CHAPTER 6
OPERATING DATA AND PERFORMANCE MEASURES
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Table of Contents

Purpose ..................................................................................................................... VI-2
A. Operating Data Requirements ........................................................................... VI-2
B. Performance Measures ...................................................................................... VI-2
   Cost Efficiency .................................................................................................... VI-2
   Service Effectiveness ........................................................................................ VI-3
   Cost Effectiveness ............................................................................................. VI-3
   Service Quality ................................................................................................... VI-4
C. Data for Performance Measures ....................................................................... VI-4
D. Sources of Data for Evaluation ......................................................................... VI-5
E. Indicators Required by ODOT ......................................................................... VI-6

Table 6-1 Selected Performance Measures ............................................................. VI-8

Attachments

6-A Instructions for Completing the Operating Data Report Form ....................... VI-9
Chapter 6
Operating Data and Performance Measures

Purpose

The purpose of this chapter is to provide all readers with a good understanding of performance indicators as well as describe the required operating data that must be submitted quarterly. All grantees should be familiar with the performance indicators discussed in this chapter.

A. Operating Data Requirements

Grantees are required to submit the Operating Data Report Form (ODRF) to ODOT along with the quarterly invoice (See Chapter 5, Accounting, Budgeting, and Invoicing, Section J, Operating Invoice Requirements) by the 15th of the month following the end of each quarter. The first quarter report is due by April 15th and each report thereafter is due by July 15th and October 15th. The fourth quarter report is due by February 28th. The ODRF must be submitted by e-mail.

ODOT, as well as Rural Transit Program system managers, need timely management information to successfully administer and operate Ohio’s rural public transportation network. By analyzing selected performance indicators, ODOT staff and transit managers are equipped with vital information to set both statewide program and individual system objectives. Besides making objectives measurable, performance indicators can be used to gauge individual system productivity, evaluate maintenance and supervisory staff, and monitor each system’s use of financial resources.

For this information to be meaningful, it must be based on current and accurate data. A sample ODRF is provided in Attachment 6-A and may also be downloaded from the ODOT website at www.dot.state.oh.us/ptrans.

B. Performance Measures

Performance measures normally take one of three forms: cost or resource efficiency, service effectiveness, or cost effectiveness. Cost effectiveness is the most important measure and is a function of both cost efficiency and service effectiveness. The three measures are defined as follows:

Cost Efficiency
Cost efficiency is defined as the amount of public transportation services produced for the community in relation to the resources expended. This measure attempts to answer the question, How many resources were expended per unit of public transit
Units of service produced are measured in terms of service outputs such as vehicle hours or vehicle miles. Resources expended include labor, capital, materials, and services. The smaller the amount of resources expended to produce a unity of service, the greater the resource efficiency of the public transit service.

Primary cost efficiency measures include total operating cost per vehicle service hour and total operating cost per vehicle service mile. Total operating cost is defined as the cost of operating a transit system including all labor, materials, and services necessary for operations, maintenance, and administration, but excluding capital costs. Vehicle service hours and miles are the hours and miles that transit vehicles are in passenger service or available (with driver) for service.

Secondary cost efficiency measures are normally used to assess components of total operating cost when primary measures indicate problems or declining performance. Such measures include driver operating cost per vehicle service hour, vehicle service hours as a percentage of driver pay hours, maintenance cost per vehicle mile, and administrative cost per vehicle service hour.

Service Effectiveness
Service effectiveness is defined as the consumption of public transit service in relation to the amount of service available. This measure attempts to answer the question, *How must public transit service was consumed (or revenue received), at an established price, in relation to the amount of service available?* The more service consumption (or passenger revenue) in relation to service output (vehicle miles and hours), the higher the level of service effectiveness.

Primary service effectiveness measures include passengers per vehicle service hour and passengers per vehicle service mile. Passengers are defined as the number of boarding passengers, revenue producing or not, carried by the transit system. Other primary measures are passenger revenue per vehicle service hour and passenger revenue per vehicle service mile. Passenger revenue is defined as the passenger fares and payments received from contract passenger services.

Cost Effectiveness
Cost effectiveness is defined as the consumption of public transit service in relation to resources expended. This concept attempts to answer the question, *How many resources were expended per unit of consumption or how much consumption revenue was received per unit of resource expended?* Consumption is measured by passenger trips or passenger miles. Consumption revenue is measured in dollars. Resources expended to produce service are also normally measured in dollars. The smaller the dollars of resources expended in relation to the service consumed or the greater the consumption revenue received in relation to the dollars expended, the more cost effective the service.

