Integrating Shared Mobility into Multimodal Transportation Planning:

Metropolitan Area Case Studies

May 2019

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FHWA Project Contacts Corbin Davis and Harlan Miller, Office of Planning, Email: Corbin.Davis@dot.gov; Harlan.Miller@dot.gov

14. ABSTRACT
New shared mobility services have become increasingly common and transportation agencies are beginning to integrate them into regional planning processes. This report provides three case studies of how metropolitan planning organizations (MPOs) and their regional partners are integrating shared mobility into regional multimodal transportation planning. The Boston, Massachusetts, Dallas-Fort Worth, Texas, and San Francisco Bay metropolitan areas are featured. This report is a follow-up to the Federal Highway Administration White Paper "Integrating Shared Mobility into Multimodal Transportation Planning: Improving Regional Performance to Meet Public Goals" (FHWA-HEP-18-033).

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Abbreviations and Symbols

ABAG	Association of Bay Area Governments
ADA	Americans with Disabilities Act
API	Application Programing Interface
BAAQD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
DART	Dallas Area Rapid Transit
DCTA	Denton County Transportation Authority
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HOV	High-Occupancy Vehicle
IRS	Internal Revenue Service
IT	Information Technology
ITS	Intelligent Transportation Systems
LA Metro	Los Angeles County Metropolitan Transportation Authority
LRTP	Long Range Transportation Plan
MAPC	Metropolitan Area Planning Council
MaaS	Mobility as a Service
MOD	Mobility On Demand
MPO	Metropolitan Planning Organization
MTC	Metropolitan Transportation Commission
NCTCOG	North Central Texas Council of Governments
RFP	Request For Proposals
RTP/SCS	Regional Transportation Plan / Sustainable Communities Strategy
SF Bay	San Francisco Bay
SFCTA	San Francisco County Transportation Authority
SFMTA	San Francisco Municipal Transportation Agency
TDM	Transportation Demand Management
TIP	Transportation Improvement Program
TNC	Transportation Network Company
TTI	Texas A&M Transportation Institute
UPWP	Unified Planning Work Program
VMT	Vehicle Miles Traveled

Introduction

Shared mobility options have become common in many U.S. cities, and enthusiasm may be growing, with new services appearing every year. Most recently, shared electric bicycles and scooters, carpooling applications (apps) and an expanding array of microtransit operations have joined transportation network companies (TNCs), carsharing, bikesharing, and other more established shared mobility services in many cities. These services are making a notable impact on how people travel, particularly in urban areas. This report features three case studies of how metropolitan planning organizations (MPOs) and their regional planning partners are working with each other, and shared mobility companies, to integrate these new options into regional multimodal transportation networks in ways that improve system performance and support regional goals.

The case studies capture the distinct and complementary roles of the various transportation stakeholders who share responsibility for planning, funding, and operating a regional multimodal network. The case studies feature the work of MPOs because of their central role in metropolitan transportation planning and the programming of federal, and other, transportation funds. However, transit agencies and local governments are often on the front lines of shared mobility partnerships and their activities are also featured throughout.

The three case studies in this report include:

Boston, Massachusetts: Regional planning agencies and local governments coordinating pilots, sharing lessons learned, and funding research to understand how to better integrate shared mobility into the multimodal system.

Dallas-Fort Worth, Texas: A growing number of partnerships across the region presents opportunities to coordinate and fund shared mobility pilots, share best practices, and expand transportation options in fast-growing areas.

San Francisco Bay Area, California: MPO partnerships with shared mobility companies and the regional transit agency promote new carpooling options, gather new data, and support more efficient use of transportation resources.

Background

In February 2018, the Federal Highway Administration (FHWA) Office of Planning published a white paper, *Integrating Shared Mobility into Multimodal Transportation Planning: Improving Regional Performance to Meet Public Goals*, which presented a framework for integrating emerging shared mobility services into multimodal transportation planning at a regional scale. The white paper synthesizes emerging practices and strategies for shared mobility planning in 13 metropolitan areas, identifies opportunities and challenges, and features several short examples.

This follow-up report examines three metropolitan areas in greater depth, detailing their different approaches to shared mobility partnerships, pilots, and planning practices. The case studies illustrate how MPOs and their planning partners are interacting with shared mobility companies to serve regional transportation planning goals.

Shared Mobility Terminology

Because shared mobility technologies provide novel transportation services and business models, shared mobility terminology can be difficult to standardize. This report adopts definitions that are based on FHWA's *Shared Mobility: Current Practices and Guiding Principles*, and SAE International's *Taxonomy and Definitions for Terms Related to Shared Mobility and Enabling Technologies* (Standard J3163_201809), including the following definition of shared mobility:

> *Shared mobility is the shared use of a vehicle, motorcycle, scooter, bicycle, or other travel mode; it provides users with short-term access to a travel mode on an as-needed basis. Shared mobility includes various travel modes and service models that meet the diverse needs of users, and can include station-based roundtrip services, station-based one-way services, and free-floating one-way services (SAE International Standard J3163_201809)*

Table 1 provides definitions for shared mobility terms referenced in this report, recognizing that new services are constantly being introduced and that this may require definitions to evolve. Additional context and terms can be found in the FHWA and SAE resources linked above.

Table 1: Definitions of Shared Mobility Terms

Bikesharing	Users access bicycles on an as-needed basis for one-way (point-to-point) or roundtrip use. Station-based bikesharing kiosks are typically unattended, concentrated in urban settings, and offer one-way station-based access (bicycles can be returned to any kiosk).
Carsharing	A program where individuals have temporary access to a vehicle without the costs and responsibilities of ownership. Individuals typically access vehicles by joining an organization that maintains a fleet of cars and light trucks deployed in lots located within neighborhoods, public transit stations, employment centers, and colleges/universities.
Dockless Bikesharing	Also sometimes called "free-floating bikesharing" dockless bikesharing offers users the ability to check-out a bicycle and return it to any location within a predefined geographic region. These systems do not typically use kiosks or stations.
First/last mile transit connections	A trip is a journey from an origin to a destination. Travelers may use a number of transportation modes and services – often in combination – to complete a journey. Public transit services form the core of many trips, but travelers often need to complete the first and last portion of a journey via a different mode, connecting to or from a transit stop. This is referred to as the "first/last mile connection," although the actual distance may vary. While the majority of these connections are made on foot, shared mobility services are increasingly popular options for first/last mile transit connections, particularly those that may be too far for many travelers to walk.[1]

[1] This definition is adapted from Los Angeles Metro's *First Last Mile Strategic Plan*.

Microtransit	Includes both fixed route and fixed schedule microtransit and flexible route and on-demand microtransit. Fixed route and fixed schedule microtransit occurs where the routing and arrival/departure times of the shared vehicles are fixed. The alignment of routes, however, can be "crowdsourced" (i.e., users can request origin-destination points on a tech-enabled platform that can inform the operators of which routes to introduce). Users of on-demand microtransit can request shared vans or buses in real time through a tech-enabled application, and the vehicle will deviate from its route to somewhere within walking distance of the requester. These services can range in how dynamic they are—from routes that change over the span of a few days to fully dynamic routes that adjust in real time based on traffic and demand.
Scooter Sharing	Scooter sharing allows individuals to access scooters by joining an organization that maintains a fleet of scooters at various locations. Scooter sharing models can include a variety of motorized and non-motorized scooter types. The scooter service provider typically provides gasoline or electric charge (in the case of motorized scooters), maintenance, and may include parking as part of the service. Users typically pay a fee each time they use a scooter. Trips can be roundtrip or one way.
Transportation Network Company (TNC)	Transportation network companies (also known as ridesourcing provide prearranged and on-demand transportation services for compensation, which connect drivers of personal vehicles with passengers. Smartphone mobile applications are used for booking, ratings (for both drivers and passengers), and electronic payment.

Key Findings and Examples

Efforts to integrate shared mobility services into regional multimodal transportation planning reveal a range of opportunities and challenges being negotiated at both regional and local scales. The Boston, Dallas-Fort Worth, and the San Francisco Bay metropolitan areas provide examples of how practitioners are working with a variety of planning and policy tools to guide their regions toward a future where shared mobility services may advance transportation planning goals.

MPOs are playing important roles in bringing shared mobility into the regional multimodal transportation planning process. Some key findings and examples from the case studies featured in this report include:

MPOs and partners are working together to create forums for sharing lessons and knowledge related to shared mobility. MPOs approach transportation planning with a multimodal and regional perspective, making them natural venues to convene regional stakeholders to share best practices, discuss challenges, and develop coordinated strategies for working with shared mobility companies to advance priority goals identified through the transportation planning process, as illustrated in Figure 1.

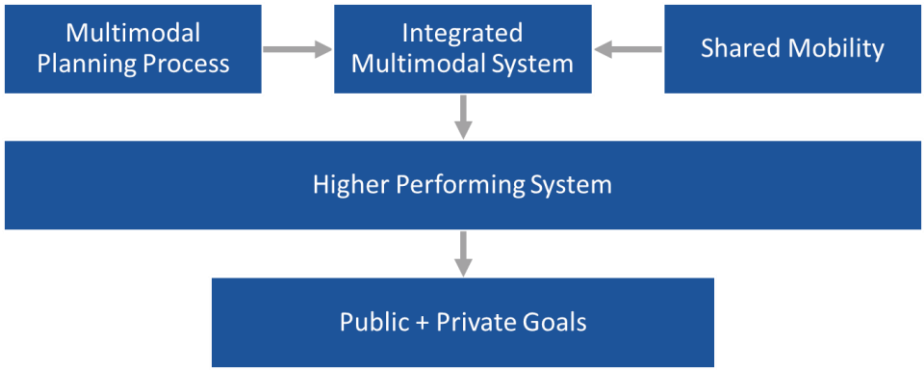

Figure 1: Integrating Shared Mobility with the Multimodal Planning Process to Meet Public Goals

- In Boston, transportation stakeholders from across Massachusetts attended a forum hosted by the Metropolitan Area Planning Council (MAPC) to share lessons learned from experiences working with TNCs and other shared mobility providers throughout the state.

- The North Central Texas Council of Governments (NCTCOG) Mobility on Demand (MOD) Working Group provides a forum for transit agencies, shared mobility companies, local governments, and others in the Dallas-Fort Worth region, to coordinate on shared mobility pilot projects and begin to shape ideas for how shared mobility could be a more integrated part of the regional transportation system.

MPOs are well-positioned to support promising shared mobility planning studies and pilot projects in their regions. Because of their roles conducting regional transportation planning and programming transportation funds, MPOs occupy a unique postion in many regions. In addition to planning for the regional multimodal system, MPOs can provide technical assistance to local governments and transit agencies, and help develop common approaches to working with shared mobility companies. Over time, these efforts may build regional knowledge about how shared mobility works, its potential to

contribute to regional mobility and accessibility, and challenges that need to be addressed to better integrate these services into multimodal travel.

- The Boston Region MPO programed funding in its fiscal year 2019 Unified Planning Work Program (UPWP) to support a dockless bikeshare procurement and vendor selection process for several suburban towns. The funding enabled MAPC to facilitate the conversation between the municipalities and private service providers, and ensure that the project development included procurement best practices

- NCTCOG programmed federal, state, and local funds for shared mobility projects, including a microtransit pilot in Arlington, Texas with Via, and others.

- The Metropolitan Transportation Commission (MTC) in the San Francisco Bay Area supported the development of a partnership between Bay Area Rapid Transit (BART) and carpooling startup Scoop to promote carpooling to BART park and ride locations. Although BART chose to end the partnership after approximately two years, BART staff consider it to have been a successful experiment, which allowed it to learn and grow expertise in app-based carpooling. MTC also has a partnership with Scoop to promote regional carpooling.

