



Twin Cities

Shared Mobility Collaborative

Regional and Statewide Shared-Mobility Funding: Recommendations for Minnesota

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Executive Summary

Shared-mobility transportation services are shared among users, either concurrently or one after another. A variety of shared-mobility services such as public transit, ride sharing, ride sourcing, bike sharing, and scooter sharing play an important role in Minnesota's transportation network.

Recent technology innovations, evolving attitudes, and government interest have led to the proliferation of shared-mobility service models designed to fill important transportation gaps, such as transportation to work, health care, and other essential services. Shared-mobility services also have the potential to lead to other societal benefits, including lower air pollution and transportation costs.

The COVID-19 pandemic has created significant challenges for public and private shared-mobility providers. There have been large declines in ridership and revenue during spring 2020. The pandemic also has influenced attitudes toward shared mobility and disrupted typical commute patterns for many Minnesotans. Despite these challenges, shared-mobility services have continued to provide essential transportation during the pandemic and have introduced innovative service models to meet the needs it has created.

Public support has been important for funding innovative shared-mobility services that can fill gaps in existing transportation options. That support will be especially important given the uncertainty the pandemic has brought for shared mobility. This paper makes two recommendations for increased support of innovative shared-mobility projects based on opportunities identified through discussions with the advisory panel. The first recommendation is a set of evaluation criteria that could facilitate the increased consideration of shared-mobility projects in the regional solicitation. The second recommendation is for the development of a state grant program for innovative shared-mobility services.

The Metropolitan Council's regional solicitation process awards federal funding to local transportation projects on a biannual basis. It is an important source of transportation funding for the Twin Cities region and has provided previous funding for shared mobility. The researchers identified opportunities within the solicitation to facilitate the increased consideration of shared-mobility projects and, ultimately, developed recommendations for funding criteria used in the funding category for unique projects.

The researchers developed a list of recommended evaluation criteria for the unique projects category based on a review of peer programs, while considering that other projects besides shared mobility are also eligible for funding in the category. The following list of recommended criteria was developed with a focus of encouraging innovation and increasing regional transportation equity. The following criteria are organized from most to least important.

- Innovation or uniqueness
- Transportation equity
- Integration with existing systems
- Replication potential
- Applicant capability/strength of plan
- Cost-effectiveness
- Local match

The researchers also developed recommendations for a state-level, competitive grant program for shared-mobility innovations that increase access to essential services in Minnesota. The program would ensure that all areas of the state and the residents of those areas are prepared to take advantage of emerging technologies to make transportation more efficient and equitable. It would have a flexible funding source and prioritize funding shared mobility across the state. Potential funding sources could include the state general fund or funds from agencies involved in program administration. A suggested funding range of \$6–8 million would allow the program to fund up to around five pilot programs, judging from the results of similar U.S. programs.

The framework for the proposed program was developed based on a review of shared-mobility funding programs in the United States. The suggested program ultimately shares many similarities with the several innovative Federal Transit Administration (FTA) programs and with the 2018 Michigan Mobility Challenge program.

Both recommendations would increase public funding for shared-mobility projects in Minnesota. Funded projects could play an important role in addressing existing state mobility gaps and contribute to statewide transportation innovation that increases transportation access, equity, and variety.

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Introduction

Shared-mobility transportation services are shared among users, either concurrently or one after another (Shared-Use Mobility Center, 2020). These services allow access to transportation on an as-needed basis, providing new alternatives to personal vehicles. The umbrella of shared-mobility services includes traditional transportation services such as public transit and emerging services like ride sourcing or scooter sharing.

New technology and evolving attitudes have driven the growth of shared-mobility modes and service models that can address important issues in Minnesota. Public funding is an essential tool to make shared-mobility innovation possible and to ensure it meets the needs of all users. However, there is still a lack of funding opportunities for innovative shared-mobility projects in Minnesota. This paper seeks to develop recommendations for new funding sources in Minnesota based on practices used in other states.

The remainder of this paper is organized as follows. The second section provides an overview of shared-mobility modes, their impacts, and trends in their use. The third section recommends criteria that could be used in the Met Council regional solicitation process to ensure the consideration of shared-mobility services. The fourth section develops a framework for a state competitive-grant program for innovative shared-mobility projects. Finally, the fifth section presents conclusions for the paper.

Literature Review

Shared-Mobility Modes

Some shared-mobility modes have long been important transportation modes in the United States, while others have emerged in the last several decades enabled by advances in technology such as smartphones and GPS systems (Shaheen, Cohen, & Zhody, Shared Mobility: Current Practices and Guiding Principles, 2016). Public transit, ride sharing, ride sourcing, bike sharing, scooter sharing, and microtransit are some of the most widely used shared-mobility modes and each has unique uses.

Public transit services are offered through a mix of modes, such as fixed-route buses, trains, and demand-response services.

Ride sharing refers to the coordinated, concurrent shared use of one or more vehicles, often by commuters. Car pools are formed by commuters traveling in the same general direction and generally operate at routine times with driver and passengers remaining static. Van pools are formed by groups of commuters and their designated driver(s) using larger vehicles typically provided with subsidy by transit agencies for mostly fixed-route service. While ride sharing is one of the oldest forms of shared mobility, new technology has allowed the development of new car-pool and van-pool service models that use scheduling algorithms to more efficiently match drivers to passenger requests (Shared-Use Mobility Center, 2015).

Ride-sourcing or Ride-hailing services use online apps to connect riders with drivers using personal vehicles. Ride-sourcing services are provided by transportation-network companies (TNCs) such as Uber and Lyft.

Bike-sharing services allow users to rent bikes, typically for short trips. The most common type of bike sharing is dock-based, in which users rent and return bikes to secure storage structures at specific locations using an app. More systems also are adopting dockless bike sharing, in which users can access and leave bikes anywhere in a service area (MnDOT, 2018).

Scooter sharing provides app-based electric scooter rentals, typically using a dockless model.

Microtransit is defined broadly compared to other shared-mobility services, but usually offers service similar to traditional demand-response transit while utilizing innovative technology to improve dispatching and routing. It often relies on passenger or cutaway vans (Shared-Use Mobility Center).

Benefits of Shared Mobility

Increased adoption of shared-mobility services potentially offers significant individual and societal benefits. Fundamentally, shared-mobility services increase the variety and availability of transportation options. That is especially important for residents who have little or no access to personal vehicles, and shared-mobility services can provide transportation access at a lower cost than vehicle ownership (Massachusetts Department of Transportation, 2017). Shared mobility also allows users to choose between more transportation modes and services depending on the nature of their trip, budget, and personal preferences. Overall, the increased access made possible by shared mobility can improve the ability of all people to use essential services and more equitably participate in society.

