and Schlep connect people to neighbors who own trucks for on-demand moving and delivery.

13. Mobility Hubs

Several cities in the U.S. have taken steps to support development of integrated mobility hubs, which feature multiple transportation modes combined in one location. For example, the Los Angeles Department of Transportation is launching a three-year demonstration program, which includes mobility hubs at key transit station nodes anchored by secure bicycle parking plus bike- and carsharing access. Riders will be able to use smart phones and smartcards for reservations, simple fare collection and automated billing. Additionally, there will be a special focus on access needs for low-income customers.[7]

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[7] Jay Kim, LADOT, First and Las Mile Solution Transforming Transportation Summit, April 8, 2011.

The Benefits of Shared-Use Mobility

Part II

[8] Moving Together in the 21st Century: How Ride-sharing Supports Livable Communities, U.S. Department of Transportation, Research and Innovative Technology Administration, John A. Volpe National Transportation Systems Center, June 2013.

[9] Martin, Shaheen, Lidicker, The Impact of Carsharing on Household Vehicle Holdings: Results from a North American Shared-Use Vehicle Survey, 2010.

[10] *Getting More with Less: Managing Residential Parking in Urban Developments with Carsharing and Unbundling, Nelson Nygaard for City CarShare, December 2011.*

[11] Martin, Shaheen, Lidicker, The Impact of Carsharing on Household Vehicle Holdings: Results from a North American Shared-Use Vehicle Survey, 2010.

[12] Heidi Groover, "2,000 Seattleites Have Given Up a Personal Car in Favor of Car2Go," The Stranger, January 4, 2015.

Exploring the Benefits

The economic and social benefits of shared mobility are significant and wide-ranging. Many have suggested that new, innovative forms of shared transportation can help reduce VMT and emissions as well as car ownership rates and household transportation costs. Shared mobility can also encourage greater use of transit, open up more land for parks and other public space and help improve users' health by encouraging biking, walking and other forms of active transportation.

At the same time, however, more independent research must be done to substantiate current data, and agreement is also needed on the appropriate methodologies used for benefits analysis.[8]

Local governments need more information to decide how to allocate scarce resources, integrate shared modes into transportation management plans and provide incentives to encourage greater use of shared-use mobility. State and federal governments need the same data to justify new regulations and policies that support the growth of shared mobility. Following is a breakdown of the benefits cataloged to date for carsharing, bikesharing and ridesourcing providers like Uber and Lyft, along with an overview of emerging new research on the benefits of shared mobility.

Carsharing

The literature on changes in vehicle ownership associated with carsharing membership is well established. A widely cited 2010 University of California, Berkeley study found that between 9 and 13 cars are sold or not purchased for each carshare car.[9] Studies have also shown carsharing members enjoy significant reductions in their cost of living and increase their use of public transit. For instance, a 2011 study from City Carshare noted that more than 65 percent of respondents with carsharing memberships take transit a few times a week or more compared to approximately 41 percent of respondents without carsharing memberships.[10]

Research also suggests that, since carsharing members often shed older vehicles, the new carsharing cars that replaced them were much more efficient, averaging 10 more miles per gallon and resulting in lower fuel costs and greenhouse gas emissions.[11] While the effects of one-way carsharing have not been studied as closely, operator car2go has estimated that more than 2,000 of its Seattle members have sold their personal vehicles since joining.[12]

> **Car2go has estimated that more than 2,000 of its Seattle members have sold their personal vehicles since joining.**

Bikesharing

UC Berkeley's North American Bikesharing Survey, completed in 2014, found that bikesharing reduced respondents' driving by large margins. In Montreal and Toronto, 29 percent and 35 percent reported driving less, respectively. In Minneapolis and Salt Lake City, 53 percent and 55 percent noted driving less.[13] This report and a 2013 Capital Bikeshare Member Survey also found that 4 to 5 percent of members sold a household vehicle and cited bikesharing as a factor in their decision. The Capital Bikeshare study found an average driving reduction of 198 miles per year. [14]

Ridesourcing

A 2014 UC Berkeley intercept survey limited to three "hotspots" in San Francisco found that ridesourcing "appears to substitute for longer public transit trips but otherwise complements transit."[15] Ridesourcing provider Lyft has also noted that 25 percent of its trips in the San Francisco area are to or from Caltrain stations. [16]

To get a better handle on benefits requires consistent impact measures and methodologies. Further benefit analysis is also needed to assess each mode and portfolios of modes for households (e.g. cost savings) and communities (e.g. access, congestion, air quality). Benefits analysis requires controlled experiments that compare transportation behavior with and without shared-use modes.   However, it has been a challenge to get the data needed to analyze the impacts due to privacy concerns and companies' efforts to protect their competitive advantages.

Emerging Research on Shared-Use Impacts

Shared Mobility Benefit Examples (Source: Shared-Use Mobility Center)

If 10% of households became carshare members, there would be:

	San Francisco Bay Area	Chicago	Houston	Atlanta	Salt Lake City
Fewer Vehicles	50,000	31,000	30,000	5,000	3,000
Fewer Vehicle Miles Traveled Millions annually	267	165	158	27	13
Fewer Gallons of Gasoline Used, thousands annually	12,000	8,000	7,000	1,000	600
CO_2 Reductions Metric tons reduced annually	109,000	67,000	64,000	11,000	5,000

If there was a bikeshare dock every ½ mile, there would be:

	San Francisco Bay Area	Chicago	Houston	Atlanta	Salt Lake City
Fewer Vehicles	20,000	1,000	5,000	1,000	1,000
CO_2 Reductions Metric tons reduced annually	8,000	500	2,000	400	400

To increase the capacity for benefits calculations, SUMC created a visual forecasting tool that can be used to illustrate the effects of policy changes and program investments. The tool highlights growth in shared-use modes and the resulting impact on VMT reduction, mode shift, auto ownership rates, CO_2 reductions and more. Additionally, SUMC's policy database, which catalogues public investment in shared-use mobility over the past several years, includes the most current data available from governments on program impacts. Both are available online at **SharedUseMobilityCenter.org**.

