

Transit Cooperative Research Program
Sponsored by the Federal Transit Administration
RESEARCH RESULTS DIGEST

January 2003—Number 56

Subject Areas: IA Planning and Administration and
VI Public Transit

TCRP Manager: Christopher W. Jenks
TCRP Project G-06

***A Summary of TCRP Report 88: A Guidebook for
Developing a Transit Performance-Measurement System***

This digest provides senior transit managers with an easy-to-read summary of the contents of and tools in TCRP Report 88: A Guidebook for Developing a Transit Performance-Measurement System. The guidebook provides a step-by-step process for developing a performance-measurement program that includes both traditional and nontraditional performance indicators that address customer-oriented and community issues. Information on obtaining the guidebook is on page 25. This summary was prepared by Paul Ryus, principal investigator, Kittelson & Associates, Inc.

CONTENTS

BACKGROUND, 3

MEASURING PERFORMANCE, 4
 Why Measure Performance? 4
 Performance Points of View, 4
 Performance Measure Categories, 5
 Characteristics of Effective Performance-
 Measurement Systems, 5

CASE STUDY HIGHLIGHTS, 6
 Program Goals and Objectives, 6
 Measures and Standards, 7
 Monitoring and Reporting, 8
 Successes and Challenges, 8
 Lessons from Private Industry, 9

DEVELOPING A PERFORMANCE-
MEASUREMENT PROGRAM, 10
 Step 1: Define Goals and Objectives, 11
 Step 2: Generate Management Support, 12
 Step 3: Identify Users, Stakeholders, and
 Constraints, 13
 Step 4: Select Performance Measures and
 Develop Consensus, 13

Step 5: Test and Implement the Program, 14
Step 6: Monitor and Report Performance, 15
Step 7: Integrate Results into Agency Decision-
making, 15
Step 8: Review and Update the Program, 16
Special Considerations, 16

PERFORMANCE-MEASUREMENT TOOLS, 17
 Data Sources, 17
 Reporting Results, 19

APPLYING THE GUIDEBOOK, 20
 Selection Menus, 20
 Browsing the Summaries, 21
 Core Measures, 21
 Hypothetical Example, 24

ADDITIONAL RESOURCES, 24
 Guidebook, 24
 Background Document, 24
 CD-ROM Reference Material, 24
 Obtaining the Guidebook, 25

REFERENCES, 25

This page left blank intentionally

A Summary of TCRP Report 88: A Guidebook for Developing a Transit Performance-Measurement System

BACKGROUND

Much has been written about performance measurement in the transit industry. Many performance measures have been developed and used in a variety of ways in response to differing transit system goals and objectives.

What the transit industry has lacked is a rigorous process for determining the most appropriate performance measures that should be used by a transit organization. In addition, traditional service efficiency indicators (e.g., operating expense per vehicle revenue mile and/or hour) and cost-effectiveness indicators (e.g., operating expense per passenger mile and/or passenger trip) are sometimes not linked to customer-oriented and community issues.

Research was needed to develop a process that transit systems could use to prepare a performance-measurement program sensitive to customer-oriented and community issues. This research needed to provide a context, or framework, in which to select and apply appropriate performance measures integral to transit-system decisionmaking. It also needed to analyze the dimensions along which agency performance can be defined, measured, and interpreted on the basis of an agency's goals and objectives.

In accomplishing these objectives, this project produced a practical, user-friendly guidebook (*TCRP Report 88: A Guidebook for Developing A Transit Performance-Measurement System*, hereafter referred to as "the guidebook") that assists transit system managers in developing a performance-measurement system or program that uses traditional and nontraditional performance measures to address customer and community issues. The measures presented in the guidebook will also be of interest to metropolitan planning organizations interested in assessing the community benefits provided by transit service.

The guidebook contains six main sections, each covering a different aspect of developing a performance-measurement program:

- **Chapter 1** describes how to use the guidebook.
- **Chapter 2** makes the case for why agencies should measure their performance.
- **Chapter 3** presents 12 case studies of successful programs.
- **Chapter 4** provides an eight-step process for implementing, using, and periodically updating a program.
- **Chapter 5** describes resources available to agencies developing or updating a program.
- **Chapter 6** contains 130 summaries describing more than 400 individual performance measures and a series of selection menus to help users quickly identify measures appropriate to particular agency goals and resources.

This summary serves as an introduction to the guidebook. It is intended to introduce agency staff and decisionmakers to the key performance-measurement concepts described in the guidebook. For users who will be involved with managing an agency's program, this summary can also serve as a reference showing where in the guidebook to look for more detailed information.

MEASURING PERFORMANCE

WHY MEASURE PERFORMANCE?

Performance measures are used by transit agencies for three main reasons:

- Because the agencies are required to use performance measures,
- Because using performance measures is useful to the agency, and
- Because others outside the agency need to know what is going on.

Reporting and regulatory requirements dictate a certain number of performance measures that must be used. Measures that agencies are required to collect and report to the National Transit Database are an example.

Agencies collect other measures to help identify how well service is provided to their customers, the areas where improvement may be needed, and the effects of actions taken to improve performance. Agencies use these measures to help provide service as efficiently as possible, to monitor whether agency and community goals are being met, and, over time, to improve service so that the agencies attract new riders and retain existing riders.

Decision-making bodies, such as transit boards and funding bodies, need to have access to accurate information to help them make decisions on where and when service should be provided and to support actions designed to improve performance. The public is interested in knowing how well service is being provided and may need convincing that transit provides a valuable service for them, for someone they know, or for the community.

Performance measure data provide transit agency management with objective assessments of current circumstances, past trends, existing concerns, and unmet needs. Key management uses of these data include

- Monitoring service,
- Evaluating economic performance,
- Administering the organization,

- Communicating the organization's achievements and challenges,
- Developing service design standards, and
- Noting community benefits.

PERFORMANCE POINTS OF VIEW

One agency staff member interviewed stated "What gets measured, gets attention." Conversely, what is not measured, doesn't get acted upon. If an agency only uses financial indicators, for example, actions that the agency takes to improve performance will tend to focus on improving those indicators, with results that may be contrary to other agency objectives. This is not to say that measuring financial performance is unimportant, but merely that it is not the only perspective that should be considered.

The guidebook identifies four points of view that transit performance measures address: customer, community, agency, and driver/vehicle. Each is described below.

The **customer** point of view reflects passengers' perceptions of transit service, with both existing and potential passengers considered. *TCRP Web Document 6: Transit Capacity and Quality of Service Manual (1)* terms this point of view "quality of service," a term also used by similar documents that cover the perceptions of motorists, pedestrians, and bicyclists.

