

the perceived benefits might be even more important to people than the actual, quantifiable benefits. Many people want public transportation in their community because it is perceived as a symbol of civic progress and pride. The usual attitude is that public transportation should be supported as a social good for people who have no other means of travel. Usually these are “other” people. Many public transportation supporters have no intention of using the services themselves, but want the option of being able to take the bus or ride the shuttle in case they find themselves unable to use a personal vehicle.

For some individuals, the unscripted contact with other people and close interaction with a community that the use of public transportation requires is a great benefit, while for others such contact is a horror to be avoided at all costs. Even within the public transportation spectrum, stratification of acceptability exists. Rail travel is generally perceived to be a more acceptable and positive way to travel than bus travel. The perception exists that rail travel is safer, cleaner, more comfortable, and more attractive than bus travel. Whether or not this is true is difficult to measure because people’s perceptions are so highly personal and amorphous. Yet these perceptions are just as relevant as statistics on ridership or age and condition of a system’s vehicles. Public transportation cannot be severed from its close connection to local politics and personal perceptions.

Typical Performance Measures

Performance measures are not to be confused with the goals and objectives of transportation providers. Measures are necessary to determine if the objectives and goals are being fulfilled in a safe, reliable, and efficient manner. Even the most obvious items should be subjected to measurement because guesswork and hunches are often in error. In general, measures should be meaningful, appropriate to the operation or system, suitable to analysis, easily interpreted, and relevant for decision making. Each objective should have a performance measure.

Performance measures that do not relate to the goals and objectives of the transit service typically are ignored and become meaningless. Although it is possible to collect and measure large amounts of data, measures are important only when they are tied to what a transit system desires to achieve.

Continuous—or at least regular—evaluation allows systems to adjust their operations or modify their objectives to keep improving without pursuing unrealistic goals. Care should be exercised when comparing measurements from different operations because so much depends on local conditions, the size of each system or area served, and the purpose of each system.

At the least, the service quality, productivity, and efficiency of public transportation operators should be measured. Performance can be measured as the kind and level of service delivered by the system. Overall measures of service quality may include the number of days of service, hours of service each day, type of service, percentage of service-area population served, on-time performance, safety, vehicle cleanliness, and attitudes of drivers.

Productivity can be measured as the actual use of a system’s resources and facilities compared to their potential use, given the geographical area covered and type of service offered. What are the vehicle-miles per vehicle? What are the load factors and the passenger-miles per vehicle-hour?

Efficiency can be measured as how much service is being provided and at what cost in time, resources, and facilities. Efficiency measures are cost per vehicle-mile; fare revenues as a percentage of cost; and cost of overhead, administration, operations, maintenance, or equipment as percentages of total expenditure.

Many aspects of public transportation are difficult to measure, but some aspects are more easily counted and categorized. The most basic of these are input measures: what facilities exist for public transportation. To plan public transportation in accordance with the desires of the citizens of the tribe (as expressed in the issues identified in public meetings), planners must know what facilities exist with which to provide services.

However, simply measuring the “hardware” without measuring user satisfaction or user opinion—considered output measures—is meaningless. Users’ opinions about public transportation are as important to measure as the number of maintenance facilities. Both input and output measures are needed to understand public transportation. On the following pages, recommended input and output measures are grouped in tables, as follows:

- Table 5.2. Suggested input measures: overview of transit system.
- Table 5.3. Evaluation criteria: vehicle characteristics.
- Table 5.4. Evaluation criteria: maintenance, dependability, system, and safety.
- Table 5.5. Possible input and output measures: role of public transportation.
- Table 5.6. Possible input and output measures: coordination, infrastructure, and promotion of public transportation.

Table 5.2. Suggested input measures: overview of transit system.