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[13] Public Bikesharing in North America During a Period of Rapid Expansion: Understanding Business Models, Industry Trends and User Impacts, Mineta Transportation Institute, MTI Report 12-29, October 2014.
[14] LDA Consulting. 2013 Capital Bikeshare Member Survey. May 22, 2013.
[15] Shaheen and Chan, App-Based, On-Demand Ride Services: Comparing Taxi and Ridesourcing Trips and User Characteristics in San Francisco, 2014
[16] GreenCaltrain.com. "Lyft plays a growing role in Caltrain connections; first/last mile connections are barriers for many." July 24, 2015.

Local Government in the Lead (and the Hot Seat) Again

Part III

The "Wild West"

Given the paucity of local and federal transportation funding for new infrastructure, shared mobility may be one of the most efficient and economical options to help cities quickly expand service, meet increased demand, improve access in low-income and low-density areas, reduce air pollution and lessen traffic congestion and pressure on parking space supply.

As new shared-use service offerings proliferate, however, city governments have often found themselves playing catch-up, quickly passing new policies and gauging their effectiveness as they go. Some still are not sure whether these new services will enhance their existing transit services or compete with them. Many local governments have struggled to anticipate challenges and opportunities and to balance divergent goals, including:

- Maximizing access
- Preserving safety
- Ensuring support for public transit networks
- Managing traffic
- Allocating parking and other uses of curb space
- Ensuring all communities are served
- Providing clear and consistent guidelines for a quickly evolving industry

The environment that has resulted is one filled with innovation, but also chaos. The focus on catch-up has meant few cities have developed a long-term vision for a public-private mobility world. City and transit agencies have also not had a chance to reorganize or build new capacities, resulting in some confusion as to who is best suited to oversee these new modes of transportation. City departments of transportation own the streets, for instance, while transit agencies manage transit, and planners make decisions about use of the right-of-way. Other agencies regulate taxis and determine tax rates for carsharing.

For shared-use transportation to thrive, public agencies that previously worked in silos will need to collaborate with each other and with private companies to find the right mix of government policies at the local, state, and federal level.

What Is a City to Do?

Every city has its own transportation and land use policies, so each needs to find its own path to address these issues. Still, the key steps and players could be quite similar across cities. Following are some emerging best practices for cities, many of which were drawn from a framework created by the Frontier Group for the U.S. PIRG Education Fund and further developed by SUMC.[17]

Vision Development and Execution
- Develop a long-term mobility vision that includes shared-use mobility.
- Create mode-split goals to focus attention on what can be done now and how.
- Appoint a "Mobility Czar" to help break down government silos and engage public and private actors in collaborative innovation and assessment of impacts and opportunities.
- Adopt open data and open source software policies and engage a broad community in visioning and implementation.

Business Regulation
- Use the mobility vision to decide on the number and types of modes to attract and at what scale.
- Adopt clear regulations for desired new services that protect the public while supporting innovation.
- Set rules for accessible vehicles and service availability to all residents and neighborhoods.
- Require that providers share their data so that it will be possible to assess impact and integrate new services into transportation plans.
- Include specific requirements in requests for proposals to encourage utilization of common technology platforms and expand services to a diverse set of neighborhoods and populations.

Transportation Planning

- Integrate shared-use transportation modes into transportation planning, making accommodations in city streets for cars, buses, bicycles, pedestrians and shared-mobility operators.
- Study the effects of new transportation modes—both individually and in combination—and incorporate the findings into transportation models.
- Investigate the potential for additional modes to address transportation challenges.
- Support the launch of new modes, including financial support for start-up costs (for example, many transportation departments have worked with private operators to launch bikesharing ventures).

Land Use Planning

- Adjust municipal policies, including planning and zoning rules, to encourage the use of these services, which may include allocating curb space for shared vehicles, reducing parking fees for shared-use vehicle users, and reducing minimum parking requirements for new developments that incorporate shared-use transportation.
- Encourage integration of public transit, bikesharing, ridesharing and carsharing around transit stops, including electric vehicle infrastructure.

> **Every city has its own transportation and land use policies, so each needs to find its own path to address these issues.**

Transit Systems Management

- Plan like a mobility provider, experimenting with ways to integrate transit with new modes.
- Provide public access to transit data, including static and real-time information, so that developers can create innovative apps.
- Expand access to cellular networks, Wi-Fi and electric outlets in transit stations, and aboard transit vehicles.

Marketing

- Build awareness and support to attract new users.
- Engage in cross-promotions, such as discounted carshare rates for transit users.

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[17] Lindsey Hallock and Jeff Inglis, The Innovation Transportation Index: The Cities Where New Technologies and Tools Can Reduce Your Need to Own a Car, Frontier Group, U.S. PIRG Education Fund, February 2015.

Collaborative Public-Private Innovation

- Pursue public-private partnerships and pool information to support innovation.
- Support the creation of universal payment and trip planning mechanisms for multiple modes.
- Test new approaches to meet the mobility needs of those poorly served by the transportation system, including the young, the elderly, the disabled and those in low-income households.
- Identify ways to address barriers like insurance issues.
- Work with other cities to create and share policies, develop common data standards and make coordinated data requests of shared-use providers.

Funding for Scaling

- Develop a funding plan for pilots and scaling that considers all possible funding sources, including developers, toll revenues, employer TDM mandates, enhanced fleet modernization programs, Congestion Mitigation and Air Quality funds, private operators and more.
- Make the case for state and federal investment.

The Support Cities Need

To succeed, cities need tools for optimizing their transportation mix based upon local goals and achieving economies of scale for alternatives. They need frameworks for how to get "shared-use mobility ready" through land use planning and zoning, system design, information services and processes for bringing together transit operators, transportation departments, developers, property owners and vendors. They need model policies and guidance on how to address key challenges such as lack of data and poor integration. And they need examples from other cities that have gone first.

To advance shared mobility, cities also need funding. States could play a key role because federal funding apportionment to states is flexible, but most are not using this funding to its full potential. Cities also need federal support. While other countries such as Germany have accelerated the adoption of shared mobility through government support, the U.S. largely has not.[18]

Federal policy could help local transit agencies by providing support for rapid experimentation with new, more flexible modes. As pointed out by Tim Papandreou, Strategic Planning & Policy Director for the San Francisco Municipal Transportation Agency, it is too hard to find special funding every time a city wants to run a carsharing pilot or create new street designs for shared mode parking.[19] Securing such support, however, will likely require national coalition building.

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[18] *Catalyzing New Mobility in Cities, University of Michigan's SMART Initiative, May 2013. .*
[19] Tim Papandreou, SFMTA, Interview, February 2014.

