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Linking Transportation Systems Management and Operations (TSMO) and Transportation Equity

Transportation Systems Management and Operations

(TSMO) is a “set of strategies that focus on operational improvements that can maintain and even restore the performance of the existing transportation system before extra capacity is needed. The goal is to get the most performance out of the transportation facilities that we already have. This requires knowledge, skills, and techniques to administer comprehensive solutions that can be quickly implemented at a relatively low cost. This may enable transportation agencies to stretch their funding to benefit more areas and customers. TSMO also helps agencies balance supply and demand and provide flexible solutions to match changing conditions.”¹

Equity “means the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons; Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality.”²

Transportation agencies have increasingly pursued the application of TSMO strategies to optimize the performance of the existing transportation system and provide lower cost and more sustainable solutions than traditional transportation infrastructure projects that add lanes to meet safety, mobility, and reliability challenges.¹ An emphasis on transportation equity² can create the opportunity for identifying how TSMO strategies can play an effective role in addressing the needs of disadvantaged, underserved, or overburdened populations, thus making it important to define the connections between TSMO and equity. Because transportation inequities result from a complex combination of past actions and external factors, changes in management and operations of the existing transportation system alone will not achieve total transportation equity. However, TSMO can help advance transportation equity with the goal of optimizing the multimodal transportation system for all users.

Although transportation equity is not a new concept, it is an evolving field, which creates challenges in evaluating and addressing it. Sometimes, a single agency may not be able to address the equity issue on its own or may have conflicting objectives with other agencies that they would need to partner with to address an issue.

Challenges and Opportunities Related to Transportation Equity

Within a TSMO program, there may be challenges that create potential TSMO-centered inequities and opportunities for agencies to address them. Challenges and opportunities include the following:

- **Data:** Availability, quality, granularity, analyzation, leadership willingness/ability to act on data. Crowdsourced data may rely on new technologies and insights may not represent all populations.
Helpful tips: Agencies can install/implement data collection methods that do not require new technologies and place data collection tools in disadvantaged communities.
- **Project Identification:** TSMO projects may not be identified for transportation improvement programs as staff are not aware of TSMO as a solution. Inequities may be created in the way that agencies identify system needs.
Helpful tips: Agencies can promote interagency collaboration and reevaluate processes for identifying system needs.
- **Project Prioritization:** Some trade-offs in the allocation of funding may exacerbate inequities for resource investment.
Helpful tips: Agencies can evaluate and adjust high-priority operations activities to include underserved communities and multiple modes.

¹For more information on TSMO, please visit the FHWA “What is TSMO?” website. <https://ops.fhwa.dot.gov/tsmo/>

²United States Department of Transportation. (2022). “Equity Action Plan.” https://www.transportation.gov/sites/dot.gov/files/2022-04/Equity_Action_Plan.pdf

- **Mainline Commuter Travel:** Freeway management priorities focus on optimizing suburb to business district travel, rather than reverse commute travel. As distances increase between central-city resident homes and employment locations, this creates difficulties for transit-dependent workers.
Helpful tips: Agencies can ensure the maintenance and reliability of transit routes, especially in underserved communities.
- **Curb Space:** The various needs for curb space can create trade-offs related to equity, with traditional approaches favoring parking as the primary curb user.
Helpful tips: Agencies can consider how curb space availability can be spread across needs and modes.
- **Detour Routes:** Disadvantaged or overburdened communities may be negatively impacted by detouring traffic, which is beneficial from a systemwide delay and safety perspective.
Helpful tips: Agencies can review detour routes within communities to understand issues and develop plans to mitigate the potential negative impacts.
- **Pricing Strategies:** Road pricing (high-occupancy toll lanes) can be perceived by the public as a “two-tier transportation system.” One tier who can afford to use the roads and the other that may not gain the same benefit unless cordon or area pricing are used.
Helpful tips: Agencies can complete analyses to understand equity impacts of implementing pricing strategies and ensure that alternative transportation options are available and dependable.
- **Technology Advancements:** For low-income, unbanked drivers, or those without a smartphone, certain transportation technologies can create challenges when using electronic tolling and cashless payment systems for transit and micromobility. A lack of access or usability features to help older adults and people with disabilities is also a hindrance.
Helpful tips: Agencies can ensure that alternative payment options are accessible when implementing technology advancements and try to mitigate potential user challenges and usability issues.