Some research indicates that services such as ride sourcing or car sharing reduce the amount people drive in personal vehicles (Massachusetts Department of Transportation, 2017; Feigon & Murphy, 2016; Shaheen & Cohen, 2009). By reducing vehicle trips and miles traveled, shared-mobility services could reduce congestion, vehicle emissions, and required parking. This leads to a transportation system that is better for users, more environmentally friendly, and requires less-demanding land use. However, other research has found the impact of shared mobility on miles traveled, particularly ride sourcing, was limited or negative (Henaoui, Marshall, & Jenson, 2019), likely because it attracted people who previously walked, biked, or used transit. This field of research still is evolving.

Innovative shared-mobility services also can offer synergies with traditional transit (Feigon & Murphy, 2016). They are well-equipped to address the first/last mile problem, the common difficulty for transit users traveling between a residence and transit stops. Longer trips are a barrier to ridership. Emerging forms of mobility such as microtransit, bike sharing, and scooter sharing all facilitate easier travel to and from transit stops. Emerging mobility services also may offer more efficient options for some existing services such as some demand-response transit and could be candidates to replace those routes in a more cost-effective manner.

Use of shared-mobility services still is evolving across the country, and future innovations could carry even more societal benefits. Public-private partnerships (PPP) and innovative service models will continue to offer intriguing ways to address key mobility needs and reduce externalities from transportation.

Shared Mobility in Minnesota

Shared-mobility services play an important role in Minnesota's transportation network, particularly for those who do not drive a personal vehicle. They are operated and funded by a mix of public and private sources, and new shared-mobility innovations have continued to expand the variety of services offered in recent years.

Public transit service is offered in all 87 counties in Minnesota (MnDOT, 2019) and provided 93.7 million rides in 2017 (MnDOT Office of Transit, 2018; Metro Transit, 2018). Metro Transit serves much of the Twin Cities area and operates services including fixed-route buses, light rail, and demand-response transit. Several smaller transit agencies, including SouthWest Transit, Minnesota Valley Transit Authority, Plymouth Metrolink, and Maple Grove Transit, provide services in suburban areas, and the University of Minnesota operates services connecting its Twin Cities campus locations. Systems in Greater Minnesota offer a mix of fixed-route and demand-response services. Regular transit also is complemented by paratransit in several large cities. Public transit services are funded through a combination of federal, state, local, and own-source revenues.

Metro Transit/Met Council operates a car-pool matching service and subsidizes a van-pool program in the Twin Cities region. HOURCAR and Zipcar also offer member-based car-sharing services using fleets of vehicles located primarily in the Twin Cities. Vehicles offered through these services can be reserved online and picked up at designated locations (Shared-Use Mobility Center, 2017). Ride-sourcing services also are available in Minnesota through Uber and Lyft, which operate in the Twin Cities and several other large cities (Harlow, Uber arrives in Rochester, St. Cloud and Mankato, 2017).

Bike-sharing services have been offered in Minneapolis since 2010 by Nice Ride, which is now operated by Lyft. Bike-sharing providers left St. Paul in 2019 (Roper, 2019). Slightly under 360,000 trips were taken on Nice Ride's fleet of about 3,000 bikes in 2019 (Nice Ride, 2020; Thomas, 2019). Bike-sharing services have been piloted outside of the Twin Cities as well. Nice Ride launched bike-sharing pilots in Bemidji and Rochester, and, though both eventually ended, altered services were continued in both cities (Liedke, 2018). Communities such as Hastings, Willmar, and Austin also have experimented with bike sharing (MnDOT, 2018).

Lime and Bird began renting scooters in the Twin Cities during 2018. After their introduction, both Minneapolis and St. Paul developed pilot programs to regulate the industry and license providers. The number of scooters on Minneapolis streets increased from the maximum 600 allowed in 2018 to 2,000 in 2019. That year, Minneapolis tracked and recorded over one million rides taken on Lyft, Lime, and Spin scooters from 175,000 unique users (Thomas, 2019). Minneapolis selected two companies to operate in 2020, Lyft and Bird, while Saint Paul signed contracts with Lime and Bird (Harlow, 2020).

Microtransit services have yet to be widely adopted in Minnesota. Southwest Transit operates the SW Prime on-demand service that allows users to request rides via its smartphone app or by phone (Southwest Transit, 2020). In 2019, the Minnesota Valley Transit Authority (MVTA) announced it had partnered with

TransLoc to launch a pilot of MVTA Connect, an agency-owned microtransit service in Savage, Minnesota (TransLoc, 2019).

Shared mobility remains an innovative part of the transportation sector, and new service models have been tested in Minnesota. New shared-mobility innovations can continue to offer more efficient and accessible transportation options. Local governments in Minnesota recently have piloted several innovative services that indicate the ongoing potential for the adoption of new models of shared mobility.

In April 2019, Dakota County launched a partnership with Lyft to offer flexible, on-demand rides to work for individuals with disabilities who receive county services. The partnership was supported in part by a grant from the Minnesota Department of Human Services. The pilot ran until June 2020 and was free to users who received money in their Lyft accounts from Medicaid waivers (Shared-Use Mobility Center, 2019). Hitch Health, a startup developed by Hennepin Healthcare, launched a similar six-month pilot program in 2018. It partnered with Lyft to offer free rides to health appointments to reduce the number of missed appointments (Terrell, 2018).

The development of mobility hubs has been another important shared-mobility innovation in Minnesota. Mobility hubs are places that offer access to multiple modes of transportation, including transit, scooters, and bikes. In 2019, the City of Minneapolis launched a three-month mobility-hub pilot program in collaboration with Metro Transit, Hennepin County, mobility service providers, and neighborhood organizations. This pilot was intended to introduce the concept of mobility hubs to the public and help inform a long-term approach to implementing a larger mobility-hub network in the city (Minneapolis Public Works, 2020). St. Paul is the lead partner in a project to launch a network of charging hubs in St. Paul and Minneapolis that will support electric-vehicle car sharing in 2021 (Gray, 2019).

[COVID-19 Impacts on Shared Mobility](#)

The COVID-19 pandemic has created significant challenges for public transit and emerging shared-mobility services. It also has spurred providers to introduce new service models that meet needs created by the crisis, such as grocery delivery and free rides for essential workers. Across all modes, workplace closings, restrictions on nonessential travel, and voluntary social distancing have led to large declines in ridership and revenue in 2020 (Shared-Use Mobility Center, 2020).

Many of the country's largest public transit systems saw peak ridership declines of between 70 and 90% by May (Bliss, 2020). However, public transit services have continued to provide rides for essential workers and those who lack other transportation options to access health care, groceries, and other necessary services. According to analysis of American Community Survey data by TransitCenter, 2.8 million essential workers use transit to get to their jobs (Transit Center, 2020).