Primary cost effectiveness measures include passenger revenue plus local contributions as a percentage of total operating cost, passenger revenue as a percent of total operating cost, and total operating cost per passenger. Local contributions are defined as the sum of revenues provided by local government and any local private contributions to support the operation and services of the public transit system.
It is, however, not only important to measure a system’s efficiency and effectiveness, but also its quality. But how do you measure service quality?

**Service Quality**

Service quality is defined as the relationship of service delivery, how efficient and effective it is, and customer expectations. This concept attempts to answer the questions, *Does the delivery of public transportation service meet or exceed customer expectations?* Service quality is typically defined by passengers, clients, and the public perception. Service quality has many dimensions and the importance of any single attribute differs among people. However, the attributes of quality include at a minimum accessibility, availability, reliability, safety, and comfort. The following is a brief description of each.

1. **Accessibility** may be defined as the ability of transportation service to readily accommodate disabled passengers on its buses and vans. A performance measure would be the percent of vehicle service hours with lift-equipped vehicles.

2. **Availability** may be defined by several factors including the span of service hours, frequency of service, and percent of population within walking distance (normally ¼ mile) of fixed route service.

3. **Comfort** includes seat availability, climate control, and smooth ride operations. Seat availability is generally not an issue with small urban and rural systems but can be measured by counting standing passengers as a percentage of total passenger boardings. Climate control comfort can be measured, for example, by the number of malfunctioning vehicle air conditioner days as a percentage of total bus days when the temperature exceeds 85°F. Smooth ride performance is most appropriately judged by the number of passenger complaints about driver performance as a percentage of total passenger boarding’s.

4. **Reliability** is a function of on-time performance. For demand response service, it is generally measured as the percent of time the vehicle picks up passengers within plus or minus minutes as scheduled (e.g., 5 minutes early to 15 minutes late). For fixed route systems, it is similarly measured as the percent of time the vehicle arrives at a stop within plus or minus minutes according to the public timetable (e.g. zero minutes early to 5 minutes late).

5. **Safety** is a critical service quality attribute. It is often measured as the number of vehicle miles per accident or collision. More importantly, it should also be measured as the number of passenger injuries (or deaths) per 100,000 passenger boardings.

**C. Data for Performance Measures**

Performance assessment requires the formulation of data and statistics resulting in meaningful performance measures. To ensure appropriate formulations, it is useful to categorize data and statistics as follows:
1. Resource Inputs: Resources expended in providing transportation service including labor, capital, materials, services, and other measurable items. Inputs may be classified either as financial or non-financial.

2. Service Outputs: Service outputs include miles or hours of service or other service statistics such as accidents, road calls, or delays which can be used in assessing performance quality. These are expressed in non-financial terms.

3. Public Consumption Statistics: the actual results of service outputs considering the price or fare structure may be expressed in either financial or non-financial terms. For example, the number of passenger boardings is non-financial; passenger revenue is financial.

To formulate resource efficiency performance measures, resource inputs are expressed in relation to service outputs (e.g., labor cost per service hour). To formulate service effectiveness performance measures, public consumption statistics are used with service outputs (e.g., passenger boardings per vehicle service mile). To formulate cost effectiveness performance measures, resource inputs are used with public consumption statistics (e.g., cost per passenger boarding).

D. Sources of Data for Evaluation

Data and statistics used for formulating performance measures may be found throughout the transit organization. Availability and quality of data and statistics are functions of management policies, procedures used in collecting and assimilating the information, and a structured reporting system. Management must establish policies which encourage and motivate employees to measure performance. A reporting system must be structured and in place to easily accept data and statistics collected from work processes. Poor data collection techniques will inevitably lead to unreliable statistics and, subsequently, misleading performance measures. A listing of important data and statistics and their most probable sources are as follows:

<table>
<thead>
<tr>
<th>Sources of Data</th>
<th>Probable Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dollars, labor hours</td>
<td>Accounting, payroll, financial management</td>
</tr>
<tr>
<td>Vehicle hours, vehicle service hours</td>
<td>Drivers, dispatchers, supervisors</td>
</tr>
<tr>
<td>Vehicle miles, vehicles service miles</td>
<td>Drivers, schedulers, dispatchers, maintenance shop</td>
</tr>
<tr>
<td>Passenger boardings, passenger trips</td>
<td>Drivers, schedule checkers, surveys</td>
</tr>
<tr>
<td>Accidents, passenger injuries</td>
<td>Drivers, supervisors, safety, training</td>
</tr>
<tr>
<td>Complaints</td>
<td>Telephone information center, public relations, supervisors, managers</td>
</tr>
</tbody>
</table>
E. Indicators Required by ODOT

Sooner or later in a system’s operation, the system manager, the Board of Directors, or other interested parties will want to apply qualitative judgments to the quantitative measurements. From the manager’s point of view, the question of *How do I know if I’m doing a good job?* is a significant issue to be addressed.