Pilot projects and partnerships provide important opportunities to experiment with shared mobility business models. Agencies in all three case studies featured in this report have been involved to some degree in brokering and managing partnerships with shared mobility providers, and a number have led pilot projects. These demonstrations have been met with mixed success.

- MTC is working with startup shared mobility companies that offer carpooling services. The partnerships have expanded the reach of MTC's carpool program and provided access to some valuable usage data. However, some companies have shifted business models or failed to honor all aspects of their agreements, and sometimes the data these companies share with MTC is not as useful or comprehensive as initially hoped for.

- In the Dallas-Fort Worth area, transit agencies are experiementing with numerous microtransit pilots that extend the reach of fixed route transit options, often serving growing areas in the region. Some of the agencies are also working to integrate shared mobility services into transit payment and trip planning apps, fostering connectivity between established and emerging services. Transit agencies throughout the region continue to expand partnerships with shared mobility companies.

Updating models and planning frameworks to better integrate shared mobility is a priority. MPOs are responsible for maintaining important data, tools, and frameworks for guiding regional planning activites, including regional travel demand models. Some MPOs are working to improve the capabilities of these models to account for the rising popularity of shared mobility services and make effective use of data from shared mobility companies, when available. Advancements in this area are needed to better forecast the potential effects of rising shared mobility use on regional transportation goals such as congestion reduction, air quality improvement, affordability, and many other factors.

- The Boston Region MPO programed funds in its fiscal year 2019 UPWP for regional model enhancements, including incorporating TNCs into the regional travel demand model. These and other updates will allow the MPO to better capture how TNCs factor into regional travel patterns.

- NCTCOG is working with the University of Texas-Austin to research ways to better incorporate shared mobility into travel modeling and forecasting.

Framework and Integration Models

The case studies use an analytical framework for conceptualizing how shared mobility can be integrated into regional multimodal planning. This framework and four potential models describing how shared mobility integration may occur in a region were first introduced in the FHWA white paper *Integrating Shared Mobility into Multimodal Transportation Planning: Improving Regional Performance to Meet Public Goals*. A brief summary of the framework and models of integration can be found below.

Conceptual Framework for Shared Mobility Integration

Figure 2 provides a framework for visualizing how shared mobility may fit into the regional transportation planning process.

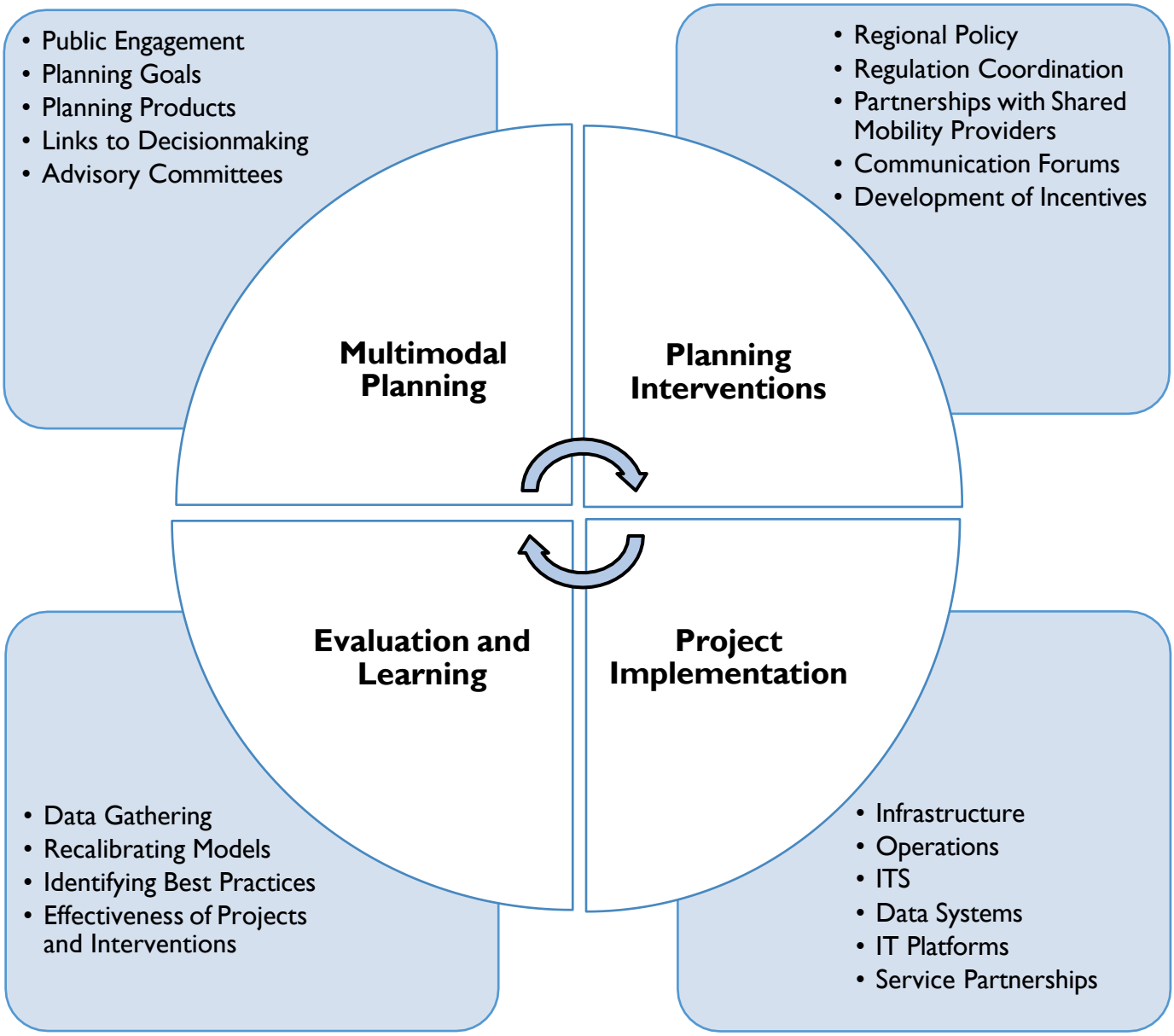

Figure 2: Conceptual Framework for Visualizing Shared Mobility Integration with Regional Multimodal Planning Process

Multimodal Planning

Public planning goals and public engagement are at the core of the regional planning process. It is from this foundation that MPOs and other public agencies collect data, conduct technical analyses, develop project ideas and assessments, define performance measures, and synthesize results into plans. These, in turn, inform a host of decisions about how transportation funds will be invested and the types of planning interventions and implementation actions the region will pursue. This is no different in a shared mobility context. Planning agencies work to account for shared mobility services as they identify strategies to improve the overall performance of the regional system. MPOs and their partners approach shared mobility as one of many strategies that can help a region achieve its transportation goals, as a risk to be planned for or mitigated, or both. MPOs also often organize technical advisory committees to inform the work of the organization on special topics. MPOs may consider inviting shared mobility providers to participate in technical advisory committees as one way of integrating them into the regional planning process.

Planning Interventions

Planning interventions are the mechanisms through which MPOs and their partners seek to achieve the region's goals. In a shared mobility context these may take a number of different forms, including development of regional policies, coordination of local or state regulations, interagency coordination, partnerships with shared mobility providers, development of new outreach materials, or the development of incentives for shared mobility providers to engage in the regional planning process, to name a few examples.

Project Implementation

Implementation of identified planning interventions is often in the form of options to fund infrastructure, operations and maintenance, or Intelligent Transportation Systems (ITS) projects. Shared mobility opportunities and risks, played out through the planning process, will likely inform future infrastructure decisions – regions may have different infrastructure needs in a high-tech shared mobility future. However, other types of projects may also be needed to ensure that public planning goals are being advanced, either new and innovative projects or enhancement of traditional projects. For example, metropolitan areas are taking creative approaches to the use of publically-owned curb spaces, bus stops, drop-off zones, managed lanes, and enhanced features in mobility hubs to accommodate shared mobility providers under negotiated terms. Non-physical infrastructure investments in data systems, information technology (IT) platforms, and service partnerships with shared mobility providers are examples of potential future projects which may come from the integration of shared mobility into the planning process.

Evaluation and Learning

Because technologies are changing rapidly and because MPOs and their partners are still learning how to effectively integrate them into the planning process, it will be important to evaluate the effectiveness of planning interventions and resulting projects. MPOs and their partners are accustomed to monitoring and evaluating the results of plans and investment decisions, and can use data from pilot projects, engagement with shared mobility companies, and regulatory agreements to recalibrate models, identify best practices, and update regional plans and policies to reflect an improved understanding of how shared mobility can successfully fit into regional transportation networks. As technologies continue to change, finding ways to learn and adapt quickly may be increasingly critical for MPOs and partners to remain effective.

Models for Describing Early-Stage Development of Shared Mobility Planning in Metropolitan Areas

MPOs and their partners are just beginning to experiment with integrating shared mobility into the regional transportation planning process. There is no one size fits all approach. However, there are some patterns worth exploring to help understand how this is taking place and to help regions learn from each other. This section proposes four models for generalizing the unique ways in which shared mobility is being integrated into regional transportation planning in the metropolitan areas researched. These models can be seen as developing either bottom-up from the local level and then influencing regional and statewide approaches, or strategically from the top-down.

The following examples illustrate key concepts, with a recognition that every region is unique and that many exhibit characteristics of two or more models.

Lighthouse Model

In many regions, a champion has emerged on this topic. In this model, one individual or agency is taking the lead and formulating an approach to integrating shared mobility while also encouraging partners to follow a similar path.

Strategic Model

Some regions appear to be focusing on high-level strategic planning and long-range visioning in their approach to incorporating shared mobility into transportation planning. In this model, strategies and projects to address shared mobility might filter down from the regional level to the local level and may influence policies at the statewide scale or in other areas of the state.

Operational Partnership Model

Transit agencies and MPOs in several regions are experimenting with pilot projects and partnerships where they work directly with shared mobility providers – TNCs and bikesharing systems in particular. In some of these regions, public planning agencies are learning about shared mobility and building relationships primarily through partnerships that begin to address system operations (i.e., first/last mile transit connections, ridematching and carpooling services) with less of an emphasis on long-range strategic planning.

Watch and Learn Model

Transportation technologies are changing rapidly, with further and more extreme changes on the horizon. Many regions are unsure of how to proceed with shared mobility planning, but at the same time, recognize the potential benefits and risks. Several planning agencies are taking somewhat of a watch and learn approach to shared mobility planning, focusing primarily on research and thought leadership roles in the short term with an eye towards how these changes may affect their planning processes in the longer term.

Case Studies

This section features case studies of shared mobility planning in three metropolitan areas (Figure 3):

- Boston, Massachusetts (p. 7)
- Dallas-Fort Worth, Texas (p. 14)
- San Francisco Bay Area, California (p. 24)

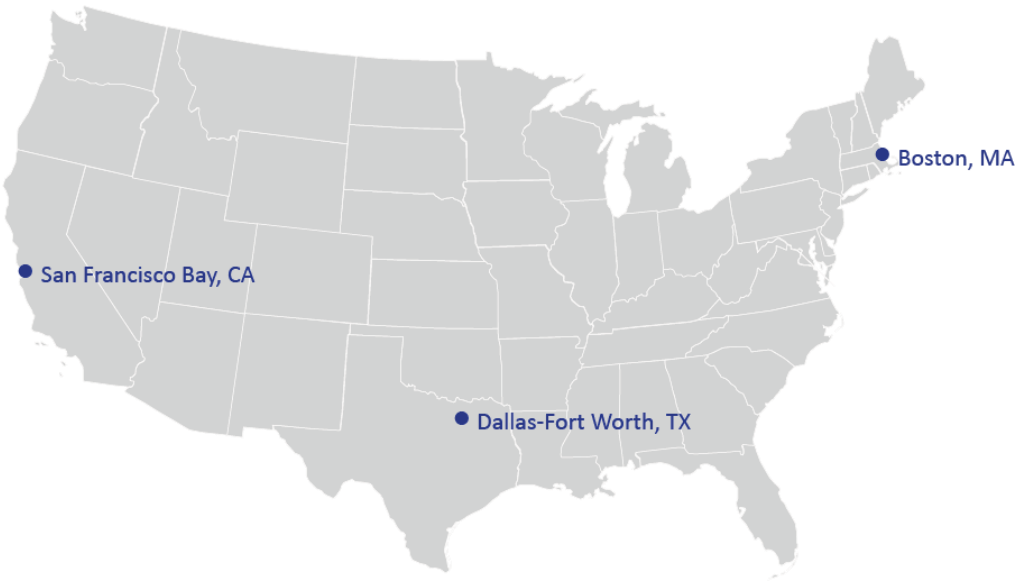

Figure 3: Map of Case Study Metropolitan Areas

Each case study features a description of shared mobility planning and partnerships in the region, activities of the MPO and other regional planning and transportation agency partners, initial lessons learned from the case study, and a description of how the region's activities can be conceptualized using the framework from FHWA's *Integrating Shared Mobility into Multimodal Transportation Planning: Improving Regional Performance to Meet Public Goals*.