To advance shared mobility, cities need to bring a variety of new resources to the table.

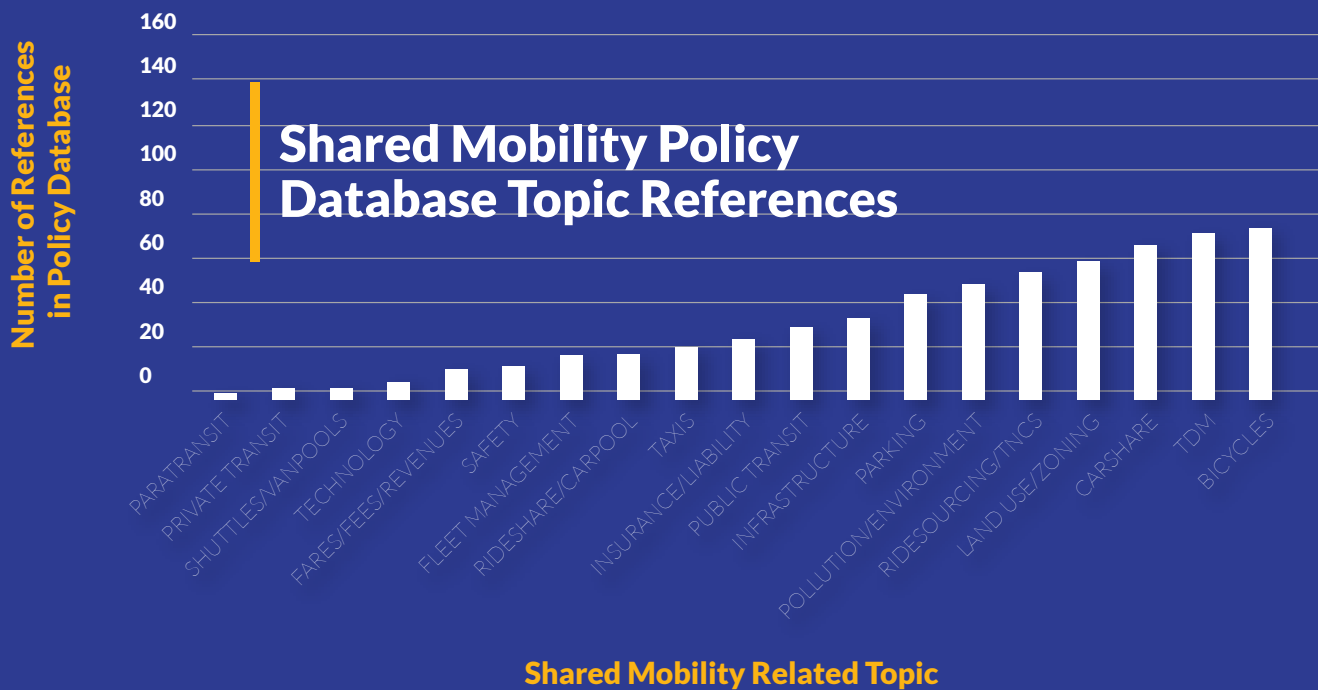# Local Policy Matters

Part IV

Cities are accelerating the passage of new policies to protect residents and spur innovation in urban mobility. Recently, SUMC began tracking their progress through a database that summarizes more than 500 of the most important shared-use mobility policies, studies and strategic plans in the United States.

The Evolution of Shared Mobility Policy

SUMC's shared mobility policy database features national policies as well as regulations and ordinances from states and cities that are leading the pack in addressing new developments in shared transportation. To get a better idea of where shared mobility may be heading, it is worthwhile to look back and see how policies and regulations have evolved. Interestingly, some city and state governments began addressing issues related to shared mobility more than 20 years ago:

- One of the oldest policies in the database is a piece of legislation from 1990 on transportation services for individuals with disabilities (stemming from the Americans with Disabilities Act) that included public transportation providers as well as taxis and vanpools. Interestingly, elements of this legislation are beginning to show up in new policies as a few cities have asked carsharing providers and TNCs to include wheelchair-accessible vehicles.

- The first transportation demand management (TDM) policy in the database is from Yorba Linda, CA, in 1991. TDM policies helped plant a stake in the ground for shared-use mobility and strategies aimed at reducing the number of people driving alone.

- The oldest carsharing policy in the database is from Multnomah County, OR in 1999. This policy exempted carsharing from a tax on motor vehicle rentals. A more recent carsharing policy, passed by Hawaii in 2014, stopped the practice of charging carshare vehicles the same $3 flat surcharge tax as daily car rentals, replacing it with a tax of 25 cents per half-hour. In all, 17 percent of the policies in the database deal with carsharing.

- Bikesharing shows up for the first time in April 2011, when Washington, D.C. passed an ordinance focused on eliminating bike network gaps and increasing dedicated bike-use infrastructure, including for bikesharing programs like D.C.'s Capital Bike-share.

- Minneapolis passed the first ordinance in 2009 to reduce the minimum automobile parking requirements for buildings with bike parking. The ordinance reduced the requirement for each non-residential unit by 10 percent, or one space, when bicycle spaces are provided equal to 25 percent of the number of automobile spaces.

- In July 2014, Washington, D.C. passed a regulation called the Transportation Network Services Innovation Act of 2014, which set minimum commercial insurance requirements on TNCs and placed the regulation of taxis, for-hire vehicles and tour buses within a new District Transit Authority. Nearly 15 percent of the policies in the database deal with TNCs.

Shared Mobility Policy Database Topic References

Y-axis: **Number of References in Policy Database** (0, 20, 40, 60, 80, 100, 120, 140, 160)

X-axis (**Shared Mobility Related Topic**): PARATRANSIT, PRIVATE TRANSIT, SHUTTLES/VANPOOLS, TECHNOLOGY, FARES/FEES/REVENUES, SAFETY, FLEET MANAGEMENT, RIDESHARE/CARPOOL, TAXIS, INSURANCE/LIABILITY, PUBLIC TRANSIT, INFRASTRUCTURE, PARKING, POLLUTION/ENVIRONMENT, RIDESOURCING/TNCS, LAND USE/ZONING, CARSHARE, TDM, BICYCLES

A Cross-Sectional Look

Austin, Chicago, San Francisco and Seattle are among the most prolific policymakers in SUMC's database. Many of the policies they have passed address the same modes. For instance, all four cities have passed carsharing regulations. Three of them have passed TNC policies (and San Francisco's lives under a state policy). Following is a snapshot of the policies each city has enacted.