Metro Transit bus ridership declined 50% between March and the end of June 2020, while daily light rail ridership declined around 70% by April compared to pre-pandemic levels. Metro Transit has operated at a reduced service level, limited the number of riders allowed per bus, and restricted travel to essential trips only to limit public health risks during the crisis. Metro Mobility also has provided free, on-demand transportation to health care workers (Moore, 2020; Harlow, 2020).

Bike and scooter sharing providers have also seen a significant reduction in users and revenue. Lime removed all its scooters from U.S. cities, while Bird also withdrew from many areas, amid layoffs at both companies (Bliss, 2020). The pandemic's impact on bike sharing has been more mixed. Many cities initially saw bike sharing increase during the crisis, likely as a substitute for transit, but ridership declined once stay-at-home orders were put in place (Shared-Use Mobility Center, 2020). As states have opened back up, bikes are in high demand across the country (Goldbaum, 2020), suggesting that bike-sharing ridership may increase as an option perceived as safer than transit.

TNCs similarly have been affected. Uber ridership declined by 72% in between the first and second quarter of 2020, with Lyft reporting a similar decrease (Pesce, 2020). Uber cut about a quarter of its workforce to deal with the effects of the pandemic, while Lyft cut about 20% (Gaus, 2020). Overall, the pandemic's impact on the use and revenue of emerging shared-mobility providers has been severe.

The pandemic has offered opportunities for transit providers to fill gaps in existing transportation networks by connecting people to employment and health care, delivering groceries, and providing other services. One example is rabbittransit, a transit provider in a predominantly rural area of Pennsylvania. During the pandemic, it partnered with the local health system to provide rides to testing and safe quarantine facilities. Charlevoix County Transit, in rural Michigan, was one of many systems to begin providing deliveries of food and essential medication (Lynott & Heller, 2020).

Emerging shared-mobility providers also have experimented with new services during the pandemic, including new delivery services and programs for essential workers. For instance, Nice Ride offered 30 days of free rides to critical workers in Minneapolis during the pandemic, a common move for bike-sharing systems (Nice Ride, 2020). Uber has also placed an increased emphasis on food delivery through Uber Eats (Bellon & Mukherjee, 2020). Even while their standard business models are impacted, these shifts have shown the ability of innovative mobility providers to respond to challenges created by COVID-19.

The long-term impacts of the pandemic on transit services remain unclear but will need to be closely monitored. An April survey of more than 25,000 U.S. adults

found that 20% of those who regularly used public transportation said they would not after the pandemic, and another 28% indicated they would use it less often (IBM, 2020). A May survey from the Met Council also found that half of respondents were neutral or unlikely to ride transit without a vaccine (Met Council, 2020). Prolonged economic disruption or increases in telecommuting could decrease commuter ridership after the pandemic is over (Guyot & Sawhill, 2020) and declines in government revenue also may contribute to funding issues for transit systems.

The impact of the pandemic on the long-term health of shared-mobility companies also is uncertain, though it has caused serious financial harm. This could lead to multiple long-term changes, such as a consolidation of providers or increased subsidization of shared-mobility services by local governments. The suggestions presented in this paper were developed considering the challenges and opportunities the COVID-19 pandemic presents for shared mobility.

Research Design

This paper develops recommendations for two mechanisms that could increase shared-mobility funding in Minnesota. The first is the Metropolitan Council regional solicitation process, with recommendations for project evaluation criteria that could facilitate the increased consideration of shared-mobility projects. The second is a proposed state grant program for innovative shared-mobility services in Minnesota. These two topics were developed based on conversations with the technical advisory panel for this project.

To develop recommendations for regional solicitation criteria, the researchers conducted a review of criteria used by peer metropolitan planning organizations (MPOs) for programs that award funding to shared-mobility projects. They identified MPOs with potentially eligible programs¹ to supplement a list of peer MPOs considered in the Met Council's *2019 Regional Solicitation Before and After Study*. The researchers conducted a document analysis of federal funding programs for each of these peer MPOs and identified five specific programs for further analysis. Then, they analyzed the criteria from these programs to inform their recommendations, supplemented by interviews with experts on the regional solicitation process.

For the second recommendation, the researchers conducted a document review of federal and state programs to understand best practices for shared-mobility grant programs. They also reviewed each state to discover eligible programs. They used this information, supplemented by discussions with experts on shared mobility in the state, to create the framework of the proposed program in Minnesota. The final program structure was most informed by three grant programs offered by the Federal Transit Administration (FTA) Office of Research, Innovation, and Demonstration and the 2018 Michigan Mobility Challenge.

¹ The MPOs included in the review were the North Texas Council of Governments (COG), Denver Regional COG (DRCOG), Baltimore Metropolitan Council, North Carolina Capital Area MPO, Boston Region MPO, Metro Portland, Sacramento Area COG (SACOG), Atlanta Regional Commission, Delaware Valley Regional Planning Commission, Metropolitan Transportation Commission, Southeast Michigan COG, New York Metropolitan Transportation Commission, East-West Gateway COG, and the Puget Sound Regional Council.

Developing Regional Solicitation Criteria

Regional Solicitation Background

The Met Council biannually distributes federal funds to transportation projects that meet regional needs in the Twin Cities metro area through the regional solicitation. Local road, transit, transportation demand management (TDM), and pedestrian and bicycle projects all receive funding through this process. The solicitation is an important funding opportunity for local transportation projects in the Twin Cities, and, as emerging shared-mobility services continue to offer benefits for the region's transportation network, it will be important to find a clear place for those emerging services in the process.

The Met Council works with the Transportation Advisory Board (TAB), made up of officials from transportation agencies and local communities, to allocate funding through the regional solicitation. About \$180 million was awarded in the 2020 solicitation, most of which will be available for use during 2024 and 2025. Funds awarded through this competitive process come from the federal Surface Transportation Block Grant (STBG) and Congestion Mitigation and Air Quality Improvement (CMAQ) programs (Met Council, 2020).

Projects receive funding through submission to one of 12 application categories, such as traffic management technology or pedestrian facilities, based on their characteristics. Different criteria are used to evaluate projects by category, each with their own minimum and maximum funding awards. Criteria are closely tied to goals defined in the development framework for the region, Thrive MSP 2040 (Met Council, 2020). In addition, projects that are not eligible under these categories may receive funding under a category for unique projects.

The innovative TDM category supports projects that increase the availability of transportation options in the Twin Cities as well as reduce congestion and emissions. A variety of shared-mobility projects are eligible for this funding, such as bike sharing, car sharing, and car pooling (Met Council, 2020). Funds available under the innovative TDM category come from the CMAQ program and are available in 2022 or 2023 for 2020 projects, as opposed to the longer period for other application categories.

While the innovative TDM category has been a funding source for some shared-mobility projects, it is not ideal for all shared-mobility projects. One challenge is that the maximum possible award for projects in the category is \$500,000 — not enough to finance projects that require large capital investments. In addition, not all potential shared-mobility projects may be eligible in this category and could be disadvantaged by the existing criteria.