Regional Shared Mobility Planning Case Study: Boston, Massachusetts

Introduction

The Boston Region Metropolitan Planning Organization (MPO), the MPO conducting transportation planning for the core of the Boston metropolitan area, plays a key role in advancing planning for emerging transportation technology in the region. Boston is also home to a regional planning entity, the Metropolitan Area Planning Council (MAPC), which serves on the MPO board and is an important partner in regional planning efforts. Together, MAPC and the Boston Region MPO have taken a proactive approach to integrate shared mobility into multimodal transportation and land-use planning. The agencies have focused primarily on coordinating and convening transportation stakeholders across levels of government, collecting and integrating new data sources into regional planning tools, and highlighting the potential benefits of shared mobility services to advance public goals through targeted technical assistance and project development.

The Boston region's urban core is distinct for the densely-populated employment centers in the cities and towns bordering the City of Boston itself. MAPC and the Boston Region MPO have fostered a forward-looking and successful regional perspective on shared mobility planning despite the region's complex governance structure that includes over 100 local governments and several state agencies with related roles and shared responsibilities for regional transportation planning across the metropolitan area.

Case Study Highlights

MPO uses federal planning funds to research the use of curbside lanes by shared mobility services and explores potential initiatives to better manage curb space.

Regional planning council hosted a "ride hailing forum" in September 2018 to help its local government members to discuss lessons learned from partnerships with shared mobility companies.

The MPO and MAPC are advising smaller towns and cities in negotiating agreements with shared mobility providers, and have established a Suburban Mobility Working Group to promote a regional dialogue.

The Boston region's approach illustrates aspects of the Lighthouse and Watch and Learn models described in the Federal Highway Administration (FHWA) white paper, *Integrating Shared Mobility into Multimodal Transportation Planning: Improving Regional Performance to Meet Public Goals*.

By convening a Suburban Mobility Working Group and beginning to integrate shared mobility data into regional planning models, the Boston Region MPO has highlighted promising approaches to integrating shared mobility into planning, and is facilitating the adoption of these approaches among partners in the region (Lighthouse Model).

Boston's planning agencies have served as thought leaders in the region through a number of research efforts, including work investigating the impact of shared mobility on curb space usage, and have worked to identify promising practices from pilot partnerships and other demonstrations (Watch and Learn Model).

Shared Mobility Context in the Region

- **Taxis and Transportation Network Companies (TNCs)** serve the entire Boston metropolitan planning area. Taxis have been mainstays in the region for decades and Boston was one of the first metropolitan areas where TNCs started in the early 2010's. TNCs operating in Boston have explored a range experimental business models that go beyond traditional car service. These additional services include pooled and "express pooled" rides, as well as well as rides in wheelchair-accessible vehicles.

- **Microtransit** services were previously offered by local start-up Bridj, which operated a dynamically-routed shuttle bus between 2014 and 2017. Boston is still served by a number of traditional commuter and corporate shuttle buses, but on-demand microtransit service has yet to return.

- **Bikesharing** has been prominent in Boston's urban core since the launch of the region's traditional docked system, BlueBikes (formerly known as Hubway), in 2011. BlueBikes continues to expand throughout Boston, Cambridge, Somerville, and Brookline, and will be adding nine new stations in Everett in 2019. Dockless bikesharing was first offered in Cambridge in 2016 through local start-up Ant Bicycle. In 2018, LimeBike rolled out 1,500 dockless bikes in predominantly suburban municipalities across the region under an arrangement with MAPC, which is detailed later in this case study.

- **Electric scooter sharing** has thus far been fairly limited in the Boston region due to existing statewide laws limiting their use. Start-up Bird started service in Cambridge and Somerville during the summer of 2018, but was quickly forced to suspend service by local officials. As of spring 2019, electric scooters are only permitted in one municipality in the region, Brookline, as part of a pilot project between the town and scooter operators Bird and Lime.

- **Carsharing** has been common in the Boston region for over a decade. The largest carsharing company, Zipcar, started there in 2000, and today there are several providers. In addition to traditional carsharing business models, Boston is also home to a number of peer-to-peer car sharing services like Getaround and Turo.

- **Automated Vehicle Pilots** have been conducted in Boston since the start of 2017, after the city created a designated automated vehicle testing area in the Seaport District. In 2018, the Seaport District was home to an automated vehicle TNC pilot operated by nuTonomy, in partnership with Lyft, which matched Lyft customers with automated vehicles on some journeys within the designated testing area. In 2019 there are plans to expand these automated services to other neighborhoods in the city.

Situating Shared Mobility within the Regional Vision

Planning activities in the region are guided by a 20-year vision and strategy for a modern, safe, equitable, accessible, sustainable, and technologically advanced transportation system for the Boston Region. This vision is described in the MPO's latest collaborative Long-Range Transportation Plan (LRTP), *Charting Progress to 2040*, and is set to be expanded in the next LRTP currently under development, Destination 2040 (Figure 4). The forthcoming LRTP will build upon six primary goals that range from safety and environmental quality improvements,and economic development targets. Capacity Management and Mobility is included among the six goals reflecting the region's focus on using the capacity of existing transportation facilities more efficiently and increasing healthy transportation capacity through improvements in pedestrian and bicycle infrastructure. The MPO and its partners have aligned shared mobility-related initiatives within the Capacity Management and Mobility plan goal area, because expansion of these services has demonstrated potential to enhance network connectivity and improve the efficiency of multimodal trips.

Figure 4: Logos of Boston Region MPO Long-Range Transportation Plans
Source: Boston Region MPO

Charting Progress to 2040 broadly emphasizes the use of new technology to provide equitable access and enhance mobility in the region. The Boston Region has taken steps to implement the vision and meet long-term goals through a range of projects and initiatives. These activities are reflected in the subsequent planning documents that derive from the LRTP's central vision, such as the Transportation Improvement Program (TIP), which captures investment decisions over a 5-year period, and the Unified Planning Work Program (UPWP), which explains how the MPO will use transportation planning funds in upcoming fiscal years. The UPWP is a strategic document that identifies data needs, lays the groundwork for data collection, and develops project concepts for future investment. On the whole, the UPWP demonstrates how the region will advance system-wide performance goals and establishes roles for the various planning entities and other transportation stakeholders operating across the metropolitan area.

Identifying Opportunities to Integrate Shared Mobility

The UPWP for fiscal year 2019 funds a number of discrete initiatives related to emerging technology that provide insights into how the MPO and its partners are approaching shared mobility planning. Looking at the UPWP in relation to the vision and goals established in the LRTP, there are three key observations:

- **First/last mile transit connections**: Although shared mobility has a variety of impacts across the regional network, the MPO and its partners agree that these services may be especially useful in solving first/last mile transit connectivity issues in suburban communities.

- **Collecting and integrating data:** The MPO is actively engaging shared mobility providers in the region, coordinating data collection efforts, and working to integrate these data into the regional travel demand model and related planning tools.

- **Shared mobility and travel behavior research**: Given the general uncertainty around how transportation network companies (TNCs), bike sharing services, and electric scooter sharing start-ups may ultimately influence travel behavior and overall performance of the multimodal system,

the MPO and its partners are focusing on research, coordination, and technical assistance efforts that may inform future interventions and investments related to shared mobility.

These observations, supported by conversations with staff at the MPO and MAPC and highlighted in the UPWP activities discussed below, demonstrate a clear link to the Boston Region's LRTP framework. These efforts aim to enhance connectivity through a proactive approach to integrating new technologies into the planning process, which is consistent with the Capacity Management and Mobility goal of the regional LRTP. The convening and research activities funded through the UPWP also illustrate how regional coordination and strategic planning functions are fundamental to approaching shared mobility at a regional scale.

Research and Data Collection Projects

Boston's regional planning organizations are heavily involved in research on the impacts of TNCs, such as Uber and Lyft, and are beginning to explore broader implications for the regional network that may stem from a convergence of shared mobility and automated vehicle technology.

The UPWP for fiscal year 2019 funds research into the use of curbside lanes by shared mobility services and explores potential initiatives to better manage curb space. This example illustrates the strategic nature of the approach, while also highlighting the connection to the region's broader public purpose goals as captured in the LRTP (in this case, opportunities to better manage curb space may directly benefit the Capacity Management and Mobility goal cited above).

MAPC and MPO staff work together to prioritize and fund planning and research activities in the UPWP (Figure 5). As a state entity and member of the MPO board, MAPC brings its regional focus on comprehensive planning, research rigor, and technical expertise to exploring wide-ranging transportation trends that can contribute to the strategic direction of the Boston Region MPO's transportation planning functions and project investment decisions. This fruitful research partnership has yielded benefits that go beyond the day-to-day technical assistance and implementation support activities that have traditionally been undertaken by MAPC, as they support the MPO's forward-looking foundation and facilitate informed planning and investment decisions around emerging technology.

Figure 5: Boston Region MPO fiscal year 2019 UPWP Logo
Source: Boston Region MPO

The Boston Region MPO is interfacing directly with shared mobility providers in order to coordinate data collection, and is integrating new data sources into regional models and decision-making tools. Data partnerships with shared mobility providers are an emerging trend in large metropolitan areas, and the MPO is leading efforts to use these data in the regional planning process. As the "keeper" of the regional travel demand model, which serves as an important technical tool in understanding changes in travel behavior and the impact of new services, the Boston Region MPO is well-positioned to incorporate insights from shared mobility data into planning decisions. To this end, the MPO is currently working to update the model so that it can accept data from shared mobility services in the region, such as bikesharing. These data will help stakeholders understand the relative contribution of shared mobility services to regional travel characteristics such as mode-share, and vehicle-miles or hours traveled. The MPO also hopes shared mobility data will help it understand and illustrate the linkages between these services and public transit services. Beyond the technical work associated with updating the model, the MPO has also served an important coordination role in negotiating for and brokering new data sharing agreements with private service providers.

Convening Stakeholders and Sharing Best Practices

MAPC is an active voice in the regional dialogue and organizes a number of convening and coordinating activities with participation from the Boston Region MPO. In response to the fact that shared mobility is new, evolving, and difficult to "get right" in a more formal policy or regulatory context, MAPC has taken a results-oriented approach to introducing the region to new and challenging ideas, and is listening closely to the technical assistance needs articulated by its local community partners. The bulk of this effort has been to create opportunities to share ideas and have a regional conversation about shared mobility, such as a recent forum on TNC partnerships and the newly-created Suburban Mobility Working Group, both discussed in more detail below.