A Tale of Four Cities' Shared-Use Mobility Policies

	Austin	Chicago	San Francisco	Seattle
Carsharing	●	●	●	●
TNCs	●	●		●
Bicycles (Master Plan, Safety)	●	●	●	●
Taxis	●	●	●	
TDM	●	●	●	●
Pedicabs	●	●	●	
Green Fleet	●		●	
Parking	●	●	●	●
Bikesharing		●		●
Transit		●	●	
Complete Streets	●	●	●	●
TOD	●	●	●	●
Shuttles		●		
Helmets			●	●

[20] District of Columbia Municipal Regulation 3133 Reserved On-Street Carsharing, http://www.dcregs.dc.gov/Gateway/FinalAdoptionHome.aspx?RuleVersionID=4150259

[21] Shaheen, Cohen, Martin, "Carsharing Parking Policy: A Review of North American Best Practices and San Francisco Bay Area Case Study, May 2010.

Policy Issues to Watch

SUMC's policy database also includes policy case reports that reveal some issues to watch, including:

Carsharing Policy

One of the biggest policy issues for the carsharing sector is access to parking. In July 2013, the San Francisco Municipal Transportation Agency (SFMTA) launched a two-year pilot program to allow car share vehicles to locate in regulated parking spots on city streets. Only traditional and peer-to-peer carsharing organizations may participate (not one-way carsharing). The SFMTA board of directors must approve parking permits. As of January 2015, SFMTA had approved three carsharing organizations, and 450 parking spots had been requested out of 900 possible in the pilot. Outreach to neighboring residents and businesses has helped to reduce conflicts over this use of parking spaces, but there has been some debate about the program in the media.

Washington, D.C. has also made parking available for one-way carsharing. In 2005, the district began providing curbside parking spaces for carsharing vehicles. Today there are 224 on-street spaces in 84 locations. Carsharing operators permitted to use these spots must have at least one car in each D.C. ward and at least as many cars in private parking locations as public permits.[20] Austin and Seattle also have provided on-street parking.[21] In December 2011, Washington, D.C. went on to address one-way carsharing parking, passing a rule allowing carsharing vehicles to park in any available spot on city streets in residential permit zones and at meters. Seattle also amended parking policies to allow for free-floating, one-way carsharing.

TNC Policy

TNCs first tried to muscle their way into cities and now are trying a softer approach. Many operated without approval for months but are now becoming legal in more and more cities, such as Chicago, Seattle, Washington, D.C., Dallas, Nashville, Cincinnati, San Antonio, Austin and Chattanooga, to name just a few.

Conflict over regulation of TNCs is not over. Current California law explicitly prohibits charging passengers on an individual basis, excepting certain school and tour buses. As a result, shared ride services offered by TNCs in which passengers pay separately are disallowed. In September 2014, the California PUC issued letters to the operators informing them that the shared rides were not allowed by regulation. However, these services remain in operation.

More requirements for TNCs are likely to come as cities grapple with safety and access issues. In Washington, D.C., for instance, TNC services are required to suspend any driver when a customer complains that they may have used drugs or alcohol, or refused service on the basis of discrimination. Other recent TNC ordinances have gone a step further,as evidenced by the reporting requirements in effect in Portland, Seattle and New York City. TNCs in these three cities are required to share performance and user trip data with local government for planning and equity related concerns.

Minimum Parking Requirements

One of the hopes for shared-use mobility is that it will reduce congestion and costly parking requirements. In 2013, San Jose, California amended its zoning ordinance to reduce minimum parking requirements from 15 to 50 percent for developments that are located near transit and include Travel Demand Management (TDM) measures. Qualified TDM programs include carpooling, vanpooling, on-site car share parking, transit passes, electric vehicle charging, alternative fuel vehicle priority parking, guaranteed ride home, telecommuting, parking cash out, education and programmatic support, emergency transportation, transit shuttles, and bicycle commuter facilities. This regulation is an example of the type of transit oriented development (TOD) zoning that is becoming more common in communities around the country.

SUMC's Shared Mobility Policy Database

More detailed information is available in SUMC's
Shared Mobility Policy Database located online at
SharedUseMobilityCenter.org

Shared-use mobility can drastically reduce congestion and parking needs

Shared-Use Mobility & Transit: Complementary or Competitive?

Part V

22 Shaheen and Martin, Evaluating public transit modal shift dynamics in response to bikesharing: a tale of two U.S. cities, Journal of Transport Geography, December 2014.

A Changing Transit Marketplace

As new shared-use services proliferate in cities across the nation, one debate that has continued to surface is whether shared mobility is good or bad for public transit. With the rapid rise of disruptive technologies like ridesourcing, many people have questioned whether public transit will have to make significant changes to the way it operates.

On one hand, shared mobility may take riders off transit for some trips. On the other hand, by enabling people in more places to easily get around without owning a car, it may be creating an entirely new group of transit riders. Overall, it seems shared-use services have the potential to expand regional mobility and—in some cases—provide service with more flexibility and lower capital costs than traditional rail and bus.

SUMC has interviewed local transportation officials from around the country to determine their level of interaction with shared-use modes and the possibilities for integration. The opinions many of these stakeholders shared are in line with the early evidence in this area, which suggests that shared-use mobility complements public transit.

According to a 2014 study by Susan Shaheen and Elliot Martin, shared mobility services have helped to expand demand for public transit networks, especially in more dispersed communities and small to midsized cities without dense urban cores.[22] For instance, the study found that 14 percent of Minneapolis bikeshare members increased rail use along the main commuter corridor as well as on the city's outer edge. A similar number reported increased bus use.

In places where transit demand outpaces capacity (because of physical constraints, capital shortfalls, or both), shared-use services also work as a peak-hour pressure valve. Especially in bigger cities, the rush-hour downtown commute remains the largest service concern, and many agencies are already working at the limits of their capacity. By relieving some of this excess demand, shared-use modes can enable agencies to continue providing efficient service while slowing the need for capital expansions.

Bikesharing, ridesourcing, and other shared modes can also provide feeder or first/last mile connections to transit trips. Mass transit is unsurpassed at bypassing congestion and efficiently moving a large number of people in and out of dense urban areas. Even if they have the resources, few users would likely want to swap a 15-mile train ride for a daily ridesourced trip in rush-hour traffic.