Framework for Linking Transportation Equity and TSMO – A People-First Approach to Operations

When addressing transportation equity within the existing system, it is important to identify and understand the key issues and how the historical equity issues of the region impact the existing transportation system. Advancing transportation equity requires agencies to undertake an iterative approach with the public to meet their needs rather than the application of a prescribed method or one-size-fits-all checklist. The following framework has been developed to support the connection between TSMO and transportation equity through a people-first approach.

Step 1. Building Context and Enabling Community Voices for Operations

Often, public engagement occurs during long-range planning or project development processes; however, it is beneficial in TSMO, too. Within an agency, including TSMO practitioners in the long-range planning, prioritization, and project development process supports a broader view of how TSMO strategies can support agency goals and objectives. This intra-agency coordination can provide the opportunity for incorporation of TSMO-related strategies that could further equity goals in the statewide transportation improvement program. Regular engagement creates the opportunity to build agency trust and allows planners and operations staff to hear directly from the people impacted by a project/service, getting reliable information from the people with the needs.

Agencies can consider how and when to involve the public to build community trust in the agency and provide transparency with regard to how solutions are identified and what factors are considered in selecting and implementing solutions. Post-implementation public involvement can help agencies understand whether the proposed solutions result in the intended outcomes.

Step 2. Defining Equity-Related Issues in the Transportation System

Use data and tools to understand equity-related issues caused or addressable by TSMO.

Identify Gaps in the Distribution of Transportation Resources: Agencies can overlay the resource under consideration onto demographic data to understand the impacts on disadvantaged and underserved populations and identify gaps in the connectivity of and access to infrastructure.

Sample of Available Data Sources

- U.S. Environmental Protection Agency's [Smart Location Mapping](#) and [EJScreen](#)
- Economic Innovation Group's
- [Distressed Communities Index](#)
- Council on Environmental Quality's [Climate and Economic Justice Screening Tool](#)
- USDOT [Transportation Disadvantaged Tool](#)

Understand and Use Equity-Related Data Sources and Tools for TSMO: Data sources can be used to support equity in decisionmaking around TSMO-related activities and measure performance toward advancing transportation equity.

Emerging Mobility Trends: Initial deployments can be improved by considering the location and funding of pilots, ensuring access to technology for all users, and designing pilots by factoring in the externalities of transit use, vulnerable road users, and overall system efficiency.

Step 3. Identifying Equity-Related Actions Around TSMO

When gathering information from the public about the transportation-related issues they face, it may be helpful for agencies to identify whether the issue at hand is related to existing TSMO activities, or whether the issue could be addressed by new TSMO activities. The table below includes sample questions that agencies could ask about existing and planned TSMO activities.

