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POLICY BRIEF

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What Should Agencies Measure to Decide If Microtransit Is Working?

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Issue

California state agencies, public transit agencies, and cities have invested in dozens of microtransit pilot programs, often with the stated goals of improving access, filling gaps in fixed-route public transit service, and serving communities that are difficult to reach by traditional bus or rail. As microtransit services mature, agencies increasingly face decisions about whether to expand, modify, or discontinue microtransit services—and how to allocate scarce operating funds across competing transit priorities.

Despite growing investment, there is no consistent approach to measuring whether microtransit services are delivering meaningful benefits relative to their costs, or whether those benefits are equitably distributed. Without clear and well-balanced performance metrics, agencies risk drawing the wrong conclusions about success or failure.

To help address this gap, we identified a focused set of operational- and strategic-level performance metrics, as well as equity and environmental metrics, to help agencies monitor microtransit performance, compare alternatives, and make more informed funding and service design decisions. These are summarized in Figure 1 and explained in more detail below.

Operational-Level Performance Metrics

At the operational level, we recommend that microtransit system managers focus on two core categories: service quality and fleet productivity.

For service quality, we recommend tracking rider wait times, ride-request rejection rates, and user satisfaction. For all three metrics, it is important to assess how outcomes vary by time of day and across different parts of the service area. Agencies should also examine the full distribution of rider wait times–not just average or median values to understand how often riders experience long delays and where. The ride rejection rate captures the share of trip requests that cannot be accommodated due to system capacity constraints. Because microtransit is often intended to provide a reliable mobility option, consistently high rejection rates may indicate insufficient service levels. To track user satisfaction, we recommend that agencies conduct regular rider surveys (e.g., annually) that ask about overall satisfaction and specific aspects of the service, such as wait times, reliability, safety, and comfort.

For fleet productivity, we recommend tracking both the number of passengers served per vehicle revenue hour and the passenger-miles served per vehicle revenue hour. In both cases, the denominator is the number of hours vehicles

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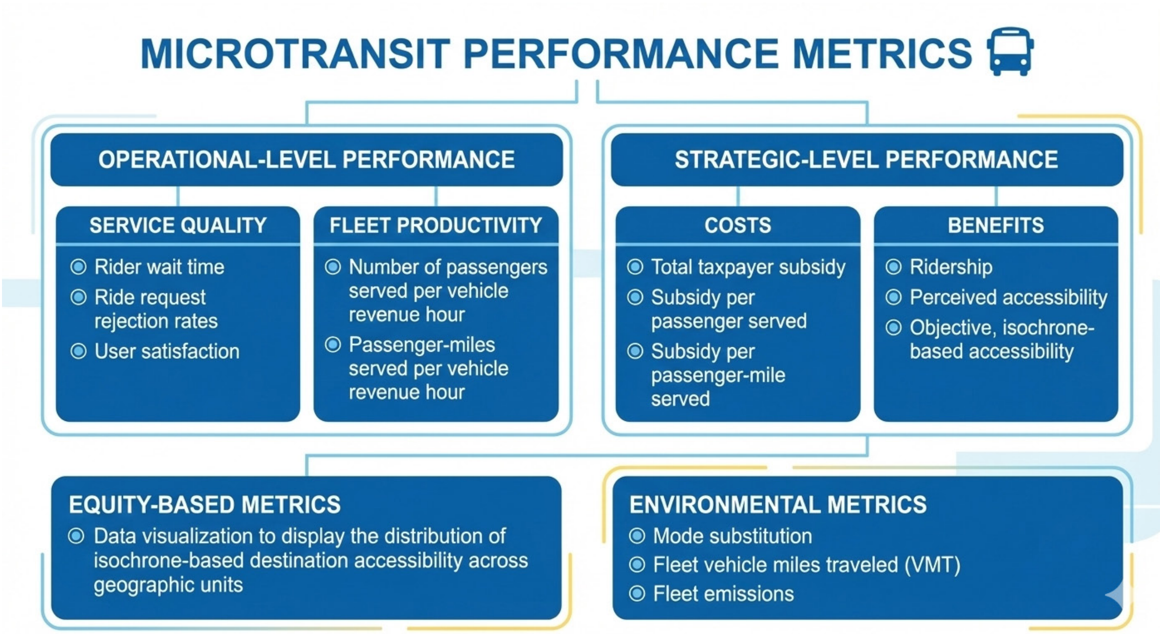

Figure 1. Recommended performance metrics for evaluating microtransit service. Image generated by Google Gemini.

are in service and can collect revenue from riders. The first metric is more common in practice; however, it fails to distinguish between long-distance microtransit trips (e.g., a trip to a medical appointment in a rural area) and short-distance trips (e.g., a first-mile transit trip to a nearby rail station). The passenger-miles served metric helps capture this distinction. For both metrics, agencies should consider not just the number of requests served but also the number of people (i.e., passengers) served per request.