The **community** point of view addresses transit's impact on the community it serves and transit's role in meeting broad community objectives. These impacts include such things as meeting community members' mobility needs, impacts on a person's finances (e.g., the ability to access or hold a job, avoid parking costs, or avoid the need to own a second car), pollution reduction, and many others.

The **agency** point of view looks at how effectively and efficiently service is provided. It also addresses how well individual departments, and the agency as a whole, perform their

core functions. Employee satisfaction is included in this point of view. Although transit management naturally will be concerned with all aspects of performance, measures relating to the agency point of view most directly relate to organizational performance.

The **driver/vehicle** point of view includes the driver- and vehicle-oriented performance measures that traffic engineers traditionally have used. For example, transit vehicles encounter delay, travel at a particular speed, and operate on roadway facilities with a finite capacity. This viewpoint indirectly reflects customers' perceptions, as passengers ride those transit vehicles. However, decisions using these measures that involve tradeoffs between autos and buses will tend to favor autos, as there are far more autos than buses, even when both modes serve similar numbers of people.

Performance measures may overlap these points of view. For example, maintenance department performance is an overall agency concern, but certain aspects of maintenance—for example, how frequently transit vehicles break down—directly affect customers' perceptions of service quality.

PERFORMANCE MEASURE CATEGORIES

The guidebook assigns performance measures to eight primary categories, each of which relates to one or more points of view:

- **Availability**—where and when service is provided, and having sufficient capacity available for passengers to take trips at their desired time (customer point of view).
- **Service delivery**—including reliability, customer service, passenger loading, and agency goal accomplishment (customer).
- **Safety and security**—reflecting the likelihood that one will be involved in an accident (*safety*) or become the victim of a crime (*security*) while using transit (customer).
- **Maintenance and construction**—evaluating the effectiveness of an

agency's maintenance program, and the impacts of construction projects on customers (customer and agency).

- **Economic**—transit performance evaluated from a business perspective, including use, efficiency, effectiveness, and administrative measures (agency and community).
- **Community**—measures of transit's impact on individuals and on the community as a whole (community, agency, and driver/vehicle).
- **Capacity**—the ability of transit facilities to move both vehicles and people (community and driver/vehicle).
- **Travel time**—how long it takes to make a trip by transit (a) by itself, (b) in comparison with another mode, or (c) in comparison with an ideal value (driver/vehicle and customer).

Secondary categories that overlap the primary categories listed above include *paratransit* measures designed specifically for demand-responsive service and *comfort* measures.

The guidebook states that agencies should develop a set of measures that address agency goals and objectives and that address multiple categories and points of view. The number of measures selected, and the amount of data required, will tend to be less for smaller agencies (because of limited staff and technical and budget resources), but should still address multiple viewpoints.

CHARACTERISTICS OF EFFECTIVE PERFORMANCE-MEASUREMENT SYSTEMS

Nakanishi and List (2) identified a number of key characteristics of effective performance-measurement systems:

- **Stakeholder acceptance**—Stakeholders include agency management (vital), staff, customers, the governing body, and any service contractors. A system initiated without broad stakeholder input and support is likely to fail or, at

least, operate substantially below expectations.

- **Linkage to goals** – An agency’s goals should reflect what the agency wishes to accomplish, and performance measures are the means of assessing how successful an agency is in accomplishing those goals.
- **Clarity** – The program’s intended audience should understand the measures used, and the way in which results are reported plays an important role in how well results are understood.
- **Reliability and credibility** – The accuracy (and usefulness) of performance-measurement results directly depends on the quality of the data used in calculating the measures; measures should be objectively selected and reported.
- **Variety of measures** – Performance measures should reflect a broad range of

relevant issues and should allow assessments of past, present, and future performance.

- **Number of measures** – The variety of measures must be balanced against the need to avoid overwhelming users with superfluous data that may obscure the key drivers of service quality.
- **Level of detail** – Measures should be sufficiently detailed to accurately identify areas where improvement is needed, but should not be more complex than necessary.
- **Flexibility** – The system should permit change over time as agency goals evolve, but should also retain links to necessary historical measures.
- **Realism of goals and targets** – Targets should be realistic (to maintain staff confidence in the program), but slightly out of reach (to encourage continually improving performance).

CASE STUDY HIGHLIGHTS

A total of 32 organizations were interviewed for the project about their performance-measurement programs. These organizations included 22 transit agencies of various sizes (including two international agencies), a metropolitan planning organization (MPO), a regional transit authority providing financial oversight and planning for three transit agencies, a city, a private transit contractor, and six companies in the private sector. The results of each interview are presented as case studies in the guidebook or its accompanying CD-ROM. In addition, European efforts to identify best practices in evaluating transit performance as perceived by customers appear as a case study.

PROGRAM GOALS AND OBJECTIVES

More than three-quarters of the transit agencies interviewed used their program as a management tool: their programs were set up because performance measurement was considered to be a good business practice, and information from their programs was used to

influence agency decisionmaking. Generally, the programs were not tied to specific agency goals and objectives, although some agencies considered their agency mission statement when developing their program, and three agencies directly linked performance measures to specific goals or objectives. Although all of the agencies that used their program as a management tool included nonfinancial measures in their program, economic measures constituted the majority of the measures reported.

Three agencies used their program exclusively to evaluate route performance and either did not measure or did not have standards for nonfinancial measures. One agency measured performance only when major internal or external changes occurred. None of the interviewed agencies measured performance solely because they were required to do so; those agencies that had external reporting requirements measured more than just their required measures.

MEASURES AND STANDARDS

The most commonly used performance measures among the agencies interviewed are listed below. At least 25 percent of the surveyed agencies monitor some variation of these measures. Note that no measures of availability, community, travel time, or capacity were used by 25 percent or more of the agencies interviewed. There was no apparent correlation between agency size and the type or number of performance measures used, but the MPO used community-oriented measures that the transit agencies did not.

Measures used by 50 percent or more of agencies interviewed:

- Cost-effectiveness,
- Ridership,
- On-time performance,
- Cost-efficiency, and
- Accident rate.

Measures used by 25–50 percent of agencies interviewed:

- Road calls,
- Employee productivity,
- Missed trips,
- Complaint/compliment rate, and
- Passenger load.

Agencies used a number of different methods for setting performance standards and, in some cases, used a combination of methods.

Some agencies implemented some of their standards in the form of **route design standards**. If the design standard is met, the agency can be reasonably confident that a goal related to that standard is met. This saves the agency the need to regularly track measures related to that goal. However, one agency indicated that political considerations frequently overruled the adopted standards and thus reduced their usefulness.

