Abridgment

Use of Federal Section 15 Data in Transit Performance Evaluation: Michigan Program

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In the first application of its kind, the reporting system of Section 15 of the Urban Mass Transportation Act, as amended, is being used to support the development of a straightforward, routine, and comprehensive transit performance evaluation program in the state of Michigan. The methodology developed for Michigan satisfies the complementary needs to account for public funds invested in transit operation and development and to promote the efficient and effective use of these funds in the delivery of transit services. At the same time, the methodology avoids placing an additional burden of record keeping and reporting on individual transit operators. In the rapidly developing field of transit performance evaluation, these features are essential for state and local funding agencies to consider as part of any plans to develop a continuing evaluation program. In this paper, the Michigan program is described, and the features of the program that have general applicability for other areas concerned with transit performance measurement and evaluation are highlighted.

In October 1978, the Michigan State Legislature enacted a law that requires the state transportation commission to report annually on the efficiency and effectiveness of all publicly funded transportation programs within Michigan and to describe the progress of these programs in carrying out plans approved in the preceding year.

The act stipulates that the annual reports on transportation programs be based on information included on forms authorized by the U.S. Department of Transportation. This requirement is intended to ensure that, to the maximum extent possible, existing data will be used and transportation programs will not be burdened by additional reporting requirements. As a result, the reporting system of Section 15 of the Urban Mass Transportation Act of 1964, as amended, was selected as the primary data base for the routine evaluations of transit performance.

As a result of these requirements, a study was initiated to develop and test a performance evaluation methodology for midsized transit systems in Michigan. This paper describes efforts by Michigan to increase the accountability of transit systems and to promote increased efficiency and effectiveness of transit management and operation.

MICHIGAN EVALUATION METHODOLOGY

The evaluation methodology developed for the midsized transit systems in Michigan includes two phases: (a) a diagnostic review of selected indicators of transit efficiency, effectiveness, and other related measures of performance and (b) a detailed evaluation of transit performance in areas suggested for further investigation by the diagnostic review. Figure 1 outlines the evaluation process and suggested use of evaluation results.

The intent of both the diagnostic and detailed phases of the evaluation methodology is to systematically and routinely review transit performance to

1. Increase the understanding of transit operations and performance in Michigan by the state department of transportation, the state legislature, and other interested groups;
2. Facilitate the exchange of information among transit properties, particularly in areas where there are innovative operations and exemplary performance;
3. Monitor the use of public funds for public transit service development and delivery; and
4. Identify opportunities to improve transit performance by promoting more efficient and effective transit services.

Diagnostic Review Element

The first phase of the evaluation methodology involves a diagnostic review of selected performance indicators. The diagnostic review includes two elements: (a) a peer comparison in which the performance of all midsized Michigan transit systems is compared and (b) a time-series assessment in which the performance of each system is assessed against itself over time and the change in performance of other midsized transit systems in the state. The primary objective of the diagnostic review is to identify the performance indicators that merit more detailed examination during the detailed evaluation.

Although there is considerable discussion within the transit industry about the uniqueness of transit systems and, therefore, the limitations of peer comparisons, an important premise of the evaluation methodology is that comparisons need not be avoided but instead should be conducted carefully. The use of a peer comparison does not overlook the differences among transit systems; rather, peer comparisons are intended to assist Michigan in identifying and understanding the differences among the midsized transit systems in the state.

Time-series assessments of transit performance facilitate assessment of performance of a transit system over time in relation to change in (a) operating policy, (b) investment and expansion plans, (c) the economy, (d) characteristics of the community, and (e) the transit system's own performance objectives.

Information from the diagnostic peer comparisons and time-series assessments allows Michigan to obtain an increased understanding about transit operations and identify areas of transit performance that merit more detailed evaluation.

Performance Indicators Used

Considerable research is under way to identify and define indicators of transit performance and assess their merit. Too often, however, evaluation methodologies suffer from the use of more indicators than are appropriate for a routine review of performance and do not organize the indicators in a structured evaluation approach. The indicators developed to support the diagnostic review element of the Michigan performance evaluation methodology avoid these pitfalls by focusing attention on performance measures that relate to and build on each other, allowing the assessment of important components of transit efficiency and effectiveness.