It is easy to imagine additional benefits from integrating shared-use mobility and public transit. Breakthroughs in real-time mobile apps and dynamic routing and carpooling solutions developed by ridesourcing companies like Uber, Lyft and Bridj could lead to transit models that optimize resources and improve performance and efficiency, even in lower-density areas that are difficult to serve effectively with fixed-route transit. Shared mobility services can more nimbly coordinate with transit to provide additional transportation options, both at times of high demand and at night and on weekends, when transit service is less frequent and often uneconomical for agencies to provide.

Some agencies have begun to think about ways to connect with shared mobility providers. In early 2015, Dallas Area Rapid Transit (DART) and Uber launched a new partnership featuring linked mobile apps. The Los Angeles County Metropolitan Transportation Authority and many other agencies have also launched partnerships with carsharing providers such as Zipcar to locate vehicles at transit stops to provide better first/last mile connectivity. Additionally, public agencies have begun looking into ways they can use shared mobility to reinvent important but inefficient modes such as paratransit and dial-a-ride services.

Transit agencies are also pursuing new information technologies that may help them integrate with other modes. The number of transit agencies providing usable data to Google for trip planning increased from six in 2006 to some 950 cities worldwide as of late 2015.[23] In addition to Google Maps, more than 200 transit-planning applications now exist, ranging from applications focused on a single transit agency to applications that cover hundreds of cities across the world. Roughly two-thirds of all transit agencies now make information available to third-party developers for the creation of apps and other tools for transit users. [24]

On the flipside, the massive new stores of transportation data that are being generated by shared-use technologies and network aggregators could help public agencies better envision and plan for new mobility patterns. Knowing in detail how intra-regional flows are growing and changing would be invaluable for both operational and long-term planning.

At this point, much of the potential for transit agencies to integrate with or offer shared modes remains untapped. Most transit agencies see their role as managing publicly owned fleets of vehicles with fixed route local service. Some transit agencies describe their role as "mobility managers," responsible for creating efficient, diverse and convenient urban mobility systems, but even these agencies are stymied by funding sources, procurement rules and other regulations that limit experimentation with new modes.[25]

James Corless, director of Transportation for America, says that the fundamental question for transit is: what is the role of a public transportation provider in this new environment where multiple mobility providers are responding more quickly to a changing market? [26]

To be sure that they understand and make the most of these opportunities, transportation decision-makers need better data on the impact of shared mobility on public transit, travel behavior, and consumer preferences. SUMC has conducted a number of research projects to illuminate the value of and pathways to integrating evolving relationship between transit and shared-use mobility, including:

- An Urban Sustainability Directors Network-supported study of shared mobility in nearly 30 major U.S. cities to understand how it can be utilized to fill transportation gaps and create a more robust transportation network. This work includes development of a visual forecasting tool to illustrate the effects of shared-use policy changes and program investments on VMT reduction and other community goals.

> " What is the role of public transportation in this new environment where multiple mobility providers are responding more quickly to a changing market? "

- A Transit Cooperative Research Program (TCRP)-supported study of the impact of new, technology-enabled shared mobility services on transit, including best practices and business models that public agencies can use to collaborate and grow the mobility pie for all. The study includes interviews with transit agencies and shared mobility providers, a survey of shared-mobility users, and an analysis of transit and shared-use capacity and coverage in seven U.S. cities.

- A TransitCenter-supported study of transit operators around the U.S. to identify how various forms of shared mobility impact transit. This work includes interviews with public transportation officials in six U.S. cities and best practices research and policy recommendations for transit agencies, cities and metropolitan planning organizations (MPOs).

[23] GTFS Data Exchange, http://www.gtfs-data-exchange.com/agencies.

[24] Moving Together in the 21st Century: How Ride-sharing Supports Livable Communities, U.S. Department of Transportation, Research and Innovative Technology Administration, John A. Volpe National Transportation Systems Center, June 2013.

[25] Heshuang Zeng, "Shared-use Mobility Summit Explores Future of Urban Mobility," The CityFix, October 16, 2013.

[26] James Corless, Director, Transportation for America, Interview, February 2014.

Equity and Shared-Use Mobility

Part VI

27 2015 Your Driving Costs Study, AAA, April 28, 2015.

28 Public Bikesharing in North America During a Period of Rapid Expansion: Understanding Business Models, Industry Trends and User Impacts, Mineta Transportation Institute, MTI Report 12-29, October 2014.

Expanding the Benefits for All

Shared-use mobility can be especially valuable for residents of low-and moderate-income communities. Working families spend a large portion of their income on transportation costs. A vast majority of these transportation costs are fixed because they are associated with private car ownership.

According to AAA, the average annual cost of owning and operating a mid-size car is nearly $9,000.[27] In comparison, a member of City Carshare, a non-profit carshare organization based in San Francisco, CA, pays on average $540 annually to make use of the carsharing service. Several studies have proven that carsharing members reduce or avoid purchasing cars in their household. A 2009 survey of IGO Carsharing members in Chicago found that 73% of IGO members sold a car or were able to avoid purchasing a car after joining IGO.

Yet, customers of shared mobility services largely have been younger, well-educated, upper-income residents. This is the case not only for private sector providers of carsharing, ridesharing, and ride sourcing, but also public bikesharing. Bikeshare membership has been underrepresented among people making under $50,000 in four cities where the income of members was studied: the Twin Cities, Salt Lake City, Washington D.C., and Toronto.[28] This is one reason why NACTO (the National Association of City Transportation Officials) launched the Better Bikeshare Partnership in conjunction with PeopleforBikes and The JPB Foundation to test bikesharing programs that focus on equity.

SUMC is involved in many experiments to spread the benefits of shared-use mobility. SUMC's team and partners already have learned a great deal about how to make this happen and are involved in the development of new approaches based upon this experience.

Growing Potential to Serve Low- and Moderate-Income Neighborhoods

While it is not yet fully realized, the potential for shared-use modes to serve low- and moderate-income communities has grown in the last two years. Private sector providers are working to expand their markets and are seeing their customer bases diversify. Even in neighborhoods considered hip and young, a significant share of carsharing customers are moderate-income. Service availability is expanding to moderate-income neighborhoods, other age groups, disabled passengers, and to the suburbs.