One method used that required data collection was **comparison with the annual average**. Routes falling into the lowest (and sometimes highest) group for a particular measure (e.g., lowest 10th or 25th percentile)

were identified for further action. This method allows an agency to prioritize the lowest-performing routes, but provides no connection to customer satisfaction or to identification of how the system as a whole is performing.

A variation on this method is **comparison with a baseline**: the value for a measure is compared with its value from the first year of the program (sometimes adjusted for inflation). Measures falling below a certain percentage of the baseline are targeted for action. This method focuses attention only on those areas that are truly under-performing. However, there is no direct connection to customer satisfaction and no incentive to improve (maintaining the baseline is sufficient). The method also requires that the baseline condition be satisfactory.

Another variation is **trend analysis**, with the standard expressed as “*x*-percent improvement from the previous year.” Measures show declining performance targeted for action. This method has built-in incentives to achieve continually improving performance and to track performance trends over time. However, it has no direct connection to customer satisfaction and has the potential to require looking at many individual measures if performance slips systemwide. Also, at some point it becomes cost-ineffective to continue to improve performance; in these cases, the standard should be to maintain the existing high performance.

Some agencies **self-identify standards**, where management, often in consultation with the governing body, sets targets based on a combination of current performance, agency goals, and professional judgment. This method allows standards to be directly tied to agency goals and customer satisfaction and, if standards are updated regularly, encourages continual performance improvement. However, other agencies’ experience is not taken into account. Eccles (3) states that comparing one’s performance with others’ can produce more of an eye-opening effect than simply comparing one’s own historical performance.

Other agencies **identify typical industry standards** by surveying other agencies or finding examples of standards in the transit literature. This method has the advantage of

being somewhat defensible—the standards weren't pulled out of thin air, but are used by others—but fails to consider other agencies' circumstances that caused them to adopt a particular standard. This method is useful for determining whether existing standards, or ones being considered, are considerably higher (potentially unrealistic) or lower (not set high enough) than other agencies'.

Finally, some agencies compare their performance with that of **peer systems** that have similar conditions (e.g., city sizes, level of government support, fare levels, goals and objectives, and cost of living). This method allows a realistic assessment of where an agency may have room for improvement, but requires up-front and ongoing work to identify suitable peers and track their performance. Not every potential peer may measure performance in every area the agency is interested in.

A combination of these methods is ideal. Developing a baseline and tracking performance each year provides useful information on whether changes represent trends or statistical blips. Comparing performance with peer agencies will indicate areas of excellence or deficiency. Internal review of standards allows local conditions and objectives to be considered and should be done annually to encourage continued improvement.

MONITORING AND REPORTING

How often performance measures were compiled and reported varied widely from one agency to another. There was no particular correlation between an agency's size and the frequency of reporting, except for a few larger agencies that reported results daily or weekly to department and upper management. The most common reporting periods were monthly, quarterly, and annually, and many agencies used more than one reporting period, depending on the measure being reported.

Some agencies reported more detailed (e.g., route-level) results only once a year, with system-level information reported more frequently. However, others did the opposite. Measures that required more extensive data collection (e.g., origin-destination or customer

satisfaction surveys) tended to be evaluated no more than once a year. However, agencies with automated equipment (e.g., electronic fareboxes, automatic passenger counters, or automatic vehicle location units) were able to calculate measures using those data much more frequently. In addition, the large agencies that had passenger environment survey programs conducted those surveys on an ongoing basis with permanently assigned staff.

SUCSESSES AND CHALLENGES

DATA COLLECTION

A number of agencies without automated data collection capabilities expressed a desire to develop those capabilities because they wanted to do one or more of the following:

- Provide more timely reporting,
- Improve data accuracy (training new data collectors and ensuring consistency between collectors were issues),
- Allow better measures to be used than the ones currently used,
- Allow more detailed analyses (particularly at a route level) than were currently possible, and
- Reduce manual data collection costs.

Agencies that had implemented automated data collection systems were challenged by the volume of data collected, particularly in terms of how to summarize, store, and report the data.

Agencies that relied on data submitted by other agencies reported that timely submittals were sometimes an issue. One agency also reported earlier problems with different departments not always sharing the data they collected with other departments.

Some agencies believed that “softer” data (such as data from customer satisfaction surveys) were harder to collect than more traditional measures, and the results were less consistent. However, the private transit provider believed that direct employee contact with customers was a better way to understand needs and problems than was reliance on quantifiable

measures, although the provider used both techniques.

Nearly all large agencies used customer satisfaction surveys, but only one mid-sized agency did. Smaller agencies tended to rely on complaint tracking as a means of identifying customer service issues.

DATA REPORTING

Timely, consistent reporting was vital. One agency reported that when the same group of people received the same information on a consistent schedule, staff paid attention to the performance-measurement program results and took action based on those results. When either the reporting schedule or the report distribution was inconsistent in the past, reports came and went with no action being taken.

STANDARDS SETTING

Several agencies noted a difficulty in identifying suitable peer agencies and believed that such factors as land use patterns and development density characteristics were just as important as identifying agencies serving similar-sized communities or operating a similar number of vehicles.

Setting different standards for different service types or times (e.g., express versus local, peak versus off-peak) was a technique used by several agencies. One agency that does not currently do so identified this technique as a need, as the agency operates university-focused services that have substantially different characteristics than its general community routes has. However, another agency found it valuable to combine some demand-responsive and fixed-route services together to adequately assess the full range of mobility options available to its customers with disabilities.

The city government interviewed reported that implementing its program was intimidating to some at first, both in terms of the amount of data to report and in terms of the increased level of departmental responsibility for meeting targets. However, those issues have lessened over time, and the program is seen as a valuable tool for uncovering problems and developing solutions. One danger to guard against is

focusing only on those areas measured by the program.

INCENTIVES

One agency interviewed that contracted its service built penalty and incentive clauses into its contract, depending on whether target standards were met in particular categories. The contractor was responsible for submitting monthly performance results. If a target value is repeatedly missed, agency staff will investigate and report to their board the causes of the problem and a recommended course of action.

Another agency reported that its bus divisions compete to see which can reduce accidents the most, and this competition has fostered an increased emphasis upon safety.

A third agency ranks its bus divisions based on various aspects of performance and provides monetary awards for best and most improved performance.

LESSONS FROM PRIVATE INDUSTRY

While both private-sector service companies and transit agencies track revenue-based performance measures, performance measures among Fortune 500 private-industry companies are more likely to be driven by measures related to customer satisfaction and loyalty. Private-service industries are driven by the goal to maintain and increase repeat customer business.