ODOT encourages all of its grantees to regularly assess system performance but at a minimum, there are six performances measures required by ODOT:

1. Cost per passenger,
2. Passengers per vehicle hour,
3. Cost per vehicle mile,
4. Collisions/100,000 miles,
5. Road calls/100,000 miles,
6. Operating recovery ratio.

Of these, the first, cost per passenger is the most important because it describes how much service is actually being consumed in terms of the dollar value of the resources required to produce those services.

ODOT requires its grantee to address their qualitative performance by carefully tracking these measures over time. If costs per passenger or per hour (or per mile) rise dramatically and permanently, this is an indicator of real problems. Short-term seasonal cycles should not be a cause of major concern. After tracking these measures for several years, a transit system should be able to establish its own internal standards of performance.

A second means of assessing relative performance is to compare your systems performance with the performance of other systems. Such comparisons are fraught with difficulty, as your system’s quantitative performance will be significantly influenced by your system’s goals and objectives, which may or may not be anything like another system’s goals and objectives. Differences in terrain, weather, local economic conditions, and service policies may also significantly influence the relative performance of different systems. With these caveats in mind, it is possible to suggest some “typical ranges of experience” that are worth considering:

1. Cost effectiveness answers the question *How much does it cost to carry one passenger?* The obvious measure is the performance indicator, operating cost per passenger. See Table 6-1 for average costs per passenger (Performance Measurement #1) data for Ohio rural transit systems.

2. Service effectiveness answers the question *How many passengers ride for every unit of service provided?* Data for the number of average passengers per vehicle hour
of service (Performance Measurement #2) for Ohio rural transit systems are in Table 6-1.

3. Cost efficiency answers the question, *How much does it cost to produce a unit of service?* See Table 6-1 for average costs per vehicle service mile (Performance Measurement #3) for Ohio’s rural transit systems.

4. Service Quality answers the question *Does the delivery of public transportation service meets or exceeds customer expectations?* Again, service quality includes many factors such as accessibility, reliability, and safety. Different indicators are used to evaluate each factor (refer back to page 6-3). As an example, however, to measure safety, typical indicators used include collisions/100,000 miles (Performance #4) and road calls/100,000 miles (Performance #5). The typical range is of collisions/100,000 miles is 2 to 5.

5. The operating recovery ratio (Performance #6), ([farebox revenues + contract revenues] divided by operating costs) is also used to assess the local contribution performance. ODOT’s recommended minimum operating recovery ratio goal for all grantees is 15 percent. Please note this is a goal, not a standard. However, since local contributions are one of three factors used to determine annual operating allocations, grantees should monitor their operating recovery ratio closely and work to maximize local contributions.

In addition, ODOT recommends a seventh performance measure for rural transit systems to track and monitor. Local Contribution Return is defined as the share of operating costs borne by the users and the local community. This area is concerned with the share of operating costs which are borne by the direct beneficiaries of the public transit service. Local contribution return is expressed as a percentage by taking total local revenues generated divided by total operating costs. Total revenues are farebox, contract, general revenue funds from a city, county or non-profit agency, donations, advertising, and any other locally generated revenues.

Generally speaking, if your system’s performance indicators fall within the ranges shown in the table below, as do the indicators for about two-thirds of the systems in this country, there is no cause for concern unless your performance this year is dramatically worse than last year. If your performance is outside these ranges, you should spend more time analyzing and reviewing your system’s performance statistics. There may be valid reasons for the variations, such as unrealistic goals or objectives, in which case you may need to reassess your system’s goals with your governing board and/or TAC. On the other hand, you may not find any appropriate explanation for the difference. In this case, you should strongly consider reviewing your operating policies and procedures to determine what actions can be taken to bring your system back within the range of “typical” operations. A thorough service evaluation may be necessary.

Service evaluations can be conducted by transit staff or by an outside party. ODOT’s Ohio Technical Assistance (OTEC) Program is also a resource for service evaluations. Contact your ODOT transit project analyst or see the ODOT website for more information on OTEC.