MAPC hosted a Ride Hailing Partnerships Forum in September 2018 to help local governments share lessons learned from partnerships with companies like Uber and Lyft (Figure 6). MAPC recognized that many suburban municipalities were considering ways to complement their mobility services with private partnerships that leverage existing transit agency fleets. The ride hailing forum - MAPC uses the term ride hailing in place of TNC or ridesourcing, as is sometimes common - gave local leadership, planners, and technical committee members an opportunity to hear directly from experienced public agencies on the benefits and challenges of working with TNCs. A summary of the forum can be found here. In 2019, MAPC, the Massachusetts Department of Transportation (MassDOT), and the Boston Region MPO will conduct follow up research on how these and other TNC partnerships may help suburban and rural communities meet mobility and transit connectivity needs.

Figure 6: MAPC Ride Hailing Partnerships Forum Promotional Graphic.
Source: MAPC

Enhancing Suburban Mobility and First/Last Mile Transit Connectivity

Through convening activities, the Boston Region MPO and MAPC identified a trend among suburban municipalities: they are interested in experimenting with private mobility providers to address first/last mile transit connectivity and expand their paratransit and elderly transportation services. These shared mobility strategies fall directly in line with LRTP objectives.

Partnerships with shared mobility companies are common in the region, and the MPO is providing technical assistance to support smaller municipalities in navigating them. The strategies mentioned above have become familiar in the region – the Massachusetts Bay Transportation Authority, the regional public transit provider, has piloted a program that subsidizes TNC trips for paratransit-eligible riders. Boston and neighboring core cities have sponsored the regional station-based bikesharing program (Bluebikes) based on a public-private model. Suburban officials have looked to these examples for inspiration, and the Boston Region MPO and MAPC are taking steps to support their constituent communities in addressing the challenges specific to a suburban operating environment.

One example of MAPC's technical support for suburban shared mobility comes from the recent procurement of a dockless bikesharing system for several communities (Figure 7). With the emergence of dockless bikesharing in the metro area, a growing number of municipalities wanted to pursue partnerships with providers to provide a flexible option for first/last mile transit connections and nonmotorized trips. The municipalities banded together and, in pursuit of an efficient, coordinated agreement across town lines, came to MAPC for procurement support. MAPC was able to facilitate the conversation between the municipalities and private service providers, and ensure that the project development included procurement best practices (e.g., a competitive bidding process that elicits bids from multiple providers, as opposed to a sole-source procurement). In providing transaction advice, MAPC was able to advocate for incorporating public planning goals in the procurement documents – for example, requiring a subsidized low-income fare for qualifying riders and developing a public awareness campaign to promote widespread and equitable use of the service.

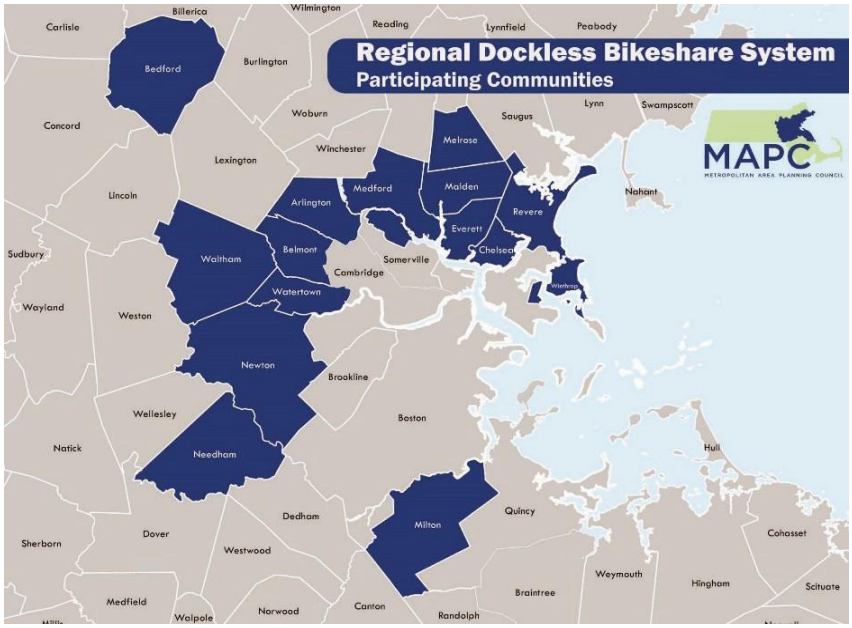

Figure 7: Communities Participating in the Suburban Boston Dockless Bikesharing System
Source: MAPC

More recently, MAPC has entered into an agreement to help several rural communities explore microtransit options to close the gaps in current transit coverage. This effort will include a request for information from microtransit vendors to better understand the various service models and possible uses in order to determine if microtransit might be an effective option to help close the transit coverage gaps in these rural areas.

The Boston Region MPO and MAPC's successes in integrating shared mobility into planning and programming processes for the region's suburban communities has led to the creation of a formal Suburban Mobility Working Group. The working group, which meets quarterly, brings together representatives from the MPO, MassDOT, and MAPC and provides a regular forum for discussing issues related to suburban mobility. The activities of this group helped the Boston Region MPO develop a program with approximately $2 million of TIP funds per year to support community and suburban transportation efforts that improve first/last mile transit connections, including shared mobility projects.

Initial Lessons from the Boston Region's Experience with Shared Mobility Planning

- **MAPC and the Boston Region MPO are logical conveners of shared mobility stakeholders in the region** because both operate at a regional scale and have regional planning and programming responsibilities. This regional scope and perspective allows the agencies to facilitate information sharing across jurisdictions and help municipalities work towards a common, consistent approach to shared mobility services.

- **MAPC and the Boston Region MPO's work with suburban municipalities on shared mobility planning and procurement has helped the region tackle new and challenging issues**, and has provided a venue to elevate policies and strategies consistent with regional transportation goals.

- **The City of Boston and the Massachusetts Bay Transportation Authority are logical first-actors in the region** as they have both the incentives and policy and regulatory tools necessary to address pressing transportation issues. MAPC and the Boston Region MPO have been instrumental in integrating these experiences into a longer-term regional vision and disseminating knowledge and practices across the region.

- **The Boston Region MPO and MAPC bring a research rigor to exploring emerging policy and regulatory issues born by shared mobility services**, such as the management and use of curbside space, and can help translate findings into action.

- **The Boston Region MPO and MAPC have been successful in facilitating agreements and ensuring new data sources are integrated into existing tools and decision-making frameworks**, such as the regional travel demand model. MAPC has also worked to address the challenges individual municipalities face in brokering service agreements with the private sector through targeted technical assistance.

Boston Region Shared Mobility Planning in the Context of FHWA Framework

The FHWA whitepaper, *Integrating Shared Mobility into Multimodal Transportation Planning: Improving Regional Performance to Meet Public Goals*, describes a framework (Figure 8) for how shared mobility can be integrated into the existing regional multimodal transportation planning process. Activities in the Boston Region fit into all four parts of the framework:

Multimodal Planning

- The Boston Region MPO is using products of the federally-required transportation planning process – like the UPWP, TIP, and the metropolitan transportation plan – as a means for integrating shared mobility into regional multimodal system planning.

Planning Interventions

- MAPC and the Boston Region MPO have developed a number of planning initiatives to facilitate integration of shared mobility to meet public goals.

- These interventions include the Suburban Mobility Working Group and the ride hailing forum.

Project Implementation

- The Boston region implemented a number of projects that incorporate shared mobility services, including the dockless bikesharing scheme procured by suburban municipalities with assistance from the MPO and MAPC.
- This example is one of a number of service partnerships stakeholders in the region have pursued in order to bolster paratransit services and enhance first/last mile transit connectivity.

Evaluation and Learning

- Boston Region MPO and MAPC lead efforts to collect and integrate shared mobility into the planning process, including updates to the regional travel demand model.

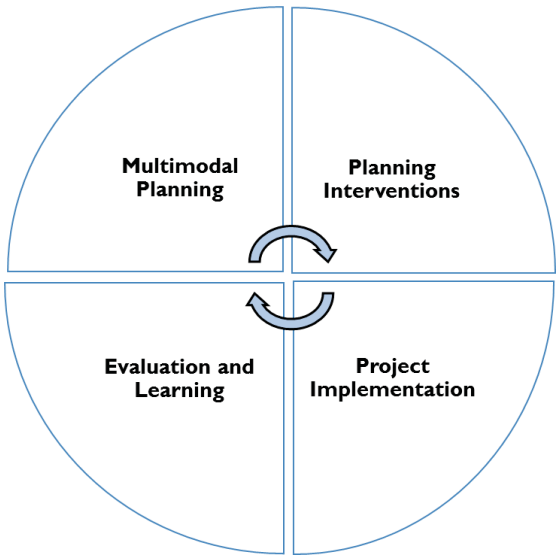

Figure 8: Conceptual Framework for Visualizing Shared Mobility Integration with Regional Multimodal Transportation Planning Process

- The region has also taken a proactive approach to researching policy implications of shared mobility, vetting promising approaches to integrating these services into planning and operations, and disseminating best practices among transportation stakeholders and member communities.

Looking Ahead

The Boston Region MPO and MAPC continue to work together on a strategic approach to integrating shared mobility into the regional transportation planning process through forward-thinking research and regular coordinating and convening efforts among its partners.

- With the rising popularity of electric scooter sharing services in cities across the country, MAPC is coordinating permitting and licensing for scooter sharing in the Boston region with local stakeholders and private companies.
- Building on experience with the Suburban Mobility Working Group, MAPC is developing evaluation criteria that it intends to use to analyze the impact of partnership-focused projects with shared mobility components.
- The Boston Region MPO is working to translate lessons from these experiments into policies that may help guide future investments related to regional priorities like improved first/last mile transit connectivity.

Regional Shared Mobility Planning Case Study: Dallas-Fort Worth, Texas

Introduction

The North Central Texas Council of Governments (NCTCOG) provides a notable example of regional coordination and cooperation to engage with and respond to the emergence of new shared mobility transportation options. The metropolitan planning organization (MPO) hosts a Mobility on Demand (MOD) Working Group to provide a regional forum for public transit agencies, local governments, and other interested parties to work together and share ideas related to shared mobility services and partnerships. NCTCOG addresses both shared mobility and emerging automated vehicle technology in the metropolitan transportation plan and the regional transit coordination plan. The MOD Working Group provides another venue through which the region continues to explore how to improve shared mobility integration across all aspects of transportation planning and policy with a focus on achieving regional transportation goals.

Shared mobility partnerships between transit agencies, local governments, and private mobility companies are quickly becoming common in the Dallas-Fort Worth Metropolitan Area. The NCTCOG working group offers an important forum for partners to coordinate, and is influencing the MPO's thinking about how best to integrate shared mobility into its multimodal planning process in the future.

Case Study Highlights

Regional forum hosted by MPO for coordination on shared mobility planning and pilot projects, with participation from transit agencies, researchers, and shared mobility companies.

Integration of shared mobility considerations into the metropolitan transportation plan and regional transit coordination plan.

Shared mobility explored as a tool to help achieve regional transportation goals such as transit system expansion, removal of first/last mile transit connection barriers, and increasing average vehicle occupancy.

The Dallas-Ft. Worth region's approach illustrates aspects of the Lighthouse and Operational Partnerships models described in the Federal Highway Administration (FHWA) white paper *Integrating Shared Mobility into Multimodal Transportation Planning: Improving Regional Performance to Meet Public Goals*.

Dallas Area Rapid Transit (DART) has been a leader in forming partnerships with shared mobility companies. Their efforts inspired NCTCOG and others to explore similar partnerships (Operational Partnerships Model).

By convening the MOD Working Group, funding shared mobility projects, and integrating shared mobility into core planning documents at an early stage, NCTCOG has provided greater visibility to the importance of shared mobility and inspired others to engage and participate in shared mobility planning and partnerships (Lighthouse Model).