Performance measures reported by transit agencies are more likely than performance measures reported by private industry to be driven by goals oriented to monitoring the system and goals that change over time. The latter includes measures of service and cost-efficiency, such as the number of boardings per hour or per mile, the number of unlinked trips per total vehicle hours, or the accident rate per 100,000 miles.

Only a handful of metropolitan transit agencies have the resources to conduct large-scale market research and customer satisfaction tracking studies on an ongoing basis. Specifically, transit agencies generally lack up-to-date electronic databases of their customers,

making it difficult or impossible to use efficient and modern telephone and web-based research methods. Transit agencies also often lack intranet systems or other companywide web-based electronic means for distributing the results of customer research to all employees in a timely manner. Critical problems gleaned from customer surveys cannot be conveyed electronically to transit agency frontline personnel for immediate resolution.

The most important learning experience from private-industry customer satisfaction and loyalty performance programs is that these programs require “buy-in” from the highest levels of an organization’s management and the involvement of all departments as well as frontline personnel. The most successful efforts have linked improvements in customer satisfaction and loyalty measures to personnel compensation and/or bonus plans—when a direct tie can be made between satisfaction levels and profitability.

Specific performance measures used in private-service industries that can be applied to transit industry market research are listed below. These measures and service attributes are rated from the customer’s perspective:

- Overall customer satisfaction with service (on a 7- or 10-point scale).
- Meeting customer expectations: “Did the service exceed your expectations,

meet your expectations, almost meet your expectations, or fail to meet your expectations overall?”

- Customer loyalty measures: “How likely are you to recommend this transit service to others?” and “How likely are you to (ride) (keep riding) this transit service?”
- Number and nature of critical incident reports (compiled from client survey verbatim).
- Service attributes regarding personnel interactions
 - courtesy,
 - timeliness of providing service,
 - quality of information and assistance, and
 - resolution of problems that arise without unnecessary delay.
- Service attributes regarding personnel interactions
 - service efficiency,
 - environment,
 - safety and security, and
 - comfort and convenience of use.
- Value of the service for costs paid.

DEVELOPING A PERFORMANCE-MEASUREMENT PROGRAM

The guidebook presents an eight-step process for establishing a performance-measurement program or for refining an existing one. These steps are, in order, as follows:

1. Define goals and objectives.
2. Generate management support.
3. Identify users, stakeholders, and constraints.
4. Select performance measures and develop consensus.
5. Test and implement the program.

6. Monitor and report performance.
7. Integrate results into agency decisionmaking.
8. Review and update the program.

None of the steps in this process should be viewed in isolation, because there is considerable overlap between them. In fact, the outcomes from virtually all of these steps will influence the others and will play a significant role in determining the program’s success.

At each step in the process, the guidebook presents a concise checklist of “things to do”

during that step. These lists are reproduced in the following sections.

STEP 1: DEFINE GOALS AND OBJECTIVES

THINGS TO DO

- Develop or update a set of agency goals and objectives.
- Include customer and community input when developing goals.
- Select an initial set of goals without worrying about potential measurement issues.
- Revisit the performance-measurement program each time the agency goals are updated.

DEVELOPING GOALS AND OBJECTIVES

An agency's first step should be to define its goals and objectives. If a program is not well integrated with an agency's goals and objectives, the program will be ineffective in performing its core function: *measuring the system's ability to achieve its goals and objectives*. Consequently, it is of paramount importance that a transit property establish clearly defined goals and objectives prior to developing its program.

Many different types of goals and objectives may be adopted. Some transit agencies have adopted product-oriented goals that focus on meeting their passengers' needs and expectations. Other agencies have remained with the more traditional process-oriented goals and objectives that evaluate the agency's internal efficiency—how well the agency is able to use its resources in providing transit service.

STAKEHOLDER INPUT

When developing a program, agencies should keep in mind its intended users and audience. A program intended to assess how well an agency serves its customers must account for those customers' needs and expectations when the program's goals and objectives are established. The best way to accomplish this is to incorporate customer and community input into the goal selection process.

Means of incorporating customer and community input include

- Identifying key customer issues through a customer satisfaction survey,
- Working with an established citizens advisory committee,
- Convening a focus group with representatives of different transit stakeholders, and
- Holding public meetings to gather community input.

The important consideration here is that an agency can develop goals and objectives that it *thinks* relate to its customers' needs and expectations, but that turn out to be quite different from what its customers *actually* want. A program based on this situation may do an excellent job of measuring the agency's goals and objectives, but any actions taken to improve performance will only accidentally result in any increase in customer satisfaction or ridership. In contrast, actions taken to improve service that are identified through a program designed around what customers *actually* want will be more likely to address issues important to customers and the community and thus will be more likely to improve customer satisfaction and ridership.

MEASURING GOALS

Regardless of the type, a goal or objective must be measurable; otherwise, the agency has no means of evaluating its progress in achieving a given goal or objective. In general, just about any goal or objective can be measured; usually, the real issue is how easily the goal or objective can be measured. This issue is considered during Step 4; it is important not to let potential measurement issues affect the selection of goals and objectives during Step 1.

UPDATING AN EXISTING PROGRAM

As part of their planning process, transit agencies typically reassess their goals and objectives every 5 years or so. This task is worthwhile, as it provides agencies with the opportunity to reconsider their priorities and reorganize their goals and objectives accordingly. As management and operating

conditions change, transit agencies will generally want to adjust the system goals and objectives to ensure that they still reflect the community and agency priorities.

It is important that transit agencies also take this opportunity to review the performance-measurement program that was established in concert with the original goals and objectives. This process involves the same steps used to develop a program the first time. Even if only one or two goals change, it is important also to review whether other aspects of the program should be changed as well. For example, resource constraints that prevented an “ideal” measure from being used previously may have been removed. How results are reported could also be reviewed at this time.

STEP 2: GENERATE MANAGEMENT SUPPORT

THINGS TO DO

- Educate the board of directors and senior management regarding the value of the program.
- Create a limited number of aggregate performance measures that are easily understood and representative of the transit system’s performance in key functional areas.
- Provide periodic performance reports to senior management.
- Provide senior management and board directors with the opportunity to shape the development of the program.

EDUCATION

Once the overall goals and objectives have been determined, transit systems should make sure their senior management is “onboard” with the implementation of the program. The critical link in any program is identifying corrective action to improve a system’s future performance. However, this link will not be in place if a transit system’s senior management does not understand, stay involved with, or support the program.

By educating board members and senior management about the value of the program, transit systems build the foundation for a successful program. Without this foundation of understanding, key decisionmakers may consider performance measurement to be just another layer of government bureaucracy. Presenting examples of success stories from peer transit agencies is a good technique to illustrate the value of an effective program. It is also important for transit staff to discuss the program’s data collection and analysis requirements with senior management and board members so that all parties are aware of the level of effort required for full program implementation.