Another potential funding source for shared-mobility projects is the unique projects category, which awards funds to projects that do not fit into other

categories, including innovative and demonstration-type projects. The category for unique projects was added in 2016. Previously, unique projects were funded on a case-by-case basis. Two-and-a-half percent of funding from the 2020 solicitation (about \$4–5 million) was set aside to be awarded through this category in 2022. This funding will be available in 2024 or 2025.

In 2018, \$4 million was awarded to a partnership between St. Paul, HOURCAR, and Xcel Energy for mobility hubs with charging stations for electric car-sharing vehicles through the unique projects category. The project may have been eligible under the innovative TDM category but would have been limited by the funding maximum. This project is an example of the type of innovative shared-mobility project that can receive funding through the regional solicitation process and suggests there is an opportunity to fund future shared-mobility projects through the unique projects category.

Overall, the unique projects category offers a promising opportunity to provide more shared-mobility funding in the Twin Cities, especially considering that it was recently a funding source for a large shared-mobility project. Also, since the TAB is currently determining what future evaluation criteria should be, it would be more straightforward to suggest options for these criteria than to suggest changes to existing practices in the innovative TDM category.

Review of Evaluation Criteria

Currently, the TAB is in the process of developing evaluation criteria for unique projects in the 2022 cycle. In a previous TAB meeting, the following criteria were presented as an initial idea, which gives some indication about the types of criteria that may be discussed in the future (Met Council, 2019).

- Innovation
- Tests new concepts or services
- Integrates multiple modes
- Potential for large regional benefits or application
- Higher level of local match
- Public-private partnerships (PPPs)
- Ability to test and implement in an identified time frame

This section explores how criteria for the unique projects category could be developed to ensure consideration of shared-mobility projects and reflect their unique potential to meet regional goals in the Twin Cities. A document review of peer practices produced a list of commonly used criteria for evaluating shared-mobility projects. *Table 1* shows the criteria used in the programs identified during the document review. Criteria are listed from most to least important in application scoring. MPOs frequently award federal funding to categories or programs in which shared-mobility programs are sometimes eligible, but these

programs were identified as those that awarded a significant amount of funding to shared mobility.

Table 1: Peer MPO Project Selection Criteria

	Denver COG	Boston MPO	Sacramento COG	Delaware Valley	Metropolitan TC
Measure 1	Project area characteristics	Connectivity/ Integration value	Innovation and uniqueness	Project readiness	Innovation and uniqueness
Measure 2	Innovation and uniqueness	Cooperation	Trip/VMT reduction	Sponsor capacity	Replication potential
Measure 3	Trip reduction	Consistency with plans	Performance measurement plan	Cost-effectiveness	Emissions reduction
Measure 4	VMT reduction	Transportation equity	Target/ Market	Long-term viability	Cost-effectiveness
Measure 5	Project readiness	Generation of mode shift	Cost/ Participants	Environmental justice	Cost-sharing by partners
Measure 6	Project timing	Demand projection			Local match
Measure 7	Cost per VMT reduction				Location
Measure 8	Local match				
Measure 9	Intangibles				

Sources: (FHWA, 2014; Boston Region MPO, 2018; SACOG, 2018; DVRPC, 2020; MTC, 2010)

These criteria reveal commonalities about how MPOs evaluate projects within shared-mobility-focused programs.² Criteria such as level of innovation, cost-effectiveness, and characteristics of the project and its sponsor (such as readiness or capability) frequently were very important. While less common, criteria related to the potential for replication, the consistency of the project with local or regional plans, and system connectivity value sometimes were ranked as very important. Most programs also included an equity or environmental justice component, though it was a small part of the overall score. Many of these criteria were reflected in the list referenced earlier of initial criteria ideas from the TAB.

Innovation and uniqueness were arguably the most important evaluation criteria, yet they are used and defined differently by MPOs. The Denver COG awards

² The five programs included in the table are Denver Regional Council of Government (COG) Regional TDM program, the Boston Region MPO Community Connections program, Sacramento Area COG Innovative TDM grant program, the Delaware Valley Regional Planning Commission Competitive CMAQ program, and the Metropolitan Transportation Commission (San Francisco) Climate Initiatives Program.

about 17% of its evaluation score using these criteria, depending on whether the project reaches new areas or demographics and if it is unlike other past project types. The Sacramento COG has a nearly identical definition of innovation and awards up to 40% of the evaluation score based on the criteria. In contrast, the Metropolitan Transportation Commission (New York) scores all its criteria qualitatively, judging application as either high, medium, or low. A more in-depth description of how it defines innovation was not found.

In addition to the analysis conducted for this paper, the Boston Region MPO conducted a similar review of peer practices when developing its Community Connections program (analyzed above), which had its first funding round in 2020. The program was designed to fund first- and last-mile solutions, community transportation, and other nontraditional transportation projects. Projects including microtransit, bike sharing, and shuttles all received funding from the program (Boston Region MPO, 2018).

Part of the review conducted by the Boston Region MPO was a peer survey about the importance of various factors in project evaluation.³ These findings are useful for reinforcing those of our own review. The survey asked about the relative importance of different evaluation criteria, including many of the ones discussed above. Overall, respondents from seven MPOs indicated that level of local funding, identification in local or regional needs assessments, and expected effectiveness were key factors. Importantly, criteria related to project innovation were not included as survey options, although some MPOs gave additional feedback that they used this criterion. Among the factors included in the survey, the respondents answered that private financial support and demand forecasts were the least important.

Recommendations

Increased shared-mobility funding opportunities in the regional solicitation will help support new transportation options to address existing transportation gaps, especially those that disproportionately impact low-income communities and communities of color. In particular, the recommendations below prioritize projects that benefit underserved communities by increasing accessible, affordable transportation options.

The analysis of peer-funding programs is useful for informing the development of criteria for unique projects in the regional solicitation, while keeping a couple of considerations in mind. Although the unique projects funding stream offers an essential opportunity to award more funding to shared mobility, it will continue to award funding to many types of projects, so the criteria need to be effective and fair to all projects. Another consideration is that the criteria used to evaluate

³ The full survey results are available at: https://www.ctps.org/data/calendar/htmls/2018/MPO_1018_Community_Transportation_Program_Development_Survey_Results.html

regional solicitation projects are connected to the goals outlined in the Thrive MSP regional development framework.

Given the focus on innovative shared-mobility projects, the level of innovation or uniqueness should be a key criterion adopted for project evaluation. Though definitions may vary, it could be evaluated similarly to DRCOG and SACOG, which award a range of points based on how a project provides a new service to a new geography or market. This also includes those that serve an underserved demographic within an already-served area. Project applications could include a justification of the innovative nature of the project and why it is necessary to address the project goals, which would then be scored by the reviewers.