Public sector leaders have paid increased attention to improving equitable access to shared-use mobility. In particular, as cities weigh the benefits of new shared-use providers like Uber and Bridj, they are asking how these services can address accessibility issues, and what policy is needed to support these opportunities. Cities also are increasingly providing incentives for operators to serve a broader range of neighborhoods. These incentives and requirements are helping to prove markets. For example, when cities have required carsharing companies to put cars in low-income neighborhoods, the companies often have found a way to make these cars financially successful.

Public and private funders are fueling experimentation to broaden the shared-use mobility customer base. For example, the California Air Resources Board broke new ground by releasing an RFP and funding to test electric carsharing in Los Angeles' poorest neighborhoods. SUMC was part of the City of Los Angeles' successful bid on this RFP.

What Has Worked to Serve Low and Moderate-Income Neighborhoods

Nonprofit shared-use mobility providers have been targeting low- and moderate-income neighborhoods for over a decade. They succeeded in attracting diverse customers because they spent more time in communities building relationships and providing member recruitment and support than for-profit providers.

SUMC leaders Sharon Feigon, former CEO of IGO CarSharing in Chicago, and Creighton Randall, former executive director of Buffalo CarShare, are among the early operators that served low and moderate income neighborhoods.

Feigon and Randall found that success for carsharing in disadvantaged communities depended upon:

- Working with community organizations on vehicle locations for safety and visibility
- Providing payment flexibility
- Opening storefront locations in neighborhoods with staff members accessible in person and over the phone
- Hiring core staff with cultural competency and interest in social service
- Adopting a hands-on approach to customer service
- Depending more on grassroots and word-of-mouth marketing and less on Internet based outreach

Boulder Housing Partners (BHP), a local housing authority in Boulder, Colorado, has incorporated many of these practices into its relatively new partnership with eGo Carshare and Boulder B-cycle to offer 280 rental households access to multiple shared-use modes.[29] The renters receive free B-cycle bikeshare memberships, free annual transit passes and a 50 percent discount on carshare vehicles through eGo Carshare. A core aspect of the program is education and social engagement about bikesharing and carsharing, including workshops, open houses, bike rides with professional bike racers, bike repair classes and bike giveaways.

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[29] Paul Mackie, "Boulder Makes It Easy for Low-Income Residents to Take Bus, Bike, and Car-share," Mobility Lab, December 22, 2014

Bikesharing organizations also have learned a great deal about how to serve low- and moderate-income residents, including offering deeply discounted annual memberships based on income, engaging in local marketing, offering materials in multiple languages and providing access to checking accounts or credit cards. Boston's Hubway bikesharing system has sold more than 1,300 subsidized memberships, comprising more than 11 percent of its riders, compared to a U.S. average of closer to 5 percent low-income bikeshare users.[30] Nice Ride Minnesota launched the Community Partners program with Target Corporation to partner with area service organizations to recruit low-income students and residents and offer them free memberships, a helmet, a demo ride, and internet access. This program attracted 884 Minneapolis and St. Paul members by 2014.[31] Their next steps seem to echo the experience of the nonprofit carsharing companies that built demand through grassroots networking, relationship building and education. Bikesharing systems in cities such as Chicago, Austin and Cincinnati have also recently launched programs of their own to provide memberships to low-income riders.

SUMC's Role in Equity and Shared-Use Mobility

SUMC is engaged in several projects related to equity in shared-use mobility, including a pilot to develop peer-to peer carsharing models for low- and moderate-income neighborhoods in Chicago and a pilot to test electric carsharing in low- and moderate-income neighborhoods in Los Angeles.

For the peer-to-peer carsharing pilot, SUMC partnered with the Center for Neighborhood Technology (CNT) and Getaround to test three models of P2P carsharing in areas of Chicagoland with varying levels of income and transportation infrastructure. After studying two years of data from Getaround,

NYU professor Arun Sundararajan and research scientist Samuel Fraiberger found that lower-income consumers were more likely to rent from others and rent out their possessions through P2P systems. SUMC's goal is to work with Getaround to determine how to structure P2P to best serve moderate-income communities and suburban areas.[32] A Federal Highway Administration grant administered through the Chicago Department of Transportation and the Illinois Department of Transportation supports the project.

The goal of the Los Angeles carsharing pilot project is to double the presence of carsharing in the City of Los Angeles and radically improve the availability of the service to low-income Angelenos by adding 150 vehicles in disadvantaged communities. Most of these vehicles will be Battery Electric Vehicles (BEV) or Plug-in Hybrids (PHEV), and will be operated by leading industry operators who have offered to partner on this project. The City of Los Angeles is the lead agency on this proposal with SUMC as technical assistance lead. The project will also draw from a steering committee of community organizations, including the Coalition for Clean Air, Communities for a Better Environment, East LA Community Corporation, LA Mas, Korean Immigrant Workers Alliance (KIWA), Move LA, OATH Ventures and T.R.U.S.T. South LA.

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[30] Michael Kodransky and Gabriel Lewenstein, Connecting Low-Income People to Opportunity with Shared Mobility, ITDP for Living Cities, December 2014.