The indicators selected for evaluating midsized transit systems in Michigan have the following characteristics:

1. Provide information on the efficiency, effectiveness, and other performance characteristics of a transit system;
2. Provide information on each midsized transit system by total system, mode, functional area, and object expense class;
3. Are not redundant (i.e., each indicator provides an important new element of information relevant to obtaining a complete understanding of transit performance);
4. Relate to and build on each other, thus allowing the assessment of important components of major indicators; and
5. Are developed from information that is routinely collected and reported by transit operators either to meet Section 15 reporting requirements or to complete the Michigan Department of Transportation grant application for capital and operating assistance for transit services.

The indicator structure for vehicle operating efficiency is shown in Figure 2 to illustrate these characteristics.

When using performance indicators to evaluate a transit system, it is important to remember that indicators provide limited information about performance and should be used carefully. If the value of a performance indicator is above or below an acceptable level, further examination is required to determine whether a problem exists, what the characteristics and impacts might be, and what remedies can be tested as a cure.

Detailed Evaluation Element

The second phase of the evaluation methodology involves the detailed evaluation of transit performance, focusing on those indicators identified in the diagnostic review phase of the evaluation process. The detailed evaluation primarily involves (a) preparing for a site visit with each transit system, (b) investigating the factors that affect transit performance through site visits, and (c) documenting the evaluation findings. A detailed evaluation must be conducted to develop informed conclusions about transit performance.

The objectives of the detailed evaluation phase of the methodology are the following:

1. To gather and report information to explain the factors that affect transit performance;
2. To identify examples of innovative performance that can be shared with the other transit operators;
3. To identify opportunities for improvement in transit performance that can be implemented by the transit system with assistance from the state and federal governments, as appropriate; and
4. To monitor changes in transit performance over

Figure 1. Overview of the evaluation process.

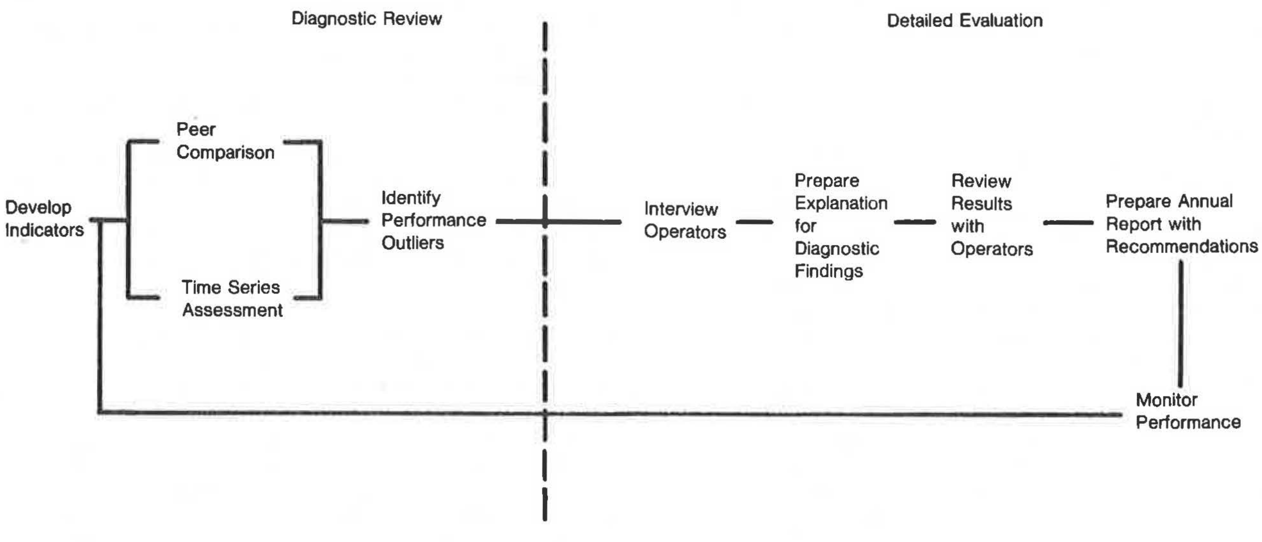

Figure 2. Illustrative indicator structure: vehicle operations labor expense per vehicle kilometer.

$$\left[\frac{\text{Total Operator Straight Time + Scheduled Overtime Hours}}{\text{Total Platform Hours}} + \frac{\text{Total Unscheduled Operator Overtime Premium Hours}}{\text{Total Platform Hours}} + \frac{\text{Total Nonoperations [Operator] Paid Worktime Hours}}{\text{Total Platform Hours}}\right]$$

$$\frac{\text{Total Vehicle Operations Labor Expense}}{\text{Total Vehicle Miles}} = \frac{\text{Total Platform Hours}}{\text{Total Vehicle Miles}} \times \frac{\text{Total Operator Pay Hours}}{\text{Total Platform Hours}} \times \frac{\text{Total Operator Salaries and Wages}}{\text{Total Operator Pay Hours}} \times \frac{\text{Total Vehicle Operations Salaries and Wages}}{\text{Total Operator Salary and Wages}} \times \frac{\text{Total Vehicle Operations Labor Expense}}{\text{Total Vehicle Operations Salaries and Wages}}$$

time, particularly efforts to improve transit system efficiency and effectiveness.