Alternatively, innovative services also could include those not previously operated by an organization, even if they have existed in a particular market or area. This would reflect the value of organizations testing new ideas and service models rather than just considering innovation in a geographic area.

Replication potential is another criterion that could be valuable for the program, though there may be some inherent tension between this and project uniqueness because unique projects may be difficult to replicate outside of their context. Still, project replication is an important consideration for funding shared-mobility projects because replicable projects can be models for addressing broader, statewide needs. This criterion was not commonly used in the programs reviewed.

In a separate program from the one reviewed, DRCOG uses a replication criterion which awards a range of points based on a panel's assessment of whether the project has potential beyond the specific area and timeline of the project (DRCOG, 2019). Both types of replicability are important for evaluation. Once again, this criterion could be scored through a review of a required section of a project application. In this section, the applicant would be required to identify core elements of the program necessary for replication and how their program could support future adoption.

Equity was frequently an evaluation component in the reviewed programs, though it was typically a criterion of lower importance. While it is common practice to assign less importance to this category, there is an opportunity to make equity a more important factor in the selection of innovative projects within the shared-mobility category, especially due to the potential of shared-mobility services to address transportation equity issues by increasing access and affordability and reducing harmful transportation externalities. As a result, it is recommended that equity play a more important role in the unique projects category.

In the reviewed programs, equity measures typically scored whether a project served an area identified by the MPO as disadvantaged. Metro Transit has previously drafted a list of performance measures to evaluate shared-mobility pilots and programs — utilizing some of these would allow for a more in-depth equity analysis than the scoring typically used by peer MPOs. Strong indicators

would include the percentage of service in areas of concentrated poverty with at least 50% residents of color (ACP50s) as designated by the Met Council, projected trips provided to people with disabilities, and availability to people who are unbanked or without a smartphone.

Other commonly used criteria included integration with existing systems, applicant capability and project readiness, cost-effectiveness, and level of local match. System integration is an important consideration for project assessment to ensure shared-mobility services complement rather than duplicate existing transportation options and connect to areas with high-mobility needs. The Boston MPO bases a project score on three equally weighted measures: connection to an activity hub or residential development, connection to existing transit hubs, and connections to other transportation infrastructure. Each of these elements is important for assessing the overall connectivity value of a project.

A criterion that assesses applicant capability or strength of the project plan also would be important to include, especially considering that many innovative projects will be much different than what applicants are used to operating. This criterion would need to be qualitatively assessed by the application reviewers.

Though cost-effectiveness was frequently an important criterion, it could be difficult to use it to compare the significantly different projects that could receive funding through the unique projects category. As a result, it is reasonable to assign it lower importance in this case. In the reviewed programs, cost-effectiveness was determined by dividing total cost by estimated population served or emissions reduction. In this case, cost divided by estimated population served would likely be the most effective measure. Finally, local match would also be a useful criterion to use for the unique projects category, though less important than most others.

In conclusion, the following criteria would be important for consideration in the unique projects category based on document review and the researchers' own analysis. They are organized from very important to less important.

- Innovation or uniqueness
- Transportation equity
- Integration with existing systems
- Replication potential
- Applicant capability, or strength of plan
- Cost-effectiveness
- Local match

The final criteria for the unique projects category will ultimately be determined by the TAB based on their goals and how they connect to Thrive MSP 2040. However, ensuring support for innovative shared-mobility services in the unique

projects category would be a valuable way to increase innovation and prioritize transportation equity in the Twin Cities. This review of peer practices is valuable for understanding how other MPOs award funding to innovative shared-mobility projects.

Outlining a State Shared-Mobility Program

Shared-mobility innovation has been spurred by pilot programs that develop and test new concepts. Successful pilots can serve as a model that can be adopted in other areas. These projects most often have been run by local governments or transit agencies and frequently leverage PPPs. A state-led competitive grant program would be an effective way to expand upon this practice by supporting innovation in all areas of Minnesota.

There is an especially important need for shared-mobility services to address transportation gaps that prevent residents from access to work and essential services, including those that stem from the COVID-19 pandemic. Innovative shared-mobility pilots could address existing transportation gaps, such as the first- and last-mile problem, access to essential services for those who do not drive, and lack of connectivity between transit systems.

While shared-mobility services most often have been associated with urban areas, federal and state programs have funded rural pilots as well. Rural Minnesota has a higher percentage of senior and disabled transit riders than urban areas, and more of whom are likely to rely on transit to access essential services (Center for Rural Policy and Development, 2016). As a result, addressing transportation gaps in rural areas is an especially important need. A state-level program would allow officials to fund projects that meet statewide needs and would ensure that funding is distributed to a diverse group of pilots in different areas of the state.

This section develops a framework for a competitive grant program for shared-mobility pilots in Minnesota. Existing programs can provide insight about how this program could be designed. The funding source and amount could be adjusted based on available resources, particularly considering the fiscal constraints imposed by the COVID-19 pandemic. A similar 2018 program in Michigan was funded with \$8 million, enough to support 11 pilots. The goals of the proposed program are listed below:

- Improve access to essential services and employment, particularly related to the COVID-19 pandemic
- Demonstrate shared-mobility innovations that could be adopted across the state
- Generate local or private matching funds
- Make Minnesota a national shared-mobility leader

FTA Shared-Mobility Programs

Federal funds typically are not available for several years after they are awarded — not ideal for innovative shared-mobility projects in a very dynamic market. In recent years, the FTA has offered special funding programs for innovative shared-mobility pilots under the Public Transportation Improvement Program (49 U.S.C.

§ 5312). FTA has run three programs, two of which have already awarded funding to applicants.

The Mobility on Demand (MOD) Sandbox Program was the first competitive FTA grant program for shared-mobility projects (FTA, 2019). It funded 11 projects in 2016 for a total of \$8 million. The program was intended to fund pilots that use smartphone apps, open-data platforms, or other advanced technologies to better connect riders to destinations. The most common project types funded through the MOD Sandbox Program were trip coordination and integrated payment technology and first- and last-mile solutions, often with an emphasis on PPPs.

The next competitive FTA grant program was the Integrated Mobility Innovation (IMI) Program, which awarded \$20.3 million to 25 projects in March 2020. It was intended for mobility-on-demand projects, strategic transit-automation research, and mobility payment integration (FTA, 2020). Ten of the selected projects offered specific services for disadvantaged populations and 37% of the funding went to projects serving only rural areas (Grossman, 2020). Most projects either introduced new shared-mobility services, such as microtransit or paratransit using TNCs, or improved and connected existing services using innovative technology for trip coordination and integrated payments.