[31] Emily Wade, "Nice Rides for All Neighborhoods: Equity Efforts in Minnesota's Bike Share," PeopleForBikes, February 5, 2015.
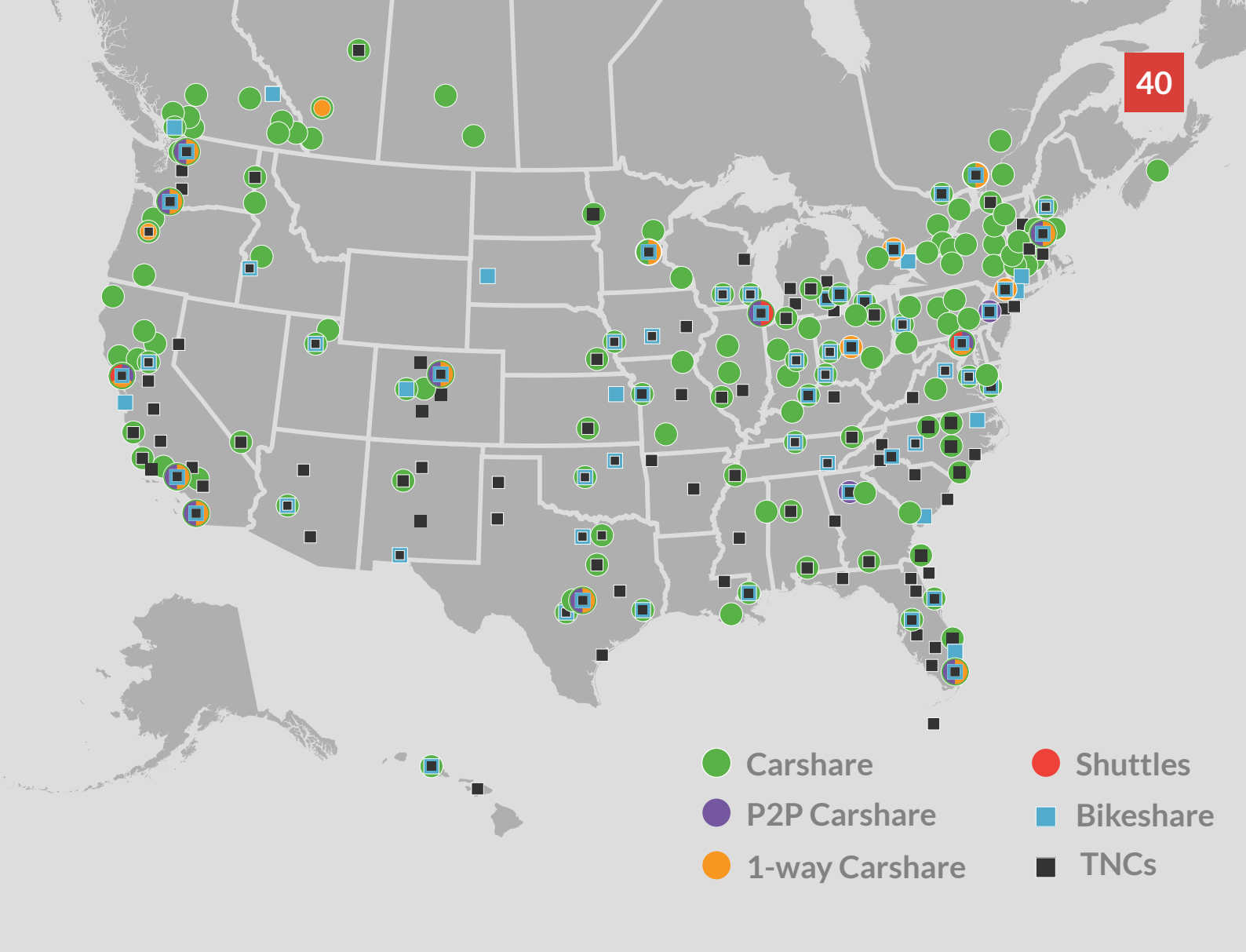
[32] Joanna Evoniuk, "How The Sharing Economy Helps Lower-income Residents," GoLocalPDX News, March 18, 2015.

# Where Shared-Use Mobility Works, Where it Doesn't, and Why

Part VII

Carshare
P2P Carshare
1-way Carshare
Shuttles
Bikeshare
TNCs

Making Shared Mobility Happen

Start-ups today are pushing new boundaries in all forms of shared mobility including bikesharing, carsharing, ridesourcing and flexible transit. In some cities, car and bikesharing have achieved enough scale to truly change the transportation landscape, while other cities have services that aren't distributed equitably, are extremely limited, or are even lacking altogether. Regardless of their progress, however, nearly every city seems to be asking the same question: what is the potential for shared mobility in our region, and how can we best tap it?

To help answer that question, SUMC has developed a model for estimating shared mobility infrastructure feasibility in a city, the benefits this infrastructure will produce, and the policy changes, if any, that are needed to make it happen.
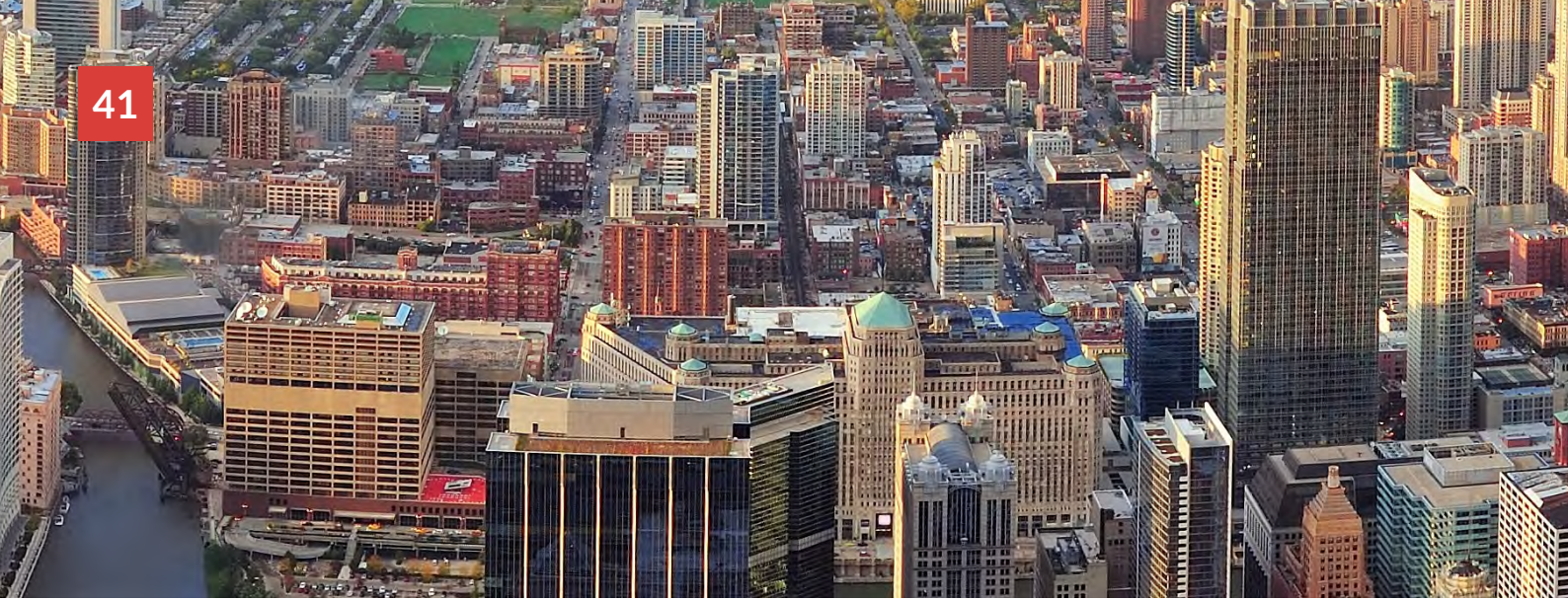
Traditional Rules for Where Shared Mobility Works

Although rapid innovation can break these rules, there are some general rules of thumb on where certain shared transportation modes work best:

- Bikeshare works best as a first-last mile transportation strategy in mixed-use neighborhoods and near transit hubs in walkable corridors with high pedestrian traffic.