Potential Equity-Related Considerations Around TSMO

TSMO Category	Potential Equity-Related Considerations
Event Management	<ul style="list-style-type: none"> When making temporary changes to the transportation system (e.g., changes in access or detours), are accessible alternatives provided and changes communicated in accessible formats? How are detour routes in areas with underserved or disadvantaged populations considered? When, where, and how are operations activities such as traffic incident management, work zone management, and planned special events management prioritized?
Freeway Management	<ul style="list-style-type: none"> Do existing or planned TSMO strategies enable higher occupant modes of travel (e.g., support transit performance)? Are the existing or planned suite of TSMO strategies balanced between the needs of long-distance traffic and traffic in the local area?
Arterial Management	<ul style="list-style-type: none"> Are the effects on all road users (e.g., bicyclists, pedestrians, transit, automobile) of signal phasing and timing being considered? Do signal phasing or timing plans consider the needs of all road users (e.g., pedestrians, bicyclists, transit), or do they only consider personal vehicles? How are locations identified for signal phasing and timing adjustments? Is it dependent on complaints, or is there also a programmatic/systematic review to identify other locations?
Freight Management	<ul style="list-style-type: none"> Is geospatial analysis being used to assess the equity of freight impacts? Have all impacted communities, including disadvantaged, been involved in discussing the benefits and burdens of freight and ways to mitigate harmful effects?
Transit	<ul style="list-style-type: none"> Do routes and schedules support all road users or favor one type of passenger over another? Do routes and schedules favor commuters from the suburban areas over travelers in the urban core? Are there opportunities to increase frequency of service in areas with high percentages of transit-dependent populations? Are there opportunities for reduced or free fares to enhance travel options? How are unbanked populations supported?
Active Transportation	<ul style="list-style-type: none"> What is the distribution of bicycle and pedestrian facilities accessible to all abilities? What are some ways to improve shared micromobility access through equity considerations?
Parking Management	<ul style="list-style-type: none"> How is curb space prioritized and is equity considered? For parking price strategies, what is the availability of travel options (e.g., transit, high-occupancy vehicle services, bike, walk, park and ride) for low-income populations? How accessible are parking garages to transit stations? How are prime parking spots close to transit stations allotted?
Road Pricing	<ul style="list-style-type: none"> Do the pricing mechanisms and changed traffic patterns of road pricing projects result in disproportionately high and adverse impacts on minority and/or low-income populations? How are unbanked populations supported? Are adequate travel options available (i.e., transit) to support the mobility of low-income populations?
Traffic Safety	<ul style="list-style-type: none"> How are traffic safety issues in disadvantaged communities identified? How are traffic safety issues communicated to ensure that disadvantaged communities are aware of safety issues and can provide input? How is the safety of all users considered in TSMO strategy deployments?

Step 4. Prioritizing and Selecting TSMO Strategies

Identify Goals and Performance Measures That Support Transportation Equity:

Agencies can measure aspects that support transportation equity in their long-range planning and project prioritization processes. Example measures include accessibility to jobs/healthcare/recreation, pedestrian/bicycle injuries and fatalities, proximity to transit, number of transfers required for transit trips, and the identity of users benefiting from a new project or program.

Scoring Criteria for Prioritization and Selection of TSMO Strategies: Agencies can develop equity-related scoring criteria, making the equity score a meaningful percentage of the total score, to support the selection of TSMO strategies. Equity-related scoring criteria can differ depending on the program and goal area. When overlaid with demographic data, criteria could include reducing transportation-related emissions, reducing transit passenger delay, improving bicycle and/or pedestrian networks, addressing severe crash locations, improving bicycles or pedestrian safety, or improving travel time reliability.

The **Boston Region Metropolitan Planning Organization** has equity make up 20 percent of the total score for its Transportation Improvement Program project prioritization process.

Step 5. Evaluating Transportation Equity and Adjusting TSMO Strategies

Evaluating transportation equity for TSMO strategies involves a two-pronged approach:

- Evaluating changes in implementation of existing TSMO activities
- Evaluating TSMO strategies implemented through an equity-focused framework

Evaluating changes in implementation of existing TSMO activities. Agencies can use demographic data and equity-related performance measures to evaluate existing TSMO activities to understand where they may be contributing to transportation inequities. Questions to consider include the following:

- How do existing TSMO strategies align with agency goals related to equity?
- Are communities of concern experiencing benefits equitably?

Evaluating TSMO strategies implemented through an equity-focused framework.

When agencies undertake steps 1 through 4 of the framework to link TSMO and transportation equity, it also may be useful to evaluate the effectiveness of TSMO strategies in advancing transportation equity. Questions to consider include the following:

The **Portland Bureau of Transportation** developed an equity matrix based on race, income, and limited English proficiency to understand whether areas of Portland are being underrepresented or overrepresented by existing operations activities and have made changes to the way they manage traffic signals.



Source: USDOT/Getty

- How does the outcome align with agency goals related to equity?
- What aspects of the process of developing and selecting TSMO strategies helped achieve an equitable outcome?
- What could have been done differently or could the strategy be refined to better support transportation equity?

Non-Binding Contents

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