DEVELOP AGGREGATE INDICATORS

Transit systems should develop aggregate performance indicators to reduce the amount of information that decisionmakers must process to understand the key trends in the system’s overall performance. For instance, a single indicator could be developed to represent a system’s service effectiveness that compared service consumption (ridership) with service outputs (hours, miles, etc.). As such, the aggregate indicators would be a function of several more detailed performance indicators. It is expected that the aggregate indicators would provide meaningful information to decisionmakers in a more digestible format.

PERIODIC PERFORMANCE REPORTING

By providing periodic performance reports to senior management and the system’s board of directors, the transit system should be able to keep the decisionmakers informed of trends in the system’s operating performance. If designed properly, management will grow to rely upon these reports as a critical input to their decision-making process. Transit systems that do not provide regular performance reports to their board of directors may erode support among the decisionmakers for the program.

INVOLVE MANAGEMENT IN PROGRAM DEVELOPMENT

Transit systems should always provide senior management and board members with

the opportunity to shape the development of the performance-measurement program in all its permutations. Feedback should be collected on an ongoing basis on all aspects of the program. However, transit systems should pay particular attention to soliciting feedback from board members and senior management as specific measures are being reviewed and updated to improve the overall program. This process should provide the transit system's decision-makers with a stronger sense of ownership of the program.

STEP 3: IDENTIFY USERS, STAKEHOLDERS, AND CONSTRAINTS

THINGS TO DO

- Determine who will be using the performance-measurement program on a regular and periodic basis.
- Evaluate existing and expected human, financial, and technical resources for the performance-measurement program.

IDENTIFY INTERNAL USERS

The program's characteristics will vary substantially depending upon the intended audience. For instance, a program that is designed for internal system evaluation and monitoring should vary significantly from a program developed by the marketing department to use in promotional campaigns for the transit system. In general, performance measures intended for use by the general public should be relatively simple and easy to understand, whereas performance measures intended for internal system evaluation can be more complex, involved, and comprehensive.

IDENTIFY RESOURCES AND CONSTRAINTS

The operating characteristics of a particular transit property play a huge role in shaping the nature of its performance-measurement program. A large urban transit system is naturally going to have more resources available than a small, rural property. Consequently, a transit system should consider all relevant system constraints when designing its program. An overly ambitious program is not advised,

particularly for smaller agencies, as it will more than likely fall short of expectations and fail to provide the system with particularly valuable information. Instead, agencies should consider developing more realistic programs that are more likely to be useful and achievable. If necessary, an agency can revisit and expand upon the existing program to include additional performance standards or categories.

STEP 4: SELECT PERFORMANCE MEASURES AND DEVELOP CONSENSUS

THINGS TO DO

- Determine performance-measurement categories.
- Review performance measures used throughout the industry.
- Consider data collection constraints, as was discussed in Step 3.
- Select performance measures.
- Develop targets or standards for the selected measures.
- Develop consensus among the key stakeholders involved.

SELECT PERFORMANCE MEASURES

Prior to selecting specific performance measures, it is recommended that transit systems establish general, overarching categories for their program. These categories should be directly linked with the system's goals and objectives. Within these categories, specific performance measures should be developed to actually track the system's performance over time. The guidebook's recommended core measures and performance measure menus and summaries can be used as a basis for developing categories and individual measures. The selection menus, in particular, can be used to match goals and objectives with individual measures and to compare data and resource requirements between measures.

For a variety of reasons, transit systems will not always be able to implement the ideal program immediately. Under these circumstances, it is recommended that interim measures be developed and implemented to

ensure that the agency is able to monitor its performance in some manner. Meanwhile, the transit system should continue to work at putting systems in place for the eventual implementation of the ideal program. While interim measures should evaluate key performance categories such as cost-efficiency, cost-effectiveness, quality of service, and service effectiveness, the measures should be relatively simple and fairly easy to calculate, since they will be in effect only for a finite time period.

If an agency is unable to identify a suitable interim measure for a goal and does not have the resources available to use an ideal measure, it should reconsider using that goal.

DEVELOP CONSENSUS

While it may not be as important to have broad community support for a performance-measurement program, compared with having support for a transit system's goals and objectives, a transit agency should make a concerted effort to develop consensus on the program among the key stakeholders involved. For most transit agencies, key stakeholders include the following: transit agency staff, the board of directors, involved decisionmakers, and public officials. Ideally, a transit agency would also hold a public forum to provide the general public with an opportunity to provide feedback on the program.

The figure below presents some critical issues to consider in the consensus-building process. It is important to mention that there is no equation or uniform approach to developing consensus, since transit agencies are quite different from one another. Nonetheless, there are certain guiding principles that should assist transit agencies in achieving consensus with their performance-measurement programs.



Just as it is important to achieve consensus during the development stage of a performance-measurement program, it is equally important to maintain this consensus over time. As such, the agency should encourage internal and external scrutiny of its program as a means of ensuring

the continued value to the transit system. One technique for maintaining consensus over time is to require an update of the performance measures on a regular basis, such as every year or two. The update will provide all interested parties with the opportunity to evaluate and propose changes to any and all facets of the performance-measurement program.

STEP 5: TEST AND IMPLEMENT THE PROGRAM

THINGS TO DO

- Develop a pilot test of the program.
- Test the agency's data collection and analysis capabilities through the pilot project. Develop alternative measures if needed.
- Assign program responsibilities to transit staff.
- Implement the program.
- Periodically review technological developments that may improve data collection capabilities.

PILOT PROJECT

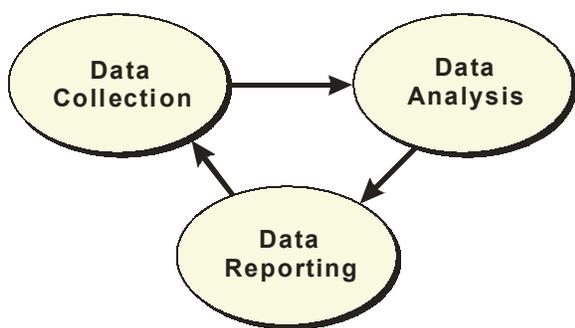
After transit agencies go through much planning and program development, this step represents the point where the program is put into action. Agencies are advised to develop a pilot project for initial implementation as a means of testing the program objectives and identifying potential pitfalls in the program's design and implementation.

Performance standards are only as good as the agency's data collection capabilities. This point is important to consider in this step as well, since a transit agency's ability to successfully test and implement its program will largely depend on its data collection capabilities.