- Traditional carshare works best in dense neighborhoods with low auto-ownership and high transit quality.

- One-way carshare works best as a first-last mile strategy in larger cities with progressive parking policies.

- Ridesourcing works best in walkable neighborhoods and in high to moderate-density areas within large and mid-size cities.

- Private shuttles work best as last mile connections to fixed rail for employment centers and in cities with "bottlenecks" in public transit.

- Taxi service works best in large cities with large transportation hubs.

These rules of thumb are supported by existing research which suggests that shared-use transportation modes require a minimum level of population, household density, mix of uses, percentage of transit commuters and walkability to flourish.

To date, density – both in terms of households and availability of services – has been used as the primary predictor of success for carsharing. Shared vehicles benefit from being located within a short walk of customers. At the same time, a mix of residences and businesses ensures that shared vehicles are used weekdays, weeknights, and weekends, making the numbers work.

Research has cited density as even more important for bikesharing, which depends heavily on convenience to attract riders. For instance, a recent NACTO report suggests that bikeshare stations should be no more than 1,000 feet apart—or about a five-minute walk—to attract a high volume of

riders.[33] To support the cost of so many stations, there needs to be density and walkability. Some cities are also experimenting with bikesharing systems that don't require docks, which may make it easier to flood an area with bikes. For bikesharing, the presence of good bike infrastructure, such as protected bike lanes, also is a key determinant of success.[34]

Ridesourcing is a very different kind of service, but it also depends on density and high levels of activity. According to Uber, the company is attracted to cities with large pools of potential drivers and riders. Customer data available through Uber's app tells the companies which neighborhoods are likely to have the most demand. For example, when Uber was launching in Los Angeles—a 600-square-mile area in which it had promised five-minute car pickup—it mapped the location of app downloads and used that information to focus its efforts in certain busy pockets of the city.[35]

While density matters, it may only be important up to a certain point. During her time as CEO of IGO Carsharing in Chicago, SUMC founder and Executive Director Sharon Feigon found that some of the most successful IGO neighborhoods did not have high density, including Rogers Park, the South Loop and Lincoln Square. According to Feigon, the parameters that mattered most for IGO were amenities, walkability and transit access. IGO found block size, for which data was readily available, was a good indicator of these factors.

In Vancouver, meanwhile, carshare providers are actively seeking to place services outside of established urban neighborhoods in outlying areas close to rapid transit stations and in transit development areas that are undergoing significant redevelopment and intensification.[36] The next step is to make shared-use work in areas that don't have strong transit.

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[33] NACTO Bike Share Equity Practitioners' Paper #1, National Association of City Transportation Officials, April 2015.

[34] Sarah Goodyear, "For Bikeshare Equity, Convenience is Key," Mobility Lab, April 29, 2015.

[35] Ryan Lawler, "What's next for Uber," Gigaom Research, March 12, 2012.

[36] The Metro Vancouver Car Share Study: Technical Report, Metro Vancouver, November 2014.

Unlocking the Greater Potential

Much of the research on siting shared mobility systems is now more than a decade old in an industry that has radically changed in the last 24 months. Furthermore, a new cultural context is emerging as social entrepreneurs focus on developing technological solutions that work for everyone, not just niche markets.

To help shed new light on these issues, SUMC's work has focused on adding new dimensions to existing analysis of where shared-use transportation works. Early findings show that the neighborhoods that have shared mobility-supportive qualities but do not have access to shared mobility services are often low to moderate-income. SUMC hopes that by providing the data to demonstrate the potential within these communities, it can help to eliminate misperceptions and open up new opportunities for shared mobility.

Going forward, SUMC plans to:

- Draw from its policy database to identify what types of policy intervention and support might have contributed to greater shared mobility access in some cities versus others.

- Create an expanded index tool that cities will be able to use to identify neighborhoods that have the potential to support greater levels of shared-use mobility.

- Create a process to categorize identified "opportunity areas" based on the level of existing shared-use services and the level of intervention required to achieve the potential. The categories will be whether shared mobility is likely to happen without any interventions, with moderate intervention, or only with major policy intervention.

Conclusion

The benefits of shared mobility for cities and residents are extensive. To fully realize them, however, public and private sector actors must work together to address remaining challenges related to issues such as regulation, insurance, business models and equity.

Following is a summary of the questions that must still be addressed and possible paths to answers.

Urgent Questions and Paths to Answers

What is the potential for shared-use mobility in specific cities across North America?

More research is needed to quantify the benefits of shared mobility. Greater awareness is also needed to ensure public sector stakeholders understand the potential for this new industry. Additionally, more can be done on the local level to analyze transportation gaps in cities and identify the potential for shared-use mobility expansion help create more robust transportation networks.

How can cities best use shared-use mobility?

Pilot projects allow cities to experiment and determine what modes will work best for their residents. Pilots are also vital for new modes such as electric bikesharing.

What policies are needed to make shared-use mobility successful in adding value for a city?

While many solutions are city-specific, more public sector collaboration and awareness can help spotlight innovative policies and practices for other cities to follow.

How can cities ensure shared mobility services reach low-density and low-income communities?

Cities must work to resolve remaining issues related to for-hire vehicles. New packages of regulations, incentives and funding are likely needed to expand the benefits of shared mobility to all communities.

What are the impacts of shared mobility on transit, and how can transit benefit?

More research on this subject is needed as well as more relationship building between public agencies and shared mobility providers.

The Shared-Use Mobility Center (SUMC) is a public-interest organization working to foster collaboration in shared mobility (including bikesharing, carsharing, ridesharing and more) and help connect the growing industry with transit agencies, cities and communities across the nation. Through piloting programs, conducting new research and providing advice and expertise to cities and regions, SUMC hopes to extend the benefits of shared mobility for all.

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