Both FTA programs relied on the same criteria to evaluate funding applications. These included whether the model was replicable in other communities, an assessment of the business model, equity and accessibility evaluations, and the willingness of the organization to complete an evaluation after project completion. Other factors such as diversity of geography and project type were also considered. Evaluations are required for all projects post-completion.

Shortly after funding awards were announced for the IMI program, the FTA launched the Accelerating Innovative Mobility (AIM) Program (FTA, 2020). This program will award \$11 million of funding to projects that 1) develop innovative technologies and service models for the transit industry, and 2) promote PPPs to improve personal mobility, 50% of which will be awarded to projects in rural areas. The criteria used to assess AIM applications are slightly different than for previous programs and include clarity of the innovative premise, demonstrated benefit, strength of partnerships, and completeness of the implementation strategy.

Overall, FTA commitment to providing quick funding for shared-mobility pilots shows the importance of such programs for supplementing traditional funding streams. Other transportation funding often is not flexible enough and takes too long to be distributed after project awards to support innovative shared-mobility pilots. This also demonstrates the recognized potential of such services to improve the accessibility and efficiency of transportation services in urban, suburban, and rural contexts.

Michigan Mobility Challenge

The state of Michigan announced the Michigan Mobility Challenge grant initiative in May 2018 (MDOT, 2020), which shares many similarities to the federal programs discussed earlier. The grant program was designed specifically to address mobility gaps for seniors, persons with disabilities, and veterans. It awarded \$8 million to projects in both urban and rural areas to subsidize a portion of project costs for 3–6 months, with the remaining costs being covered by fares, local contributions, and other funds (Wieland, 2018).

The Michigan program funded 13 projects with grants that ranged between \$100,000 and \$2.1 million. Most projects were considered shared-mobility, commonly involving the development of new technology that allowed improved trip coordination and integration between different providers or modes. Several projects that improved transit accessibility for people with disabilities also received funding.

The program was mainly operated by two state agencies, the Michigan Department of Transportation (MDOT) and PlanetM, an initiative created by the Michigan Economic Development Corporation to focus on mobility issues. Other state agencies were involved to a lesser extent, such as the Bureau for Veterans Affairs, which helped connect the program with veterans' advocates. An initial meeting served to introduce the program, foster discussion of mobility issues for the target populations, and connect providers and technology companies.

The request for proposals was purposefully broad to encourage applications for a diverse range of projects. Pilots were required to reflect innovative service models, to be operated by a diverse group of partners, to supplement existing transit services, and to be sustainable after the demonstration period. Projects were evaluated using criteria such as level of innovation and clarity of the mobility gap addressed. High-scoring projects advanced to a second stage of evaluation and ultimately were selected in a process that considered the diversity of service types, the locations of selected projects, and the project cost. An evaluation of each project also was required to identify lessons learned and judge project impacts (State of Michigan, 2018).

Michigan's program also garnered outside interest from FTA, particularly given the state program's similarity to the MOD Sandbox Program and future efforts. Ultimately, FTA provided funding so that university researchers could conduct an independent evaluation of the entire program after projects have been completed.

Analysis of the key features of the Michigan Mobility Challenge reinforces the importance of some design elements found in FTA shared-mobility programs while also showing that this type of program is feasible to operate at the state level. The Michigan Mobility Challenge distributed less funding than the two most recent FTA programs and average projects awards also were smaller, but it funded many of the same types of projects. The Michigan program also created a

model for engaging key stakeholders within a state. It relied on the Michigan Economic Development Corporation to bring in technology providers from across the country and other state agencies to connect with advocates for the disadvantaged populations that were the focus of the program.

A Framework for Minnesota

The reviewed federal and state shared-mobility programs are leading examples of how governments can successfully fund shared-mobility pilot projects. Together, they distributed millions of dollars to shared-mobility projects that piloted innovative services to increase transportation access and efficiency, often specifically supporting disadvantaged populations or rural communities.

The program framework developed for Minnesota builds on many of the strategies in the previously reviewed programs to fund shared-mobility projects that increase access to essential services. *Table 2* shows some of the key elements of the proposed program. Program parameters could change as necessary to respond to feedback from stakeholders, and details are discussed in more depth below. The program could be operated in collaboration between multiple state agencies such as the Minnesota Department of Transportation, Department of Human Services (DHS), and Department of Employment and Economic Development (DEED).

Table 2: Key Characteristics of the Minnesota Mobility Innovation Program

Name	Minnesota Mobility Innovation Program
Agencies Involved	MnDOT, DHS, DEED
Eligible Applicants	Public and private transportation providers, public agencies
Eligible Project Types	Not limited by shared-mobility mode
Available Funding	\$6–8 million
Maximum Funding Award	None
State Cost Share	80%
Pilots Funded	3–5
Eligible Costs	Capital, operating, and planning
Project Assessment	Required evaluation by operator
Key Selection Criteria	Innovation, replication potential, need addressed

Based on the RFPs for the reviewed programs, it was clear that many requirements were left broad to ensure innovative projects are not excluded from the application process. That approach is continued for this framework. A wide variety of organizations should be eligible to apply for funding. These include public transit agencies or divisions within, private transportation providers, government agencies, and nonprofits. Still, as was the case in the other programs, it would be expected that transit agencies would be contracting partners in many cases, even if they are partnered with other organizations. This aligns with

MnDOT goals to use emerging shared mobility in Greater Minnesota to improve access to and the connectivity of existing transit. Given that the state has preexisting relationships with transit providers, this also likely will make contracting simpler than it would be with other organizations.

Similarly, application eligibility would not be restricted by project mode — a variety of shared-mobility modes could contribute to the overarching program goals. Though modes would not be limited, the types of projects funded under previous programs indicate those that might be most effective in Minnesota. Most frequently, projects used innovative technology to integrate existing transportation modes or transit systems through products such as improved routing, trip coordination, and payment integration. MnDOT recently applied for funding from the FTA AIM Program for a similar project based in Southern Minnesota. Projects that introduced new transportation services most frequently utilized ride-sourcing or other demand-response services to supplement existing transit networks.

Between \$6 and \$8 million to fund projects could come from multiple sources, including the state general fund or CMAQ funding. It also could come from the state agencies involved in the program. Michigan's Mobility Challenge Initiative distributed \$8 million, while the three FTA programs have offered between \$8 and \$20 million. We recognize that funding will be especially constrained because of the COVID-19 pandemic, so the proposed program may be smaller than those reviewed. Even a program smaller than Michigan's would have funding to support several innovative shared-mobility projects to help meet essential needs and serve as models for future services. The applicant organization would be required to fund 20% of the project cost and the state share could be used to cover capital, operating, or planning expenses.