Taken together, these five metrics allow microtransit managers to evaluate operational performance without overemphasizing any single measure. Tracking multiple indicators helps avoid "gaming" the system—for example, an operator could reduce average wait times by rejecting harder-to-serve trips—and instead encourages operational improvements that enhance overall service quality and productivity.

Strategic-Level Performance Metrics

At the strategic level, we recommend that public transit agency executives, city transportation officials, and funding agencies focus on two broad categories of metrics: costs and benefits.

For costs, we recommend tracking total taxpayer subsidy, subsidy per passenger served, and subsidy per passenger-mile served on a monthly or, at most, quarterly basis. Total subsidy reflects the difference between the operating costs and fare revenue. While subsidy per passenger is a common performance metric, subsidy per passenger-mile is also important because microtransit services often vary significantly in average trip length.

These cost metrics are flexible. For an agency jointly designing fixed-route and microtransit services, we recommend tracking all three metrics for the combined service. Similarly, these metrics should be used to evaluate individual routes and transit service subareas. Monitoring these metrics as service configurations evolve (e.g., replacing a fixed-route line with microtransit or adding microtransit as a feeder to multiple fixed routes) will help agencies assess how service configuration components impact costs.

For benefits, we recommend tracking microtransit ridership alongside accessibility measures. The reason being that destination accessibility is one of the most significant benefits of microtransit[1], and ridership alone does not fully capture the social value of some trips. For example, a single long-distance microtransit trip to a healthcare appointment not accessible via fixed-route transit may provide greater

Figure 2. 60-minute (blue) and 90-minute (orange) isochrones from the City of Utrecht's center for the private auto mode (https://www.zylstra.org/blog/2020/08/on-cities-and-contrast-as-potential-energy/)

benefit than multiple short trips connecting riders to nearby destinations. To better capture social benefits, we recommend measuring perceived accessibility and objective, isochrone-based accessibility (i.e., a geographic and graph-based measure of how far someone can travel within a fixed amount of time; see Figure 3).

We recommend that agencies survey residents of a service region—not just microtransit or public transit riders—to assess perceived accessibility before and after service changes. To assess perceived accessibility, Lättman et al. (2018)[2] ask respondents to indicate their level of agreement or disagreement with the following four statements on a Likert scale:

- Considering how I travel today, it is easy to do my daily activities
- Considering how I travel today, I am able to live my life as I want to
- Considering how I travel today, I am able to do all activities I prefer
- Access to my preferred activities is satisfying, considering how I travel today

We recommend that agencies collect residents' level of agreement with each of these four statements before and after implementing changes to their fixed-route and microtransit system(s).

An isochrone-based accessibility metric measures how many key destinations–such as jobs, grocery stores, healthcare facilities, or schools–can be reached within a set amount of travel time from a given location. The time threshold (e.g., 10, 15, 20, 30, or 45 minutes) can be adjusted based on the activity type, destination, and service area. To build the isochrones, we recommend creating a multimodal network graph that considers walking time, waiting time for fixed-route and microtransit services, and in-vehicle travel time for both fixed-route and microtransit services. For those interested in constructing multimodal network graphs, please see two recent papers on the topic.[3,4]

To obtain a cumulative measure of accessibility, we recommend using a population-weighted sum of isochrone counts across geographical units. However, more sophisticated measures are also available (e.g., impedance-based, destination-choice log-sum-based). If agencies have the data and technical staff to implement these more advanced accessibility measures, we recommend they do so.

Equity Performance Metrics

Microtransit is often promoted as a solution to improve mobility equity, particularly by improving mobility for people without access to a car, those with lower incomes, or those living far from fixed-route transit. Rather than relying on a specific equity metric, such as the Gini coefficient, Theil index, or equity ratio, we recommend using data visualizations to display the distribution of isochrone-based destination accessibility across geographic units. For example, heat maps, such as those in Figure 4, can display differences in destination accessibility, wait times, or rejection rates across census blocks before and after a microtransit service is introduced or redesigned. Similar visual approaches can be used to examine perceived accessibility and rider satisfaction.