Evaluation Criteria	Measures	Purpose
System	<ul style="list-style-type: none"> • Number of active vehicles • Estimated vehicle replacement costs • Estimated vehicle rehabilitation costs • Capacity • Fare structure and collection • Responsiveness to users with special needs • Funding needs and sources • Level of service (e.g., demand-response service, fixed-route service, or other type of service) 	Assists in determining if the organizational structure of providers is capable of delivering safe, reliable service
Facility	<ul style="list-style-type: none"> • Type • Age • Condition • Number and purpose • Replacement costs • Rehabilitation costs 	Assists in determining if transit providers' infrastructure is adequate to deliver satisfactory service
Vehicle description	<ul style="list-style-type: none"> • Type and age • Manufacturer and model number • Fuel type • Seating configuration and capacity • Mileage • Expected lifetime • Estimated vehicle replacement costs • Estimated vehicle rehabilitation costs • Ownership arrangements 	Assists in determining if available transit assets are sufficient to satisfy current and projected demand
Maintenance	<ul style="list-style-type: none"> • Number of vehicles operating at maximum capacity • Number of breakdowns • Service disruptions caused by breakdowns 	Assists in determining reliability and safety of vehicles
Dependability	<ul style="list-style-type: none"> • Malfunctions and breakdowns, measured in terms of months or years, vehicle-miles, or operating hours • Type, cause, location, time of year/day of malfunction or breakdown • Repair time 	Assists in determining if providers can deliver safe, consistent service
Safety	<ul style="list-style-type: none"> • Response time of support services • Response time of emergency services • Effectiveness of safety equipment • Driver training in first aid and defensive driving • Driver training in passenger assistance techniques • Crime number, location, type, persons involved, costs, and resolutions 	Assists in determining if transit providers can assure passenger safety

Table 5.3. Evaluation criteria: vehicle characteristics.

Measures	Definitions	Purpose
Type	Automobile Vans 12–16 passengers Bus < 36 passengers Bus < 67 passengers School Buses	Assists in determining if available transit assets are sufficient to satisfy current and projected demand
Age	The year the vehicle was made.	
Manufacturer and model number	General Motors Ford Chrysler Dodge El Dorado Other:	
Fuel type	Gasoline Diesel Liquefied natural gas Methanol Ethanol	
Seating configuration and capacity	Number of seats installed in the vehicle	
Mileage	0–50,000 50,001–75,000 75,001–100,000 100,001–125,000 125,001–150,000 150,000 and above	
Expected lifetime	Period of active service expected from acquisition to retirement	
Estimated vehicle replacement cost	How much each vehicle would cost to replace at market rates	
Estimated vehicle rehabilitation costs	Costs for repairs to avoid vehicle replacement	
Ownership arrangements	Owned Leased under purchase agreement* Leased** Leased or borrowed from others***	
<p>* Vehicles leased under a closed-end agreement in which the lease acquires the capital appreciation of the vehicles as lease payments are made. At the end of the lease, the vehicles are owned by the lessee.</p> <p>** Vehicles are leased so that the lessee does not acquire the capital appreciation of the vehicles as the lease payments are made.</p> <p>*** Vehicles that are leased or borrowed through a public agency or entity as a result of governmental or legal agreements. For example, vehicles may be owned by the state or county and leased to a public transit authority which is legally prohibited from owning the vehicles.</p>		

Table 5.4. Evaluation criteria: maintenance, dependability, system, and safety.