Projects funded through the other programs give some information about the typical cost of shared-mobility pilots. The average project award for the Michigan Mobility Challenge was about \$650,000, though that average was just over \$300,000 after removing the three largest projects. The programs were subsidized for 3 to 6 months. The average funding awarded by FTA was higher — commonly \$300,000 to \$800,000. Projects that introduced new services typically were slightly more expensive than improvements to existing services, but there was quite a bit of variation. Based on these average funding amounts, even a program that provides \$6 million would be able to fund several pilots across the state.

The process through which the program brings together providers and other stakeholders to introduce the program and build connection also is important. The initial meeting was very important for Michigan's program, but such a large gathering may not be possible until concerns about the pandemic subside. MnDOT created Regional Transportation Coordinating Councils (RTCCs) in Greater Minnesota, which consist of representatives from agencies and interest groups interested in improving mobility for the transportation disadvantaged

(MnDOT, 2020). Ideally, RTCCs could be leveraged to connect partners and facilitate dialogue about the program in Greater Minnesota. The county-based Twin Cities Area Transit Coordination Assistance Projects (TCAPs) could fulfill a similar function in the metro region.

Evaluation criteria for the proposed program would be flexible, based on any changes to program goals, and generally reflect the criteria used in the reviewed programs. To evaluate applications, the key goals of demonstrating innovation and testing a project that could be adopted elsewhere would need to be prominently considered. Other important evaluation criteria would be the importance of the need addressed by a project and the operational and financial capacity of the applicant organization(s).

Finally, an evaluation report will be required for each project, consistent with the common practices identified in the review. Evaluations would be conducted by the implementing organizations for each project and would include, at minimum, an overview of the project timeline, an assessment of the project using performance measures identified in the application, in-depth lessons learned, and suggestions for improvement. The goal of each report would be to assess the impact of the innovation and provide information that could be used to implement it in other communities.

Conclusion

Research has demonstrated that innovative shared-mobility practices can bring significant individual and societal benefits. They can enhance transportation access and equity, limit vehicle trips, and reduce transportation externalities. The market for shared-mobility services is developing rapidly, and the evolution of new service models will continue to contribute to Minnesota's transportation network. Government-led investments and pilot programs, often in collaboration with private providers, have been an important tool for supporting these services.

State and regional support is important to fully realize the benefits of emerging shared-mobility services. This paper developed two recommendations for increased financial support for shared mobility. Both options complement each other and would contribute to increased funding for shared-mobility projects in Minnesota. However, neither is dependent on the other, and both options presented can be adjusted as needed to respond to current financial constraints and stakeholder goals.

The first opportunity is to develop application evaluation criteria for the Metropolitan Council regional solicitation that encourages the funding of shared-mobility projects. Work on criteria for the unique projects category of the regional solicitation has already begun, making it an ideal prospect for funding these projects. In fact, an innovative shared-mobility project was recently awarded funds in this category. Based on a review of similar programs offered by MPO peers of the Met Council, possible criteria include a project's level of innovation, impact on transportation equity, integration within existing systems, applicant capability, cost-effectiveness, replication potential, and local match. It is especially important to prioritize equity in project evaluations to ensure that new shared-mobility projects support traditionally disadvantaged communities.

The second opportunity is the development of a state-level, competitive grant program for shared-mobility innovations that increase access to essential services across the state. The program framework developed in this paper is based on best practices from similar U.S. programs and would provide funding to projects that introduce new shared-mobility services using innovative technology across the state. This program is intended to increase mobility innovation in both urban and rural areas. It would ensure that all areas of the state and the residents of those areas are prepared to take advantage of emerging technologies to make transportation more efficient and accessible.

The shared-mobility industry has rapidly evolved in the last decade and is currently challenged by the COVID-19 pandemic. Public support for shared-mobility services will be crucial to ensure they develop to best support the needs of Minnesota residents.

Bibliography

- Bellon, T., & Mukherjee, S. (2020). Uber to focus on core rides, delivery business as it cuts 23% of workforce. *Reuters*.
- Bliss, L. (2020). Bird cuts 30% of workforce as coronavirus pushes scooters out of cities. *Los Angeles Times*.
- Boston Region MPO. (2018). Community Transportation Program Development MPO Survey Results: Important Factors in Project Evaluation. *Community Transportation Program Development MPO Survey Results: Important Factors in Project Evaluation*. Retrieved from https://www.ctps.org/data/calendar/htmls/2018/MPO_1018_Community_Transportation_Program_Development_Survey_Results.html
- Center for Rural Policy and Development. (2016). Rural Reality: City transit, rural transit.
- DRCOG. (2019). TDM Service Set-Aside: Eligibility Rules and Selection Process.
- DVRPC. (2020). FY2020 Competitive CMAQ Program for New Jersey. *FY2020 Competitive CMAQ Program for New Jersey*. Retrieved from https://www.dvrpc.org/CMAQ/pdf/4902_2020CMAQNJ_Webinar.pdf
- Feigon, S., & Murphy, C. (2016). *Shared Mobility and the Transformation of Public Transit*. Tech. rep., American Public Transit Association.
- FHWA. (2014). Programming for Operations: MPO Examples of Prioritizing and Funding Transportation Systems Management & Operations Strategies. *Programming for Operations: MPO Examples of Prioritizing and Funding Transportation Systems Management & Operations Strategies*.
- FTA. (2019). Mobility on Demand (MOD) Sandbox Program. *Mobility on Demand (MOD) Sandbox Program*. Retrieved from <https://www.transit.dot.gov/research-innovation/mobility-demand-mod-sandbox-program>
- FTA. (2020). Accelerating Innovative Mobility. *Accelerating Innovative Mobility*.
- FTA. (2020). Integrated Mobility Innovation (IMI) Fiscal Year 2019 Selected Projects. *Integrated Mobility Innovation (IMI) Fiscal Year 2019 Selected Projects*.
- Gaus, A. (2020). Lyft Surges on Uptick in Rides, But Still Has Long Road Ahead. *TheStreet*.
- Goldbaum, C. (2020). Thinking of Buying a Bike? Get Ready for a Very Long Wait. *New York Times*.
- Gray, L. (2019). Mobility Hubs Come to Life in the Twin Cities.
- Grossman, A. (2020). FTA Announces Integrated Mobility Innovation Grant Awards and Next Round of Transit Innovation Funding. *Eno Center for Transportation*.
- Guyot, K., & Sawhill, I. V. (2020). Telecommuting will likely continue long after the pandemic. *Brookings Institute*.