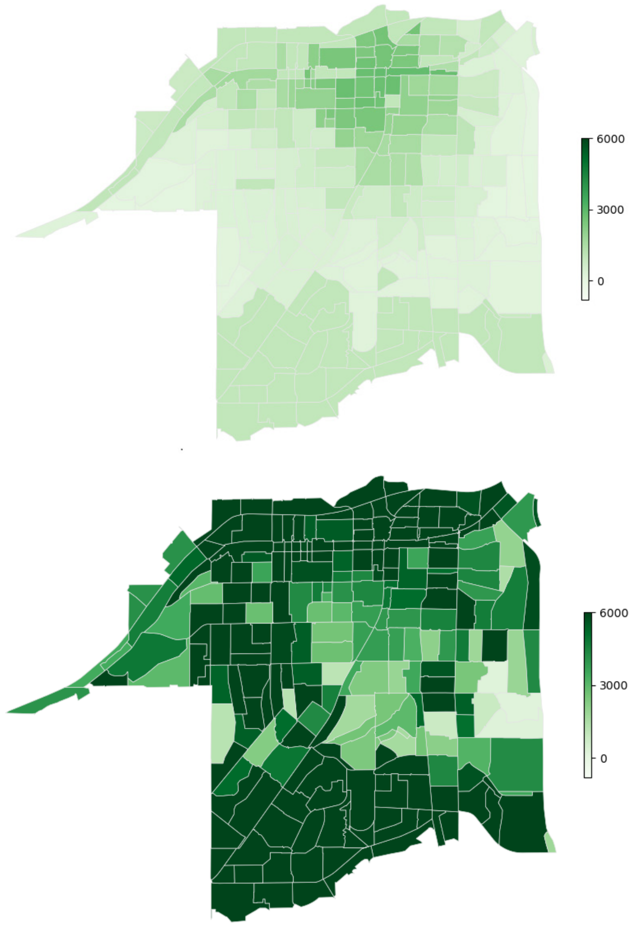

Figure 4. Heatmap displaying the number of jobs accessible within 15 minutes via a multimodal network consisting of pedestrian infrastructure, fixed-route transit, and microtransit for each census block in Lemon Grove, CA, before microtransit was deployed (left) and after (right).

If socio-demographic data are available for riders and community members, agencies can conduct more detailed equity analyses that compare distributions (of destination access) across income groups, genders, and other population characteristics. For a detailed discussion of equity analysis techniques, please refer to a recent study on measuring equity in transportation.[5]

Environmental Performance Metrics

Environmental impacts are also important to track. We recommend tracking mode substitution, fleet vehicle miles traveled (VMT), and fleet emissions. Rider surveys can determine whether a trip would have been made without microtransit and, if so, which mode(s) the rider would have used. Fleet VMT can be measured from vehicle odometer data and serves as the basis for emissions estimates. Fleet emissions can then be estimated from VMT using information on vehicle fuel type and, when possible, the number of miles driven across different speed ranges, or by instrumenting each vehicle with on-board diagnostic devices (e.g., OBD-II).

More Information

This policy brief is drawn from the UC ITS project, "Designing Microtransit Services to Complement Public Transit" found here: https://www.ucits.org/research-project/2024-13-4r/. For more information, please contact Michael Hyland at hylandm@uci.edu.

[1] Hyland, Michael F., et al. "Integrating Microtransit Service with Traditional Fixed-Route Transit Costs More but Greatly Improves Access to Jobs." (2024).

[2] Lättman, Katrin, Lars E. Olsson, and Margareta Friman. A new approach to accessibility–Examining perceived accessibility in contrast to objectively measured accessibility in daily travel. Research in Transportation Economics 69 (2018): 501-511.

[3] Hu, Siwei, et al. "Flexible Agent-based Modeling Framework to Evaluate Integrated Microtransit and Fixed-route Transit Designs: Mode Choice, Supernetworks, and Fleet Simulation." arXiv preprint arXiv:2405.19527 (2024).

[4] Graff, Lindsay K., Katherine A. Flanigan, and Sean Qian. "Constructing a routable multimodal, multi-cost, time-dependent network model with all emerging mobility options: Methodology and case studies." Transportation Research Part E: Logistics and Transportation Review 192 (2024): 103757.

[5] Karner, Alex, Rafael HM Pereira, and Steven Farber. Advances and pitfalls in measuring transportation equity. Transportation 52.4 (2025): 1399-1427.

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