	Measures	Definitions	Purpose
Maintenance	Number of vehicles operating at maximum capacity		Assists in determining reliability and safety of vehicles
	Number of breakdowns and service calls	Annual number of responses to breakdowns on vehicles in service	
	Service disruptions caused by breakdowns	Missed trips or missed routes caused by breakdowns of vehicles	
	Fleet condition	Excellent—No repairs needed Good—Only regular maintenance needed Average—Major repairs needed Poor—Major reconstruction of vehicles needed to continue service	
Dependability	Malfunctions and breakdowns, measured in terms of months or years, vehicle-miles, or operating hours	Number of fleet breakdowns per annual fleet vehicle-miles	Assists in determining if providers can deliver safe, consistent service
	Repair time	Average length of time required to repair vehicles	
System	Number of active vehicles	Vehicles available to operate, including those out for routine repair	Assists in determining if the organizational structure of providers is capable of delivering reliable service
	Number of ADA-accessible vehicles	Number of vehicles that meet ADA guidelines	
	Responsiveness to users with special needs	Existence of and adherence to ADA service plan	
	Capacity	Annual number of passengers that could be carried by fleet operating at maximum capacity	
	Fare structure and collection	How much passengers pay to use service	
	Funding needs	At existing level of service, how much money is required to operate	
Funding sources	In actual figures and in percentages of total budget, what are the funding sources for the service		
Safety	Accidents per 100,000 miles	Number of vehicular and personal accidents per 100,000 miles	Assists in determining if transit providers can assure passenger safety
	Response time of support services, emergency contingency vehicles	Time taken by emergency contingency vehicles to reach disabled vehicle to take on passengers and continue trip	
	Effectiveness of safety equipment		
	Driver training in first aid, defensive driving, passenger assistance		
	Crime number, location, type, persons involved, costs, resolutions		

Table 5.5. Possible input and output measures: role of public transportation.

Area of Interest	Evaluation Criteria	Measures	Purposes
Social role of public transportation	Community coverage	Percentage of total community accessible by transit systems	Allows identification of gaps in service and need for additional resources
	Clientele coverage		Permits identification of effective service providers and establishment of averages for service standards
	Level of service	Hours of service per day	Assists in deciding if service expansion is needed
	Resource utilization	Passengers per vehicle-mile Passengers per vehicle-hour Passengers per service day Passenger miles per vehicle-trip Vehicle-miles per vehicle Vehicle-hours per vehicle	Pinpoints under and over use of vehicles and need for fleet expansion or service redesign
	Costs per services used	Cost per one-way passenger-trip Cost per passenger-mile Cost per loaded vehicle-hour	Demonstrates efficiency and cost-effectiveness
Future role of public transportation	Demographics	Current figures on age, socio-economic characteristics, car ownership, employment status, travel patterns and ridership on transit services Projected changes in the above demographics and ridership on transit services	Allows tracking of impact of demographics so ratio of funding can be maintained

Table 5.6. Possible input and output measures: coordination, infrastructure, and promotion of public transportation.

Area of Interest	Evaluation Criteria	Measures	Purpose
Coordination between existing systems	Number of providers	Spheres and levels of activity of all passenger transportation providers in the service area - transit systems, taxis, vanpools, etc.	Excellent resource information for identification of gaps and overlapping services as well as potential providers of service
Intermodal public transportation facilities	Passenger movement	Ease of transfer between modes Ease of ticketing procedures Interline agreements Schedule coordination, explicit or serendipitous	Assists determination of degree of coordination among systems and highlights areas where transfers are difficult
	Access	Location and number of exclusive transit parking spaces at rail or air facility or special lanes or allowances for transit	A tangible measure of transit-friendliness of infrastructure
Transit-friendly infrastructure	Land-use development	Historical patterns compared to future growth projections and impact of both on transit Future road construction plans and impact on transit compared to historical patterns	Helps determine the amount of transit-friendly growth and development patterns
	Design and placement	Building codes or zoning requirements that do not promote ease of use of multiple occupant vehicles Current patterns of placement, size, shape of buildings Availability of sidewalks or pedestrian walkways	Recognizes interrelatedness of all infrastructure and allows monitoring of impact of construction on transit
	Population	Current population distribution and demographics Projected future population and demographic trends	Recognizes the basis of demand and need for services is related to population and population distribution and must be known for cost-effective resource allocation
Promotion of public transportation	Information	Knowledge of services as assessed by survey	Assists in identification of gaps in information dissemination and need for communication program
	Marketing	Effectiveness of marketing campaigns in terms of desired result (such as increased ridership)	Allows effective marketing tools to be measured for use at other locations