A performance indicator should be investigated in detail if its value differs significantly from an acceptable standard value. The standard value for the indicator should reflect the performance of a transit system that is similar in size and operating characteristics but performs optimally.

Without specific standards, decision rules need to be developed to identify indicators that deserve further examination. Typical decision rules include the following:

1. The value of the indicator for the current year is significantly above or below the average indicator value for midsized transit systems;
2. The indicator is different from the statewide average in both value and rate of change; and
3. The value of an indicator is significantly higher or lower than the value for the transit system the previous year.

The type of decision rules established will determine the number of indicators examined in depth and will, therefore, influence the resources required to conduct the detailed phase of the evaluation.

Much of the information for the detailed evaluation of a transit system is gathered and validated during site visits with the transit operator. To prepare for the site visits to a transit system, the evaluator conducts a structured review of all of the performance indicators identified for detailed review within each transit system and prepares questions and issues for discussion about these indicators.

The evaluator begins the site visit with an interview of the transit system's general manager. The general manager may initiate detailed discussions about the transit system's performance and the specific indicators or may suggest that the evaluator speak to the assistant general manager or other transit system employees in each functional area. During the site visit, the evaluator may meet with the head of vehicle operations, the maintenance supervisor, and members of the administrative departments, particularly a staff accountant or the transit system's auditor.

Following each interview, the evaluator summarizes general findings as well as findings specific to each indicator. Gaps in information or understanding are noted along with apparent differences in opinion. Follow-up interviews may be necessary to obtain additional information, verify findings, and clarify unresolved issues. Before the site visit is complete, the evaluator briefs the transit system's general manager and seeks comments and insights about the findings and preliminary recommendations.

The primary product of the detailed evaluation phase of the methodology is the documentation of the evaluation results. This report discusses current performance and identifies opportunities for improvement, as appropriate. The evaluation report should serve as a useful management tool for the transit system. Transit system officials should have the opportunity to review, comment, and rebut the evaluation findings before the report is made final or reviewed by outside interests.

The documentation of the detailed evaluation findings should fulfill the following requirements:

1. Briefly describe the transit system;
2. Identify all the performance indicators identified for detailed review in the diagnostic phase of the evaluation and provide a concise explanation of the factors that influence the value and rate of change over time for each of these indicators;
3. Discuss examples of innovative system characteristics that may be shared among the operators;
4. Identify opportunities for improvement and suggest actions for the transit system and state and federal governments, as appropriate; and
5. Report on progress toward improving the efficiency and effectiveness of the system during the past year.

GENERAL APPLICABILITY OF THE MICHIGAN METHODOLOGY

The performance evaluation methodology discussed in this paper was developed for midsized transit systems in Michigan. The methodology, however, is generally applicable for transit systems and for state and local agencies concerned with the ongoing measurement of transit performance. The methodology is attractive because it

1. Is relatively simple, straightforward, and can be routinely applied;
2. Uses readily available data and, therefore, does not place considerable additional reporting requirements on the transit operator;
3. Enhances understanding about transit operations and performance;
4. Facilitates communication between the transit operator and local governing bodies, funding authorities, the legislature, and the public; and
5. Produces information that can lead to improvements in the efficiency and effectiveness of transit performance.

The availability of Section 15 data facilitates the conduct of transit performance evaluation by use of indicators presented in this paper for the diagnostic review element of the methodology.

Although many features of the methodology described have general applicability, transit systems, local governments, states, or other concerns that are considering the development of a transit performance evaluation program should address the following considerations: (a) the audience for the evaluation results, (b) the purpose or use of evaluation findings, (c) the level of detail of the analyses, (d) the frequency of evaluation, and (e) the availability of resources to conduct the evaluations. After these issues are addressed, the evaluation methodology can be tailored to best meet the needs of the participants within the context of each unique state and local environment.

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