ASSIGN STAFF RESPONSIBILITIES

To implement an effective program, various components of the program must be assigned to specific staff members. This ensures that the program will become a priority of the system and will be relied upon by staff members in their decision-making process.

The figure below depicts the feedback loop associated with the three main responsibilities associated with implementing a performance-measurement program: data collection, data analysis, and data reporting. Transit agencies should be aware that data processing is an ongoing component of performance measurement, and steps should be made to improve this process whenever possible.



PERIODICALLY REVIEW DATA COLLECTION CAPABILITIES

It is important that transit agencies continue to revisit their data analysis procedures as technological improvements provide systems with greater access to information. Regardless of various technological improvements, agencies need to have sound data collection and analysis procedures and methodologies in place in order to successfully monitor performance.

STEP 6: MONITOR AND REPORT PERFORMANCE

THINGS TO DO

- Establish a schedule for regular performance reporting.
- Consider system requirements, as these will affect the manner in which performance is monitored and reported.
- Monitor system performance at agreed-upon intervals.
- Check results for reasonableness.
- Develop a performance measure report format.

MONITORING AND REPORTING PERFORMANCE

Once a transit agency has implemented its performance-measurement program, the next step consists of monitoring and reporting the system's performance. Throughout the project's literature review and the transit agency interviews, one common theme among virtually all transit properties was regularly scheduled performance reporting. Some agencies conducted monthly reporting on their performance standards, and others preferred quarterly, semiannual, or annual reporting.

Different audiences will require different report formats. Agency staff responsible for specific facets of performance will require more detailed information, while decisionmakers and the public will require more general, but more comprehensive information. All audiences need to have information communicated in a way that is easy to understand for that audience. The guidebook provides examples of reporting techniques used by transit agencies.

STEP 7: INTEGRATE RESULTS INTO AGENCY DECISIONMAKING

THINGS TO DO

- Develop a preferred approach for result integration.
- Consider the desired frequency of system evaluation.
- Compare the performance results with the goals set for each measure.
- For measures not meeting their goals, identify action items for improving performance.
- For measures consistently exceeding their goals, consider increasing the target, if cost-effective to do so.

DEVELOP PROCEDURES FOR INTEGRATING RESULTS

Transit agencies must have policies and procedures in place establishing how the agencies will make adjustments to their service provision approach, based on the information

collected through the program. In fact, this step is quite possibly the most important step in the whole performance-measurement process.

COMPARE RESULTS WITH APPLICABLE STANDARDS

The performance measure standards developed during Step 4 form the basis for evaluating goal achievement. Goals not being met should be targeted to see whether further action is needed. Goals that are consistently exceeded should be reevaluated to see whether they could be set higher. This evaluation should consider whether the benefits of the higher performance level would outweigh any costs associated with achieving that performance.

TAKE ACTION

Without a clearly defined course of action for improving system performance, transit systems are sure to struggle with integrating the results from the performance-measurement program with the agency's decision-making process. While corrective action will vary from case to case, transit agencies with clearly defined target values integrated into the performance-measurement program are at a definite advantage over those without this additional layer of performance assessment.

STEP 8: REVIEW AND UPDATE THE PROGRAM

THINGS TO DO

- Periodically evaluate the program.
- Based upon the evaluation, make an assessment of whether an update is necessary.
- If an update is necessary, return to Step 1 (define goals and objectives) and repeat all of the steps presented above.

REVIEW AND UPDATE THE PROGRAM

To maintain an effective performance-measurement program, transit agencies should periodically review the overall program performance. The frequency of these reviews will vary from agency to agency, but it is

recommended that these reviews be completed every 5 to 10 years.

It should be noted that many transit agencies do not have a formal process in place to review and update their programs. These agencies appear to subscribe to the "if it ain't broke, don't fix it" philosophy. This approach is fine as long as the agencies are capable of recognizing when their program is outdated and due for review. To avoid this problem, transit agencies are advised to incorporate the performance-measurement review process into the preparation of the system's short-range planning studies that are completed every few years. This tactic will provide each transit agency with a regularly scheduled opportunity to evaluate the effectiveness of its program and to revise it as necessary.

SPECIAL CONSIDERATIONS

The process for developing a performance-measurement program described above can be applied to all types of transit agencies. However, demand-responsive and contracted services have some differences from fixed-route service that also need to be considered.

DEMAND-RESPONSIVE SERVICE

Transit service in most urban areas is primarily provided through fixed-route and fixed-guideway service. The large majority of service, passengers, and expenses are dedicated to the provision of those services. Therefore, performance measures tend to focus on the primary areas of service to ensure the best possible fit with the primary service provided. Additionally, as an industry, transit largely focuses upon developing and using measures primarily suited to the largest modes of service in terms of ridership and costs.

However, by limiting the performance-measurement program's focus, a standardized set of performance measures may fail to accurately and fully assess performance effectively across different modes of transit service, particularly demand-responsive service.

Demand-responsive service in public transit usually involves advanced reservations and

shared service and is provided in a substantially different manner than fixed-route service is. Providing demand-responsive service requires different tasks and a different approach to service delivery. Additionally, in the case of Americans with Disabilities (ADA) complementary paratransit, a substantial body of regulations acts as de facto performance measures and may require the development of measures to ensure compliance.

Demand-responsive service is somewhat different from other transit modes for several reasons:

- Civil rights requirements of ADA complementary paratransit service mandate many of the specific methods of transit service.
- Productivity limitations that exist in demand-responsive service limit or affect growth.
- Demand-responsive service requires a significantly different service delivery approach, since individuals' trips must be scheduled and drivers' routes change constantly.
- Growth in demand often lacks economies of scale and results in significant financial stress for a transit agency, including limitation of demand-responsive service or reduction in the levels in other service modes.

Applying performance measures to demand-responsive services must be done differently than for fixed-route services. Improvements to particular measures that would be seen as positive in a fixed-route

environment may have negative consequences in a demand-responsive environment.

CONTRACTED SERVICE

The basis behind performance measures is to align the objectives of the service contractor with those of the transit agency. These objectives may often conflict, as the contractor is generally profit-focused. As a result, efficiency and cost-effectiveness are of particular interest. The transit agency's main aim is to provide quality transit service; thus, customer satisfaction, service availability, and service delivery are important. By linking performance with financial rewards, the quality of service is directly related to the contractor's financial gain. Therefore, financial and nonfinancial penalties and bonuses based on transit performance ensure that the actions of the contractor are in line with the transit agency's goals.

The performance incentives for a transit operator must be

- Consistent with the agency's transit goals,
- Within the operator's control, and
- Collected using a specified and agreed-upon method.