- Harlow, T. (2017). Uber arrives in Rochester, St. Cloud and Mankato. Retrieved from <https://www.startribune.com/uber-arrives-in-rochester-st-cloud-and-mankato/415217564/>
- Harlow, T. (2020). City Council Approves Measure to Bring Scooters to St. Paul. *Star Tribune*.
- Harlow, T. (2020). Metro Transit to Resume Front-door Boarding, Onboard Fare Collection. *Star Tribune*.
- Henao, A., Marshall, W., & Jenson, B. (2019). *Impacts of Ridesourcing on VMT, Parking Demand, Transportation Equity, and Travel Behavior*. Tech. rep., Mountain-Plains Consortium.
- IBM. (2020). IBM Study: COVID-19 Is Significantly Altering U.S. Consumer Behavior and Plans Post-Crisis. *IBM Study: COVID-19 Is Significantly Altering U.S. Consumer Behavior and Plans Post-Crisis*. Retrieved from <https://newsroom.ibm.com/2020-05-01-IBM-Study-COVID-19-Is-Significantly-Altering-U-S-Consumer-Behavior-and-Plans-Post-Crisis>
- Liedke, M. (2018). Nice Ride Bemidji is no more, but locals putting bikes to good use.
- Lynott, J., & Heller, M. (2020). How public transportation provides key lifelines during COVID-19. *World Economic Forum*.
- Massachusetts Department of Transportation. (2017). *Shared-Use Mobility Services: Literature Review*. Tech. rep.
- MDOT. (2020). 8 Million Michigan Mobility Challenge. *8 Million Michigan Mobility Challenge*.
- Met Council. (2019). Unique Projects in the Regional Solicitation. *Unique Projects in the Regional Solicitation*.
- Met Council. (2020). COVID-19 (Coronavirus) Outbreak Transportation Survey: May 2020. *COVID-19 (Coronavirus) Outbreak Transportation Survey: May 2020*.
- Met Council. (2020). Introduction: Regional Solicitation for Transportation Projects. *Introduction: Regional Solicitation for Transportation Projects*.
- Met Council. (2020). Travel Demand Management: Prioritizing Criteria and Measures. *Travel Demand Management: Prioritizing Criteria and Measures*.
- Metro Transit. (2018). Rail lines set records as Metro Transit ridership tops 81.9 million in 2017. *Rail lines set records as Metro Transit ridership tops 81.9 million in 2017*.
- Minneapolis Public Works. (2020). *2019 Minneapolis Mobility Hubs Pilot*. Tech. rep.
- MnDOT. (2018). *Mobility as a Service*. Tech. rep.

- MnDOT. (2019). *2018 Transit Report: A Guide to Greater Minnesota's Public Transit Systems*. Tech. rep.
- MnDOT. (2020). Greater Minnesota Regional Transportation Coordinating Councils. *Greater Minnesota Regional Transportation Coordinating Councils*.
- MnDOT Office of Transit. (2018). Annual Greater Minnesota Transit Ridership. *Annual Greater Minnesota Transit Ridership*.
- Moore, J. (2020). Metro Mobility providing free transportation for Twin Cities health care workers. *Star Tribune*.
- MTC. (2010). Climate Initiatives Program Competitive Grants Guidelines. *Climate Initiatives Program Competitive Grants Guidelines*. Retrieved from https://mtc.ca.gov/sites/default/files/BA_climate_initiatives_grant_guide.pdf
- Nice Ride. (2020). Critical Workers Program. *Critical Workers Program*. Retrieved from <https://www.niceridemn.com/blog/critical-worker-program>
- Nice Ride. (2020). System Data. *System Data*. Retrieved from <https://www.niceridemn.com/system-data>
- Pesce, N. L. (2020). Uber CEO sees 'signs of life' after ridership plummeted 80 percent in April. *MarketWatch*.
- Rana, P. (2020). Uber Ridership Fails to Recover as Pandemic Drives Another Big Loss. *The Wall Street Journal*.
- Roper, E. (2019). Bike sharing disappears from St. Paul streets. *Star Tribune*.
- SACOG. (2018). Request for Grant Applications for Transportation Demand Management Innovations Grant Program. *Request for Grant Applications for Transportation Demand Management Innovations Grant Program*. Retrieved from https://www.sacog.org/sites/main/files/file-attachments/fy1819_tdm_innovations_grant_guidelines.pdf?1529605175
- Shaheen, S., & Cohen, A. (2009). North American Carsharing 10 Year Retrospective. *Transportation Research Record: Journal of the Transportation Research Board*.
- Shaheen, S., Cohen, A., & Zhody, I. (2016). *Shared Mobility: Current Practices and Guiding Principles*. Tech. rep., Federal Highway Administration.
- Shared-Use Mobility Center. (2015). *Shared-Use Mobility Reference Guide*. Tech. rep.
- Shared-Use Mobility Center. (2017). *Twin Cities Shared-Mobility Action Plan*. Tech. rep.
- Shared-Use Mobility Center. (2019). Dakota County partners with Lyft for paratransit rides, Dakota County, MN, 2019. *Dakota County partners with Lyft for paratransit rides, Dakota County, MN, 2019*.

- Shared-Use Mobility Center. (2020). Case Study: Status Update, May 19: COVID-19 Crisis Impact on Transit & Shared Mobility. *Case Study: Status Update, May 19: COVID-19 Crisis Impact on Transit & Shared Mobility*. Retrieved from <https://learn.sharedusemobilitycenter.org/casestudy/status-update-may-19-covid-19-crisis-impact-on-transit-shared-mobility/>
- Shared-Use Mobility Center. (2020). What is Shared Mobility? *What is Shared Mobility?*
- Shared-Use Mobility Center. (n.d.). Learning Module: Microtransit.
- Southwest Transit. (2020). What is SW Prime?
- State of Michigan. (2018). Michigan Mobility Challenge Call for Projects. *Michigan Mobility Challenge Call for Projects*.
- Terrell, G. (2018). Startup launched by HCMC's innovation incubator taking partnership with Lyft national. *Minneapolis/St. Paul Business Journal*.
- Thomas, D. (2019). Minneapolis' shared scooter pilot logged more than 1 million rides in 2019. *Minneapolis/St. Paul Business Journal*.
- Thomas, D. (2019). Nice Ride's Bumpy 2019: Fewer riders, more missing bikes and new competition. *Minneapolis/St. Paul Business Journal*.
- Thomas, D. (2020). Scooters are Returning to Minneapolis, but Pandemic makes Timing Uncertain. *Minneapolis/St. Paul Business Journal*.
- Transit Center. (2020). Transit is Essential: 2.8 million U.S. Essential Workers Ride Transit to Their Jobs.
- TransLoc. (2019). TransLoc Launches Agency-Owned Microtransit Pilot Program with Minnesota Valley Transit Authority. *TransLoc Launches Agency-Owned Microtransit Pilot Program with Minnesota Valley Transit Authority*. Retrieved from <https://blog.transloc.com/press/transloc-launches-agency-owned-microtransit-pilot-program-with-minnesota-valley-transit-authority>
- Wieland, T. (2018). SPLT awarded 990,000 Michigan Mobility Challenge grant. *SPLT awarded 990,000 Michigan Mobility Challenge grant*.