Shared Mobility Context in the Region

- **Taxis and Transportation Network Companies (TNCs)** have been operating in the region for several years and now serve the vast majority of the NCTCOG planning area (Figure 9). The major TNCs serving the region primarily offer traditional car service.
- **Microtransit** services first began in Arlington in 2017 when the city launched a partnership with Via Rideshare to provide an on-demand shuttle service. DART and the Denton County Transportation Authority (DCTA) have since started several microtransit pilots focused on expanding transit access in growing or underserved areas.
- **Dockless bikesharing** began in Dallas in early 2018 with five companies providing as many as 18,000 bikes.[2] The City of Dallas responded to resident complaints of poorly maintained and managed bikes with new regulations and fees. By the end of 2018, three companies had ceased to operate in Dallas, some shifting to scooter sharing, with two companies continuing to operate a much smaller fleet.
- **Electric scooter sharing** began in Dallas and expanded to adjacent communities in the summer of 2018 with two companies providing more than 1,000 scooters.
- **Carsharing** is limited in the region. Zipcar operates a small carsharing fleet of approximately 20 vehicles in Dallas.[3] Five of these cars are provided through a DART/Zipcar partnership to place carsharing vehicles at transit stations.[4]
- **Low-Speed Automated Shuttles** are being piloted in the region. DCTA and the Frisco Transportation Management Association launched a six-month pilot in 2019 serving employees and residents in the growing North Platinum Corridor. DCTA is exploring potential opportunities for automated buses along fixed routes. The City of Arlington is also piloting low-speed automated shuttles.

[2] https://www.texasmonthly.com/news/rise-fall-dockless-bike-sharing-dallas/
[3] http://maps.sharedusemobilitycenter.org/sumc/
[4] http://policies.sharedusemobilitycenter.org/#/policies/766

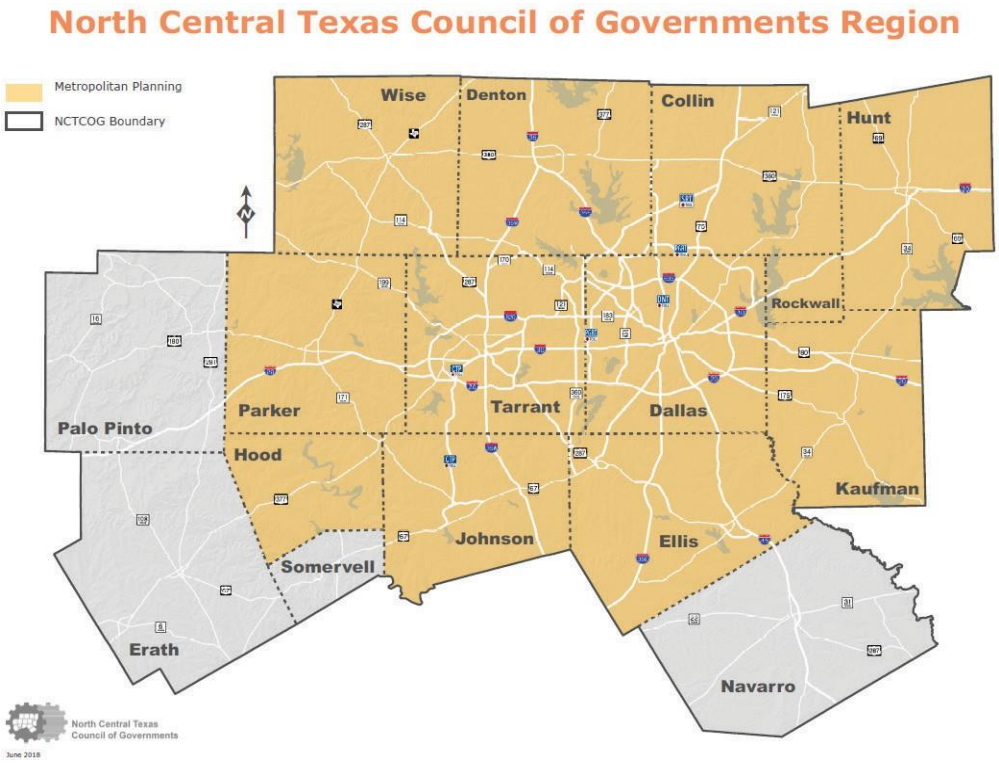

Figure 9: Map of NCTCOG Metropolitan Planning Area. Source: NCTCOG

NCTCOG's Mobility on Demand Working Group

Figure 10: FTA MOD Sandbox Program Logo. Source: FTA

As in many large metropolitan areas, shared mobility companies have begun to offer services to the public and have sought partnerships with public transportation agencies. DART received a Mobility on Demand (MOD) Sandbox Program (Figure 10) grant from the Federal Transit Administration (FTA) in 2016 to integrate its ticketing app with TNCs, microtransit, bikesharing, and other 3rd party mobility providers, in order to better facilitate first/last mile connections for transit riders. This and other shared mobility developments in the region led NCTCOG, the region's MPO and the designated recipient for FTA urbanized area formula grant program (section 5307) funds, to organize quarterly meetings of shared mobility stakeholders including the public transit operators, local governments, federal agency partners, researchers, and the shared mobility providers themselves. The MOD Working Group provides a forum to discuss partnerships, barriers, and lessons learned. Over time, these meetings have become an important venue through which NCTCOG and its partners can engage in discussions that inform future regional multimodal transportation planning, transit service planning, and regional transportation policy.

The MOD Working Group meets quarterly at the NCTCOG offices in Arlington. Agendas are developed with input from regular participants, and feature presentations and discussion on shared mobility pilots and partnerships in the region. NCTCOG focuses the agenda for each meeting on a different perspective or issue. Recent meetings have featured participation from shared mobility providers and major employers in the region, in addition to NCTCOG, local governments, and transit providers. Shared mobility pilots and the

working group discussion have changed the way that planners think about transit planning in the region. In particular, shared mobility has led the region to think about opportunities to better serve disadvantaged populations in a cost-effective and coordinated manner.

NCTCOG's Plans and Programs

Expanding the reach of the region's transit services is a priority for NCTCOG as well as the region's transit operators. Forecasts show that 20% of the population will likely live outside of the current transit service area by 2045 in this fast-growing region. This is reflected in Access North Texas, the regional transit coordination plan, and Mobility 2045, the metropolitan transportation plan. These plans identify seamless coordination of transit service in the region and transit access expansion as goals.

Access North Texas specifically identifies shared mobility as an option for overcoming first/last mile barriers and for improving transit service (Figure 11). Mobility 2045 identifies shared mobility as an emerging technology with the potential to serve a large portion of regional trips (Figure 12), while acknowledging that the MPO is not yet able to model the impacts of increased shared mobility mode share. This is due to a combination of factors, most importantly the lack of data availability from shared mobility companies and insufficient research on shared mobility usage patterns. The plan does explore the potential for creating dedicated rights of way for people movers (automated fixed guideway transit systems) or automated personal vehicles, which could also provide dedicated routes for certain types of shared mobility services that provide first/last mile transit connections.

Access North Texas identifies shared mobility as one strategy for improving access to transit services in the region: "Identify, evaluate, and implement where appropriate non-traditional ways to deliver public transportation service, including partnerships among public transit agencies, private transportation providers, and transportation network companies." NCTCOG included questions about the use of TNCs being part of the regional transportation programs in a poll it conducted during the development of Access North Texas and several county-specific strategies include shared mobility approaches.

Figure 11: Access North Texas Logo. Source: NCTCOG

Mobility 2045 identifies shared mobility and vehicle automation as technological innovations which may impact the performance of the regional highway system. The plan includes a section on shared mobility that discusses its growing popularity in the region and cites a study predicting that as much as 30% of all regional automobile trips could be provided by shared mobility services by 2030 (p. 176). The plan also notes that shared mobility platforms may be the first large-scale users of automated vehicles. Several possible implications of vehicle automation and shared mobility are listed, but the plan notes the high uncertainty about their potential impacts.

Figure 12: Mobility 2045 Logo. Source: NCTCOG

NCTCOG's metropolitan transportation plan recognizes that an increased prevalence of shared mobility services in the region may help accomplish some regional goals, such as reduced first/last mile transit connectivity barriers. It also views shared mobility as a possible way to counteract future challenges from automated vehicles, such as increased traffic and vehicle miles traveled (VMT). The plan includes a policy to "… support efforts to ameliorate the impact of increased demand for mobility as a result of automated vehicles by supporting efforts to increase average vehicle occupancy by transportation network companies…" To facilitate more efficient travel in high-density corridors, the plan supports the idea of developing a people mover system with automated vehicles that would provide first/last mile connections

to transit service. NCTCOG staff have indicated that shared, automated vehicles might be an alternative to people movers as vehicle automation technology advances.

Although Mobility 2045 identifies the importance of shared mobility and other emerging technologies, they are not yet reflected in the transportation demand model upon which portions of the plan are based. NCTCOG staff intend to better reflect the impacts of shared mobility in the next update of the long range plan. However, the fast changing nature of shared mobility technologies and services makes incorporating them into a long range plan difficult. The intent is that through pilot projects and the MOD Working Group, the MPO will learn more about the realities of how shared mobility is functioning in the region, how it might fit into the regional multimodal network in the future, and how to reflect this in the on-going planning process.

Shared Mobility Partnership and Pilots in the Region

Transit operators in the NCTCOG planning area have started partnerships or pilot projects with shared mobility companies and have started incorporating shared mobility into their strategic planning. Local governments and businesses have also been active participants in the MOD Working Group and have begun evaluating shared mobility services as possible tools to achieve local planning goals or business objectives. The following examples demonstrate the breadth of shared mobility partnerships in the region, although this list does not reflect all initiatives or pilots underway or completed.

Dallas Area Rapid Transit (DART)

- DART is working to integrate shared mobility options into its GoPass ticketing application (Figure 13) through an FTA Mobility on Demand Sandbox grant. DART intends to integrate microtransit, carpooling, taxi, TNC, bikesharing, and other mobility options through one payment and trip planning interface that also includes existing public transportation options.[5] Pilots began in October 2017 and a one-year field demonstration, with increasing options being integrated over time, began in February 2018. GoPass will include payment settlement through the user's transit account to third-party mobility providers, simplifying the process for accessing numerous mobility options.

Figure 13: Illustration of DART GoPass Application. Source: DART

[5] MOD Sandbox Demonstrations Independent Evaluation (IE) Dallas Area Rapid Transit (DART) – First and Last Mile Solution Evaluation Plan - https://rosap.ntl.bts.gov/view/dot/36657

- GoLink is a microtransit service operated by DART for certain zones. It provides curb-to-curb service in areas not served with traditional fixed route transit that are close to DART rail stations. In February 2019, Uber and DART launched a pilot pooled TNC service under the GoLink moniker, where shared-ride TNC service is offered in designated zones.

- DART launched a paratransit pilot partnership with Lyft and MV Transportation (DART's paratransit provider) in 2017 to evaluate the feasibility of using TNC services for a portion of the region's paratransit trips. The pilot demonstration has been extended through 2019 and may become a core element of DART paratransit service.

- DART is developing its 2045 Transit Plan and shared mobility options, including microtransit, shared-ride TNCs, shared electric scooters and bikes, and improved pedestrian links will be major elements of the new plan.

Denton County Transportation Authority (DCTA)

- DCTA formed a partnership with Lyft to provide free TNC rides in the early morning hours (2 a.m. - 7 a.m.) at the University of North Texas.[6]

- As a complement to its fixed-route service, DCTA launched a microtransit service for the Denton Enterprise Airport Zone, working with a 3rd party app developer for booking.[7]

- A separate DCTA/Lyft program supplanted a hybrid fixed-route, on-demand bus service connecting passengers between commuter rail stations, and hospitals, shopping and entertainment options. The new program[8] has reduced the costs of providing fixed-route on-demand transportation from fleet vehicles in a suburban environment with low ridership.