The contract must specify

- Frequency of performance reporting,
- Values against which the operator's performance is compared,
- The length of the contract, and
- Termination or renewal of the contract.

PERFORMANCE-MEASUREMENT TOOLS

DATA SOURCES

Many different transit performance measures exist, and the amount of effort required to calculate them varies considerably. However, a number of sources of readily available, useful information that agencies have access to can serve as a starting point for a comprehensive performance-measurement

program. This section summarizes these sources; for more details on the relative effort required, consult the guidebook.

IN-HOUSE

A number of performance measures require only good record keeping and can be calculated from information an agency would normally

have on hand for other purposes. Examples of these kinds of data include schedule data, system maps, service design standards, demand-responsive dispatch logs, maintenance records, operations logs, accident and incident records, financial data, fleet data, employee records, and complaint records.

NATIONAL TRANSIT DATABASE (NTD)

The Federal Transit Administration requires that all agencies benefiting from Urbanized Area Formula Program (Section 5307) grants report certain statistical information each year. This information is incorporated into the Federal Transit Administration's NTD, which is readily available for agencies, planners, researchers, and others to use to evaluate different aspects of transit service (mostly related to safety and economic performance).

Caution may be required in drawing conclusions from the data, as not all measures have been reported consistently by agencies in the past, and different agency objectives will lead to different performance results. Also, the most recent NTD data may be 2 years old.

For individual agencies, the NTD measures represent data that in most cases are already being collected. Little additional investment in time or resources is required other than that needed to compile the measures in the reporting formats used by the agency's performance-measurement program.

OTHER AGENCIES

Other local, state, and federal agencies often will be able to supply information on external factors that influence where and how well transit service is provided. Examples of the kinds of data that may be available include the following:

- **Demographic data** from the U.S. Census Bureau, local planning department, or MPO;
- **Traffic data** from local public works or planning departments or state departments of transportation;
- **Geographic information system (GIS) data** maintained by many planning

organizations and particularly useful for more detailed measures of transit availability; and

- **Transportation planning models** used to calculate mobility, accessibility, and travel-time measures.

AUTOMATED DATA COLLECTION

Manual data collection is labor intensive, but it continues to be the way that many agencies collect ridership, passenger load, and reliability data. Because of the costs involved with manual data collection, only a small number of trips can be sampled. In addition, measurement errors can occur when data are collected or transcribed.

To more accurately collect and more quickly report ridership, loading, and reliability data, some agencies have turned to automated or semiautomated data collection. Agencies that adopt these automated collection methods commonly go from not having enough data to being overwhelmed by data. The decision to use an automated data collection method should include serious consideration of how the data will be stored and managed.

Automatic vehicle location (AVL) equipment can provide arrival, departure, and dwell time information; travel times and speeds; travel time variability; and on-time performance and headway adherence data. The **train control systems** used by rail transit operators may be able to provide the same kinds of information.

Automatic passenger counters (APC) automate the collection of passenger boarding and alighting data, potentially saving labor costs for manual ride checks and allowing both system- and route-level ridership data to be available more often. APC systems incorporate some form of AVL system, so that the number of people getting on and off at individual stops can be recorded.

Data from **electronic fareboxes** are often used to obtain route- and system-level ridership. Because these fareboxes are typically installed on the entire fleet, it is possible to get regular, large-scale ridership information, rather than the samples provided by other methods. However,

this information is typically more aggregated (e.g., route level instead of stop level) than that available from other methods.

MANUAL DATA COLLECTION

Ridership and schedule reliability information frequently is collected manually. Information collected this way will be less extensive than information collected by automated means, but is often sufficient for an agency's purposes. Three main types of data collectors are used: bus operators, traffic checkers, and field supervisors.

The literature indicates that manual data collection generally produces minimal measurement errors. However, because a limited number of samples are collected, it is subject to sampling error on a route-level basis, where the data collected on a single day may not represent conditions in general (4).

Passenger environment surveys are another form of manual data collection; these are discussed separately below.

CUSTOMER SATISFACTION SURVEYS

Customer satisfaction surveys are a valuable tool for learning about what matters to the customers of a particular agency. Most transit agencies do not have the resources to conduct the same level of customer satisfaction surveying as do service industries in the private sector. However, larger systems often have the resources for annual surveying. Smaller systems that may not be able to survey very often may still find it valuable to conduct a customer satisfaction survey when developing a performance-measurement program. The results of the survey can be used to develop performance measures that evaluate the things that matter to customers.

SAFETY REVIEWS

Safety reviews or audits should be used on a regular basis to catch potential safety problems before they result in an incident. These reviews do not generate the same kinds of performance measures as other data collection techniques described in this section. Rather, the reviews consist of a number of yes/no questions, with

the preferred answer "yes," indicating that a particular safety aspect (e.g., regular brake inspections) is being addressed. The Federal Transit Administration's Office of Safety and Security and state agencies regulating the safety of passenger transportation can provide information on conducting safety reviews.

PASSENGER ENVIRONMENT SURVEYS

Passenger environment surveys are used to track aspects of transit cleanliness, ride comfort, and information that are difficult to measure by other means but play an important role in how passengers perceive transit service quality. These surveys are best conducted using a dedicated staff of surveyors and may not be feasible for smaller systems with limited resources. However, larger systems may have the resources to conduct these surveys and may find the results of the surveys quite beneficial.

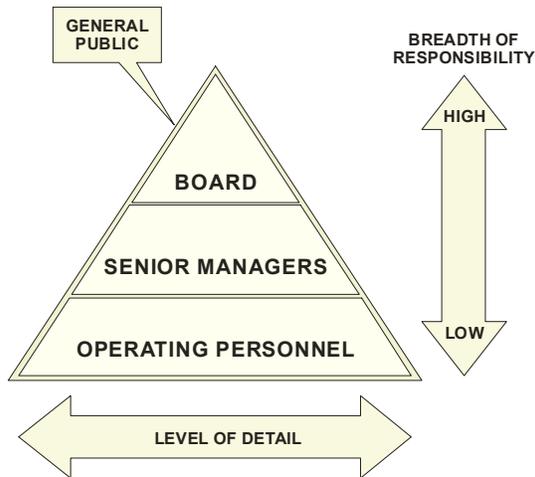
REPORTING RESULTS

Performance results will be reported to different groups of stakeholders. These groups may include operating personnel, senior managers, the general public, members of the agency board, political officials, and officials in other agencies. Results should be reported to each target audience in a manner appropriate to that audience. Otherwise, the intended message and usefulness of the performance measures will diminish.