- DCTA worked with Trinity Metro, Toyota, and several other partners on a 9-month on-demand TNC pilot project called Alliance Link (Figure 14), serving the major employers in the Alliance Airport area (an area attracting major new employment destinations). The pilot was funded by Toyota and demonstrated a need for first/last mile transit connection service for low-wage shift workers in the area. Following the end of the pilot, DCTA and Trinity Metro are providing a similar service through a contract with Lyft. This service is being managed by Trinity Metro and funded by NCTCOG through Regional Toll Revenue funds.

Figure 14: Alliance Link Vehicle Used During Nine-Month Pilot Period. Source: Toyota

[6] https://www.dcta.net/media-center/news/2018/university-north-texas-dcta-and-lyft-partner-launch-new-demand-pilot-service

[7] https://www.dcta.net/denton-airport-zone

[8] https://www.dcta.net/service-overview/additional-services/highland-village-lyft-program

- DCTA worked with the Texas A&M Transportation Institute (TTI) to develop a shared mobility action plan, which was completed in the fall of 2018. This plan's recommendations are already being implemented and will be included in the agency's updated Long-Range Service Plan.
- DCTA coordinates directly with bikesharing companies, once they have been permitted by host cities, to help organize placement of bikes to complement transit service, including designating "virtual bikesharing corrals" for shared bike storage at commuter rails stations and transit hubs. The virtual corrals are areas designated in the bike sharing apps where users are directed to drop-off bikes after they complete their trips.
- The Frisco Transportation Management Association, a collaboration between DCTA, the city of Frisco, and area real estate firms, conducted an eight-month automated shuttle pilot in Frisco's growing North Platinum Corridor. The pilot ended in March 2019 after more than 5,000 trips.[9]

City of Arlington

- The City of Arlington is in the second year of a pilot project with Via Rideshare to provide microtransit service in place of the city's previous fixed-route express bus service (Figure 15).[10] The pilot is within a defined service area and operates on-demand with average wait times of 12 minutes. The City also works with its paratransit service provider, Handitran, to transition riders from the paratransit service to the Via Rideshare service.

Figure 15: Arlington/Via Microtransit Vehicle. Source: City of Arlington

- Arlington is the site of two low-speed automated shuttle pilots using shared vehicles, one off-street program that operated from August 2017 to August 2018 and one on-street program that began year-long operations in October 2018.[11,12]

Initial Lessons from NCTCOG's Experience with Regional Shared Mobility Planning

- **NCTCOG's regional scope, and its responsibilities for regional transportation planning and funds programming, make it a logical convener for emerging issues of regional importance like shared mobility.** The MPO has used this unique role to facilitate sharing of information and best practices among agencies in the region, and to advance its own knowledge of the benefits and challenges of shared mobility partnerships and implementation.
- **The Dallas-Fort Worth region's approach to shared mobility planning includes private sector shared mobility companies and large employers as important stakeholders.** Companies and employers have participated in the MOD Working Group, and several pilot projects in the region show notable cooperation between employers, shared mobility companies, and public agencies. This type of cross-sectoral collaboration is likely to be more

[9] https://friscotexas.gov/DocumentCenter/View/17969/Driveai-Pilot-Program-Ending
[10] https://www.arlingtontx.gov/city_hall/departments/office_of_strategic_initiatives/transportation_planning/via_rideshare
[11] https://www.arlingtontx.gov/UserFiles/Servers/Server_14481062/File/City%20Hall/Depts/Office%20of%20Strategic%20Initiatives/Transportation%20Planning/Milo_Closeout_Report.pdf
[12] https://www.arlingtontx.gov/visitors/transportation/autonomous_vehicles

important for shared mobility than for other transportation modes because of the niche that shared mobility often fills in regional transportation systems, as a connecting service in multimodal trips.

- **NCTCOG's approach shows that shared mobility can be integrated into regional multimodal plans and transit service plans, even if not all of the impacts of these services are currently known or if they cannot be precisely modeled.** Shared mobility is a notable part of both *Access North Texas* and *Mobility 2045*. The plans acknowledge uncertainties associated with shared mobility and emerging transportation technologies while identifying strategies to better understand and address opportunities and challenges that they present.
- **The large number of shared mobility partnerships and pilots between shared mobility companies and transit providers in the region shows that transit providers are often the logical first-actors in planning shared mobility pilots.** The MOD Working Group provides a valuable forum for sharing information among the transit providers in the region, with NCTCOG, and with local governments, which likely contributes to accelerated learning and adoption of shared mobility approaches in the region.

Dallas-Fort Worth Shared Mobility Planning in Context of FHWA Framework

The FHWA white paper, *Integrating Shared Mobility into Multimodal Transportation Planning: Improving Regional Performance to Meet Public Goals* describes a framework (Figure 16) for how shared mobility can be integrated into the existing regional multimodal transportation planning process. This section describes the Dallas-Fort Worth example through the lens of this framework.

Multimodal Planning

- Shared mobility is integrated into *Mobility 2045* and *Access North Texas*, the region's metropolitan transportation plan and transit coordination plan.
- These plans highlight the potential importance of shared mobility and other emerging technologies in achieving plan goals related to transit service expansion, reducing first/last mile connection barriers, and increasing average vehicle occupancy.

Planning Interventions

- The MOD Working Group provides a forum for regional discussions and information sharing.
- NCTCOG and partners have involved a broad range of organizations in the MOD Working Group, including shared mobility providers and businesses.

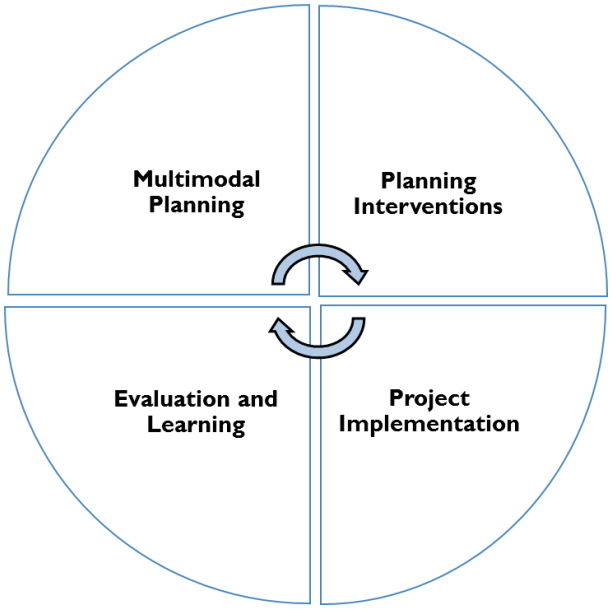

Figure 16: Conceptual Framework for Visualizing Shared Mobility Integration with Regional Multimodal Transportation Planning Process

Project Implementation

- NCTCOG programmed federal, state, and local funds for shared mobility projects, including the Arlington pilot with Via, Alliance Link, and others.
- DART, DCTA, the City of Arlington, and others, have formed service partnerships and pilots with shared mobility companies to expand the reach of, or replace, fixed-route transit and traditional paratransit services.

Evaluation and Learning

- The MOD Working Group members share information and best practices with each other, which helps to both advance shared mobility planning in the region and enable peers to learn from each other and avoid mistakes or pitfalls others have experienced.

Looking Ahead

The Dallas-Ft. Worth region is continuing to work on shared mobility integration through a number of initiatives. The MOD Working Group continues to be active at the regional scale, and transit providers are pursuing additional pilots and partnerships with shared mobility companies.

- Large transit operators and cities generally have resources to explore and pilot shared mobility options, but smaller jurisdictions may not. NCTCOG is considering how to provide support to smaller jurisdictions in the region.
- NCTCOG's next challenge may be how to coordinate individual shared mobility pilots and projects with fixed-route transit services to form a cohesive system that serves a metropolitan planning area of over 7 million people efficiently and effectively. Staff is interested in finding areas where individual agencies can work together on common approaches and applications.
- The rapid pace of changing transportation technology, including shared mobility and automation, poses significant challenges to the traditional long-range planning approach. Data on usage of shared mobility services are often not available in comparable resolution as public transportation services. Furthermore, the fast appearance and disappearance of shared mobility companies, and the potential for automation to upend regional travel patterns, makes planning for the future more uncertain. NCTCOG is partnering with the University of Texas-Austin to address this challenge, researching ways to better incorporate shared mobility into travel modeling and forecasting.
- DART is evaluating the option of turning the D-Link service, an under-performing Downtown Dallas circulator, into an on-demand microtransit service.
- DART continues to integrate services into its GoPass payment and trip planning platform with a goal of providing users with seamless scheduling and payment of multimodal trips that include transit and shared mobility options.
- In January 2019, DCTA released a request for proposals (RFP) for Mobility as a Service (MaaS) and is soliciting proposals from firms or contractor teams to provide innovative mobility services for agency member cities, contracted communities, partner organizations, as well as large

employment centers and other areas as the need arises.[13] DCTA intends to use the RFP process to formalize an agency procurement process for shared mobility services.

- DCTA is also discussing the potential of implementing low-speed automated shuttles for on-demand first/last mile connections to commuter rail stations, serving various entertainment districts in member city areas.

[13] https://www.dcta.net/media-center/news/2019/dcta-increase-transit-options-mobility-a-service-request-proposal

Regional Shared Mobility Planning Case Study: San Francisco Bay Area, California

Introduction

The Metropolitan Transportation Commission (MTC) is the metropolitan planning organization (MPO) for the San Francisco Bay Area metropolitan region. MTC provides a compelling case of an MPO working actively with its partners to develop strategies for integrating new shared mobility technology to support the region's transportation goals in two ways. First, as with all MPOs, MTC is tasked with long-range metropolitan transportation planning. Second, MTC operates and actively supports transportation demand management (TDM) programs that aim to reduce single occupant car trips in targeted locations and corridors.

The growing importance of shared mobility operators in the region (many of whom were born in this technology capital) impacted MTC's TDM programs and revealed challenges and opportunities for meeting the regional goals established in the Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS). Through engagement with private shared mobility providers, MTC offers insights about the challenges associated with developing partnerships and gathering important data. MTC is also exploring how to use its role as convener of regional transportation agencies and other entities to help proliferate successful strategies that are being developed in the region.

The San Francisco Bay Area's approach to incorporating shared mobility in planning provides an example of the Lighthouse and Operational Partnerships models described in the Federal Highway Administration (FHWA) white paper *Integrating Shared Mobility into Multimodal Transportation Planning: Improving Regional Performance to Meet Public Goals.*

Case Study Highlights

MPO works proactively with shared mobility technology firms to improve regional carpooling services.

MPO and its partners have developed public sector response strategies for working with new shared mobility technologies.

MPO is inspired to revisit its own way of doing business learning from successful private sector methods.

Private sector firms are not always able to deliver on community goals and objectives such as equitable access to services.

Shared mobility technologies are allowing better monitoring of performance through active data collection but performance results are mixed so far.

MTC and the regional transit provider Bay Area Rapid Transit (BART) have engaged in partnerships with shared mobility companies in an effort to improve carpooling services and obtain better metrics about the success and limitations of such programs (Operational Partnerships Model).

MTC's local government partners have requested assistance from MTC in developing policy responses to new shared mobility services. The MPO is considering its role and has looked at the set of guiding principles developed by the San Francisco County Transportation Authority (SFCTA). The SFCTA developed these principles to use when navigating technological disruptions in transportation, including shared mobility (Lighthouse Model).

Shared Mobility Context in the Region

- **TNCs** are common in the Bay Area and have operated there since 2009. Uber and Lyft, the two largest TNCs in the U.S., are both headquartered in San Francisco. The region is often where TNCs pilot new types of service, such as pooled rides, and wheelchair accessible vehicles. A 2017 study by SFTCA estimated that during a typical weekday 170,000 TNC trips are made in San Francisco alone, comprising at least 15% of all vehicle traffic in the city.[14]

- **Microtransit** was offered by Chariot from 2014 through early 2019 before Chariot closed down. Chariot offered both public and enterprise services, targeting large employers. New companies are starting microtransit service in San Francisco, filling the gap left by Chariot's closure.

- **Bikesharing** started in San Francisco in 2013 with Bay Area Bike Share. This grew into a regional station-based bikesharing system: Ford GoBike, which has expanded to other large cities in the Bay Area. Dockless bikesharing started in January 2018 in San Francisco with the launch of Jump Bike, a dockless electric bikesharing company. Lime provided both pedal and electric dockless bikes, but in 2019 the company announced it would phase out the majority of bikes, focusing instead on electric scooters.[15] Ford GoBike also has some limited dockless bikes in north San Jose.

- **Electric scooter sharing** is expanding in the Bay Area. Shared electric scooters first became available in San Francisco on a small scale in 2012. A much larger wave of lighter scooters followed in late 2017, as several companies (e.g. Bird, Lime, Spin) deployed scooters without prior approvals from cities in the region. Many cities responded with restrictions or temporary bans, and later, with regulated, authorized pilots. As of 2019, Oakland, San Francisco, San Jose, and several smaller cities have agreements with shared mobility companies to allow electric scooter sharing under negotiated conditions.

- **Carsharing** had an early start in the Bay Area with City Car Share (now part of Getaround) launching service in 2001. The market for carsharing has evolved over time and there are now multiple operators in several Bay Area cities. Carsharing is provided using various business models including operator-owned vehicles and peer-to-peer shared vehicles. Oakland was the site of a free-floating carsharing pilot in 2017, a model where cars can be picked-up and left in any public parking space within a designated zone.

- **Carpooling** is one of the oldest forms of shared mobility and is practiced everywhere to some extent. In the Bay Area, commuters using the Bay Bridge have long practiced "casual carpooling," where drivers pick up passengers near the bridge so that they can access the high-occupancy vehicle lanes and experience shorter wait times through the toll plaza. Casual carpooling is informal and largely self-organized, although several cities now provide signed pick-up areas. More recently, several technology companies have launched app-based carpooling services (e.g., Waze Carpool, Scoop) which aim to connect drivers with riders and facilitate cost sharing through the app.

- **Low-Speed Automated Shuttles** are being piloted in the Bay Area on both private and public roads. A six-person automated shuttle is being piloted at Bishop Ranch, a 585-acre office park in San Ramon.[16] Additional pilots are in the planning stages for San Francisco and elsewhere in the region.

[14] https://www.sfcta.org/sites/default/files/2019-02/TNCs_Today_112917_0.pdf

[15] https://www.sfchronicle.com/business/article/Lime-dropped-the-bike-from-its-name-now-13621057.php?psid=1HFKB

[16] https://abc7news.com/technology/californias-first-driverless-bus-hits-the-road-in-san-ramon/3183813/

MTC's Plan and Programs

MTC's long range transportation plan, Plan Bay Area 2040 (Figure 17) includes goals and objectives similar to those adopted in other regions such as reducing single occupant vehicle travel and greenhouse gas emissions, slowing the growth of congestion, and improving access for all populations. *Plan Bay Area 2040* is a performance-driven plan that also acts as the region's Sustainable Communities Strategy document, a mandate of the State of California. State and Federal law both require performance monitoring in different areas included within the plan and MTC has begun tracking its progress in achieving several targets. The plan includes a strategy for TDM to reduce single occupant vehicle travel using targets for reducing vehicle miles traveled (VMT).

Figure 17: Plan Bay Area 2040 Logo. Source: MTC

A key TDM strategy for MTC has long been its carpool and vanpool programs, which are marketed through MTC's traveler information program 511 SF Bay (Figure 18). The goal of the Bay Area Carpool and Vanpool programs is to increase the use of High-Occupancy Vehicles (HOVs) through targeted marketing to employers and commuters. The strategy is coordinated with the development of a network of express lanes (managed High-Occupancy Toll lanes) around the Bay Area which are free for HOV users but tolled for others. The programs intend to reduce congestion on bridge corridors by establishing more park and ride lots, creating more HOV and bus-only access, and increasing bus service.

Figure 18: 511 SF Bay Logo. Source: MTC

The Bay Area Carpool program has a ridematching system to connect potential carpoolers, who then coordinate their carpooling details on their own. MTC surveys users of the system to see how many matches are made and how successful it is at establishing lasting carpools. Since the popularization of shared mobility services in the region, MTC saw a drop in the use of its ridematching service, so they have recently changed tactics to instead form partnerships with providers of app-based carpooling options. The partnerships were begun as pilots to see how successful MTC could be in achieving agency goals by using the new private sector tools. MTC has developed no-cost contracts with these companies that other Bay Area agencies can potentially adapt and adopt.

MTC began coordinating with private shared mobility companies with the goal of leveraging their market presence. These partnerships have expanded the pool of people that MTC is reaching, particularly because when private sector carpooling services started, the number of people using MTC's own ridematching service declined. However their business models are not meeting all of the MTC's objectives, such as region-wide viability and increased regional carpool mode share. MTC is currently retaining its existing ridematching service and asks its private sector partners to refer users to it if they cease operations, change their business models, or leave the Bay Area market.

Because shared mobility services have impacted one of MTC's core implementation strategies, it has become clear to agency staff that they need to engage directly with the private sector to reformulate their approaches. Although it has not yet led to any programs, this has encouraged MTC to consider how to use its role within the region as a resource to help local governments and transit agencies address access and safety concerns related to shared mobility services such as equitable distribution of service, Americans with Disabilities Act (ADA) accessibility, and driver safety.

MTC's Experience with Shared Mobility Partnerships

MTC has been a key partner in two partnerships with private sector shared mobility companies working on new methods to facilitate carpooling. MTC currently has partnerships with Waze Carpool and Scoop to promote carpooling, and it formerly worked with Scoop in the "Scoop to BART" pilot partnership that was led by BART.

Carpool App Partnerships

MTC began partnering with private sector carpool apps in 2014, starting with Carma. Between 2014 and 2018, MTC entered into seven no-cost partnership agreements with carpool app providers. As of today, two remain – one with Scoop, which began in 2015, and one with Waze/Waze Carpool, which began in 2018. Through the no-cost partnerships, MTC's carpool program markets and conducts outreach to encourage app usage and also provides incentives to app users. In return, the apps also market their services and provide user data to MTC. MTC was not only interested in using this service to accomplish some of its goals in reducing single occupant trips, but also to obtain data about how these services are used. Collecting data about carpooling is a difficult and time consuming activity, historically done through user surveys. MTC's hope is that digital records from carpool apps will be easier to collect and more accurate than surveys. However, it is not yet clear if this will be the case.

Bay Area's Commuter Benefits Program is a Bay Area Air Quality Management District (BAAQMD) regulation administered by both MTC and BAAQMD. The regulation requires employers with 50 or more employees in the nine-county San Francisco Bay Area to provide their employees with a TDM benefit. To help employers comply – especially employers in areas underserved by public transit – MTC introduced employers to the Waze app, which easily allows employers to provide carpooling benefits, and Waze offered these employers 30 days of free rides. Although not part of the carpool partnership, MTC also shares data from its Freeway Service Patrol with Waze, which provides the company with valuable details about freeway incidents and blocked traffic. This information is then made available to all drivers who use Waze.

MTC has found that partnering with private sector carpool app providers generates new ideas, creativity and enthusiasm. As profit-driven entities that provide consumer-focused services, these companies help to bring a fresh approach to public sector transportation management and delivery of ridesharing services. These technologies also support validation of the program's success or failure because carpooling can be tracked through the app. The carpool apps remove most of the friction points of traditional ridematching by handling communication and payment electronically and automatically.

Challenges

MTC has run into a few difficulties in their carpool app partnerships. The first is that several of the apps were unable to achieve any success in building matching databases and left the market. Another challenge has been a lack of granularity in the data MTC receives from the companies. MTC does not have access to origin and destination pair data, nor can staff identify individual users, so they cannot understand whether most trips are from a small group of "power users" or how many trips are made by one-time users who never or rarely use the service again. The coarse granularity of the data shared by the app partners limits its usefulness for program evaluation and planning, however MTC is looking into ways to supplement the data with surveys of commuters.

Another limitation of the partnerships, according to MTC staff, is that riders now must pay the drivers for rides using the apps - up to the Internal Revenue Service (IRS) mileage rate of 58 cents per mile - and some, but not all, carpool apps take part of this payment as a fee. People in carpools formed through MTC's traditional ridematching service can sometimes arrange free or very low cost rides or share riding and driving responsibilities without exchanging money. A typical ride using carpooling apps can cost $6 one-

way, which could add over $200 per month for full-time carpooling. MTC is concerned that this cost may not result in as effective a reduction in VMT as might otherwise be the case if costs were lower for riders. It also limits participation of those who cannot afford to pay.

Understanding the limitations of carpooling apps is helpful in generating new ideas about how they can be part of a regional approach to shared mobility. However, the new apps have taken users away from MTC's 511 ridematching service. This development risks a possible collapse of the traditional ridematching service (which some potential carpoolers prefer) because ridematching systems require a critical mass of users. When there are fewer people in the pool of potential matches, the service is likely to be abandoned by even more people. However, MTC is not convinced they should be in the business of investing more in a government-provided ridematching tool when there are so many private sector options. There is also some initial evidence that losing the traditional ridematching service and only relying on private sector options, while more convenient for some users, will not provide the same equal access that the old system provided. At a minimum, before engaging in a partnership with a private sector company, MTC recommends that agencies ask companies to allow carpool drivers to charge less than the IRS reimbursement rate, which is something Waze allows under this partnership. This can help to maintain affordability for some users of these services, although it does not entirely remove the concerns about affordability.

Scoop to BART

MTC's partnership with Scoop led to the initiation of a pilot between BART and Scoop to verify carpool parking at BART stations called "Scoop to BART" (Figure 19). The pilot expanded to 17 BART stations with the help of a Mobility on Demand (MOD) Sandbox Program grant from the Federal Transit Administration (FTA) in 2016. Under this program, those that used Scoop to carpool to BART would be guaranteed a parking space until 10 AM.

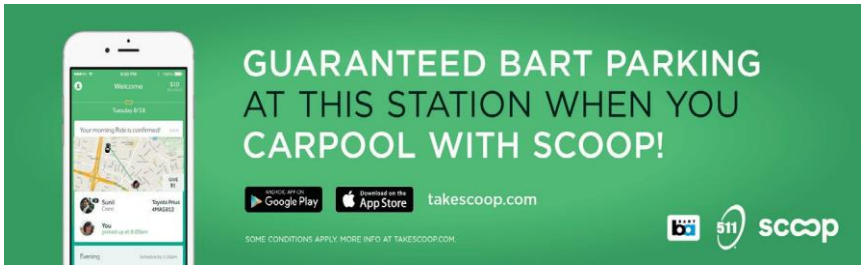

Figure 19: Advertisement for Scoop to BART Program. Source: Scoop

Parking at many BART stations typically fills up early each day, so this was a significant incentive to carpool using Scoop. Scoop ran its matching algorithm each evening and provided BART with the license plate information for carpool drivers headed to BART stations. These drivers parked in the permit areas of the station, and placed a re-useable placard on their dashboard to indicate they were participating in the program. When parking enforcement saw the placard, they checked the license plate list provided by Scoop to ensure they were matched into a carpool that day. The program provided an easy way to match people into carpools, incentivized the use of carpooling to reduce VMT and congestion around BART stations, and increased the number of BART users who benefited from its parking facilities.

This partnership succeeded in providing a consumer-friendly way for people to find a carpool match and provided a cost-effective way to get to BART stations. It also significantly increased the amount of parking available to carpoolers (BART's legacy carpool program has continued through the Scoop to BART pilot). The pilot provided BART with trip-level carpooling data, which raised awareness of carpooling's potential to address some of BART's parking challenges. While Scoop does not verify that there were at least two people in the vehicle when the trip took place, the way it matches carpools makes fraud more difficult (but not impossible). BART staff estimates that fraudulent use of carpool spaces and incentives was considerably lower in the Scoop to BART program than in BART's legacy carpool program.

Other aspects of the partnership were less successful. Participants contributed $1 for each trip to Scoop, but another core part of Scoop's business model is to work directly with large employers to encourage

carpooling amongst employees. Scoop invoices participating employers on a per-trip basis. When the original contract between BART and Scoop was set to expire in 2018, Scoop decided that BART should similarly pay a per-trip fee. Scoop had also agreed to develop an in-app parking payment system as part of the MOD project, but this never happened. Because of these changes, as well as BART incorporating parking payment into a new app of its own, BART decided to not continue its partnership with Scoop beyond 2019.

In addition to the increased cost of the program, other factors also contributed to BART's decision to end the partnership:

- Scoop does not verify carpools.
- Scoop was unwilling to provide a license plate application programing interface (API), and would only provide license plate information through an online dashboard, which is difficult for parking enforcement staff to use.
- Carpool matching via Scoop is only available for weekday AM and PM trips.
- Scoop does not provide matching to and from all areas in the regional commute-shed.

Parking payment through BART's new app will verify not only that there are two people in the vehicle when carpooling, but also will ensure that those using BART parking are using BART rail service. Despite the end of the partnership, BART staff do not consider the pilot a failure, but rather an important step in the evolution of its carpooling program.

Setting the Stage for Shared Mobility Partnerships in San Francisco

One promising development in fostering a common approach to public sector partnerships with shared mobility companies comes from MTC's most densely-populated county, San Francisco. The San Francisco County Transportation Authority (SFCTA) recently drafted its Emerging Mobility Evaluation Report, based on Ten Guiding Principles for Emerging Mobility Services and Technologies adopted by the Authority and the San Francisco Municipal Transportation Agency (SFMTA) in 2017. The report was developed by SFCTA with the participation of SFMTA and emerging mobility service providers (Figure 20).

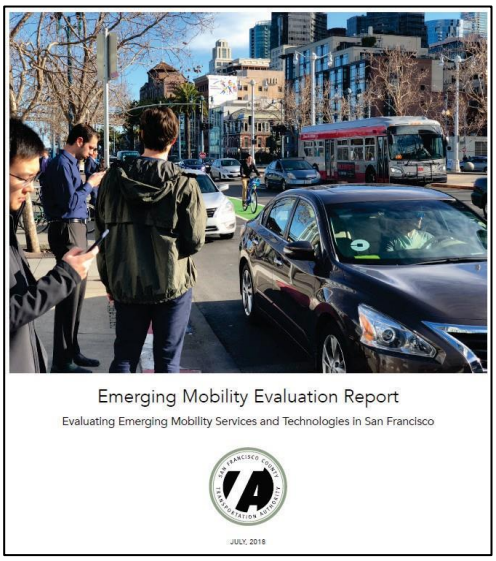

Figure 20: Cover of SFCTA Emerging Mobility Evaluation Report. Source: SFCTA

The purpose of the principles and of the Emerging Mobility Evaluation Report is to provide a framework for what companies can do in order to operate in the City and County of San Francisco. The City hopes that this framework will encourage innovation in mobility by the private sector in ways that support public goals. The Emerging Mobility Evaluation Report will be used to guide San Francisco's response to any new technology or service that wants to operate in the city.

Its recommendations include:

- Proactively partner,
- Collect emerging mobility data and conduct research,
- Regulate and recover costs,
- Bridge mobility and access gaps,
- Support and prioritize public transit,
- Enforce safe streets, and

- Manage congestion at curbs and on roadways using design and pricing.

MTC has taken note of the SFCTA Emerging Mobility principles and is considering if something similar at the regional scale could be valuable. Using the experience of the region's largest county and city is informative because it has been the location of the biggest disruption from new mobility services and technologies for several years.

Initial Lessons from the Bay Area's Experience with Shared Mobility Partnerships

MTC has found that engaging in shared mobility pilot projects advances their thinking and helps them develop more sophisticated strategies for incorporating shared mobility into regional transportation planning and TDM programs.

There are complications working with new startups. Because new mobility services are often provided by new startup companies, they have a lot of initial funding, energy, and enthusiasm, and can be at the forefront of understanding how the public is responding to shared mobility products. On the other hand, this means they are often not established companies, so partnering with them presents some risks for the public sector. Shared mobility startups can change their business models quickly, can go out of business with little to no notice, and may be more likely to exit agreements when their business model no longer supports the terms of the agreement.

In light of this risk, agencies that pursue partnerships with shared mobility providers can consider including contingencies in agreements to cover events like changes to the company business models or ceasing of operations. For instance, MTC would like apps to encourage their users to consider using MTC's ridematching system in the case that the app ceases to exist or the partnership ends for any reason.

It is important to set a high bar for data sharing before entering into partnerships. MTC staff recommend that MPOs and others looking to partner with shared mobility companies specifically list out all of the data they could use from these applications (e.g., trip origin-destination data), and describe the nexus for how that data would benefit planning or management of public assets. The public sector may not always get access to data, but agencies begin any negotiation with high expectations for how these partnerships can be useful to them. They should also keep in mind that public agency data may also be highly useful to shared mobility companies (e.g., highway operations data), so data sharing ultimately can go both ways and may benefit both parties.

MPOs are at a disadvantage negotiating because they typically lack regulatory authority. These pilot projects are just the beginning of MTC's engagement with shared mobility in operations and transportation planning. MTC is comprised of nine counties, each of which has responsibilities for modeling, long range planning, funds programming, and congestion management as part of the region's planning process. MTC has been approached by local governments to assist in developing a response to the proliferation of private sector mobility enterprises, which provide many benefits but can also create problems of safety, access, and traffic congestion where they operate. As an MPO, MTC has limited leverage to influence the operation of these new services because they do not have regulatory or permitting authority. Even if MTC negotiates with these companies, they would have little incentive to work with a regional public entity unless smaller cities have agreed to work collaboratively through MTC. This disconnect between a strong need for a regional approach to shared mobility and a lack of any enforcement mechanism at the regional level provides the context for MTC's potential responses to the issue.

Cities often lack negotiating leverage because they do not have sufficient resources and scale to most effectively negotiate with shared mobility companies. While cities do have the permitting and regulatory authority to influence where and when new mobility services operate, they typically do not have staff or financial resources to negotiate on equal terms with well-funded companies. Without any direct regulatory authority, MTC is instead looking to pool resources and come up with policies and approaches to regulation that individual partners (counties, cities, transit agencies) can adopt. MTC can also use its role as a regional forum to provide a clearinghouse of information about what different parts of the region are doing to facilitate and regulate shared mobility services so that local jurisdictions can learn from one another.

Despite some early challenges with setting up partnerships, MTC staff have found the experience of working with private shared mobility partners enlightening for considering changes to the way MPOs and other public sector agencies may operate in this new transportation context. MPOs can both help to encourage innovative approaches to meeting public goals from the private sector and can also learn from the success of these shared mobility companies and reconsider some approaches to solving transportation problems.

San Francisco Bay Area Shared Mobility Planning in the Context of FHWA Framework

The San Francisco Bay Area, through coordination with its MPO, transit agencies and county planning authorities is integrating shared mobility in multimodal planning. The FHWA whitepaper, *Integrating Shared Mobility into Multimodal Transportation Planning: Improving Regional Performance to Meet Public Goals*, describes a framework (Figure 21) for how shared mobility can be integrated into the existing regional multimodal transportation planning process. This sections describes the San Francisco Bay Area example through the lens of this framework.

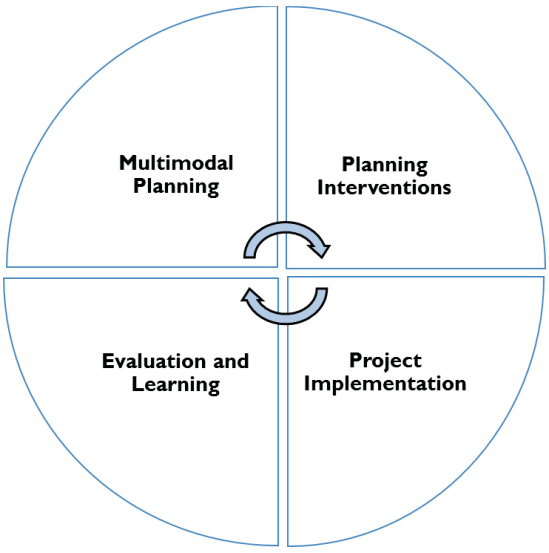

Figure 21: Conceptual Framework for Visualizing Shared Mobility Integration with Regional Multimodal Transportation Planning Process

Multimodal Planning

- As MTC and its regional partners learn more about planning for shared mobility, they expect to adjust their performance-based planning process accordingly with more targeted goals, objectives and strategies.

Planning Interventions

- MTC has taken note of the SFCTA Emerging Mobility principles and is considering if something similar at the regional scale could be valuable. MTC and BART have engaged in shared mobility partnerships with Scoop and Waze Carpool to improve the customer experience of residents who use carpooling services.

Project Implementation

- The Scoop and Waze partnerships are examples of a private sector partner taking on aspects of a publicly-provided service (MTC's 511 ridematching program).

Evaluation and Learning

- All of the shared mobility partnerships in the region are being treated as pilot projects. MTC and its partners are evaluating how they work, and if they are successful or unsuccessful at meeting public goals and objectives.
- A primary purpose for supporting the use of shared mobility services is to obtain data on carpooling behavior that was not previously available when public agencies managed such programs.
- MTC has made obtaining useful planning and evaluation data from Waze and Scoop a primary goal for the partnerships. Additionally, the SFCTA Principles document lays out expectations for data sharing with private shared mobility providers.

Looking Ahead

MTC continues to develop its regional programs to reduce single occupant vehicle travel and will keep working with shared mobility companies, and independently, on innovative ideas to do so.

- MTC is working on a carsharing pilot project using outreach and marketing to help satisfy requirements to cap vehicle trips in and out of campus-like environments. MTC is also working on the development of a grant program for carsharing and mobility services for low-income communities using electric vehicle carsharing pilots at three affordable housing sites in the region. These kinds of programs will utilize partnerships to a degree that makes sense for their successful implementation and are examples of how MTC is likely to continue to innovate in its engagement with shared mobility services and technology.
- MTC and the Association of Bay Area Governments (ABAG) launched a new scenario planning project called the Horizon Initiative in 2018. As part of this effort and to inform the next RTP/SCS (Plan Bay Area 2050), MTC and ABAG developed a perspective paper, Toward a Shared Future: Strategies to Manage Travel Demand, which presents data, trends, and strategies for managing travel demand. Shared mobility services, parking, and associated policies and pricing strategies are included in the list of potential strategies. This perspective paper is one example of how shared mobility policies will be considered in MTC's long range regional transportation and land use planning.
- While not a proposal at this point, MTC staff is looking at the experience of the Vancouver, British Columbia regional transit agency TransLink and its Open Innovation Call. This effort aims to encourage anyone with new ideas for improving mobility through technology and new services to submit them and be considered for future partnerships or funding. While not specific to shared mobility technology, Los Angeles Metropolitan Transportation Authority (LA Metro) has introduced a similar program for unsolicited proposals through its Office of Extraordinary Innovation. MTC may be in a good position to embark on a similar call considering its location within the world's premier technology hub.

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