Operating personnel need reports that are diagnostic in nature and that provide as much detail as possible. The optimal frequency of reporting is probably much higher for operating personnel than for the general public. With the enormous amount of information and data that may be obtained from AVL and APC systems, statistically valid results may be obtained for short time intervals for a wide array of service and maintenance measures. These results may then be used by operating personnel to make real-time improvements to the transit service.

Senior managers need reports that are less detailed, while the members of the board and officials may desire reports that are even less detailed. While level of detail should decrease, these stakeholders' breadth of responsibility for

various elements of transit service increases. The general public (including transit customers) needs information and results conveyed in a clear, understandable manner. The following illustrates the relationships between stakeholder responsibility and amount of detail.



As the amount of detail provided decreases but the breadth of measure increases, it becomes more important to consider how the information is presented to its intended audience. One-page summaries, such as the NTD agency profiles,

convey a broad range of information in a visually appealing way, using a minimum of space. These kinds of reports can be set up in a spreadsheet and can update themselves as new information is provided each reporting period.

Reports intended primarily for the public rely largely on graphics to present results and typically report a small number of measures. Interpretation of what the graphs mean is often incorporated into the report design, along with limited trend information (often a comparison with the previous year). The guidebook provides examples of these kinds of reports.

Measures used internally may be more detailed than those reported to the public or decisionmakers, but the need for clear presentation is no less important. Managers need to be able to easily identify key performance trends. Graphs are particularly good for demonstrating trends. Bold type and boxes within tables can be used to draw the reader’s attention to where goals were or were not achieved and to indicate areas where performance improved.

APPLYING THE GUIDEBOOK

Chapter 6 provides an extensive collection of transit performance measures, consisting of 130 summaries of more than 400 performance measures. More than half of the guidebook consists of these summaries and their related menus and indexes. Because agencies would be expected to incorporate only a small number of measures into their program, the guidebook provides several means of accessing this information.

SELECTION MENUS

The primary means of accessing performance measure information is through a series of selection menus. By answering a series of questions relating to an agency’s goals, objectives, and resources, users are guided to one or a small number of measures appropriate to the users. The figure above shows an excerpt from these menus.

Menu 4 GOAL: SERVICE AVAILABILITY		Pick a category:
Where transit service is provided	Menu 5	Page 158
When transit service is provided	Menu 6	Page 158
Where and when transit service is provided	Menu 7	Page 159
ADA accessibility or paratransit availability	Menu 8	Page 159
Access to information	Menu 9	Page 160
Welfare-to-work access	Welfare-to-Work accessibility	Page 243
Service equity	Service equity	Page 244
	Local Index of Transit Availability	Page 199
Amount of service provided	Menu 10	Page 160
Capacity constraints on availability	Menu 11	Page 160

Menu 5 GOAL: SPATIAL AVAILABILITY		I want to know...
As much as possible with limited data	Route (corridor) spacing	Page 179
	Route coverage	Page 181
	Service density	Page 182
How much area is served by transit	Service coverage	Page 180
How many people or jobs are served by transit	Accessibility	Page 241
	Welfare-to-Work accessibility	Page 243
How easy it is to walk, bike, or drive to a transit stop	Stop spacing	Page 183
	Stop accessibility	Page 184
Where potential demand for service exists	Transit Orientation Index	Page 185

If, for example, the user’s goal was to find a measure of how many jobs are served by transit, the user would first be guided to Menu 4, which addresses measures relating to the availability of transit service. Picking the category “where transit service is provided,” which most applies to the

desired measure, would lead the user to Menu 5. Here, answering the question “I want to know... how many people or jobs are served by transit” would identify two potential measures to consider: *accessibility* and *welfare-to-work accessibility*. Turning to the page identified for one of those measures leads the user to a summary of that measure, including the measure’s uses, modes and system sizes covered, potential audience, calculation methodology (if not obvious), example target values, factors influencing the measure, data requirements, and an overall assessment.

BROWSING THE SUMMARIES

All of the performance measures summarized in the guidebook are indexed by category and by name. Browsing the summaries by category allows users to quickly identify and compare a series of related measures. Browsing the summaries by name allows users to identify potential issues or new applications for measures their agency currently uses.

Users can also browse directly through the summaries, which are organized by category (e.g., availability), subcategory (e.g., spatial availability, temporal availability, paratransit availability, capacity availability), and family (e.g., *route coverage* includes *route miles per square mile*, *route miles per capita*, *directional route miles per square mile*, and *transit street miles per square mile*).

Unique measures, such as the various kinds of performance indexes, have references associated with them. Users desiring more detail can turn to the guidebook’s accompanying CD-ROM to read a summary of the original paper that described that measure.

CORE MEASURES

Although the guidebook recommends that agencies tailor their performance-measurement program to their specific agency goals and objectives—to make sure that the agency can determine how successful it is at meeting those objectives—the guidebook recognizes that not all agencies may wish to go through this process. As a result, Chapter 4 of the guidebook provides a recommended set of core performance measures tailored to different-sized agencies. The number

of measures recommended, and the complexity of those measures, increases as agency size increases, reflecting greater resources available to larger agencies. However, all of the programs comprehensively assess an agency’s customer, community, and financial performance.

FIXED-ROUTE MEASURES

The larger the transit agency, the greater the number of issues to deal with, but the greater the number of resources available to it. Tables 1 through 7 present recommended measures for the following transit agency sizes:

- Large (over 1 million population);
- Medium (200,000 to 1 million population);
- Small (50,000 to 200,000 population); and
- Under 50,000 population, providing fixed-route service.

The number and complexity of the measures increases as the system size increases. The measures provided for larger systems represent measures that all systems, at a minimum, would ideally measure to cover all perspectives of their performance. The smaller systems have fewer measures listed because they often do not have the resources to measure as much as might be desired.

The guidebook recommends that agencies begin with a small program and expand it over time. As a result, most agencies would not want to try to implement all of the listed measures at once. Instead, as agencies gain experience with performance measurement, the full complement of core measures and other measures specific to agency goals or objectives can be provided.

The following tables address these aspects of transit service:

- Service availability: Table 1.
- Service delivery: Table 2.
- Safety and security: Table 3.
- Community impact: Table 4.
- Maintenance: Table 5.
- Financial performance: Table 6.
- Agency administration: Table 7.

Table 1. Core Fixed-Route Service Availability Measures

Large	Medium	Small	Under 50,000
Service coverage		Route coverage	
Frequency			
Hours of Service			
Stop Accessibility			

Table 2. Core Fixed-Route Service Delivery Measures

Large	Medium	Small	Under 50,000
Missed trips			
Complaint rate			
Route directness			
On-time performance			
Customer response time			
Passenger load			
Reliability factor			
Transit-auto travel time			
Number of fare media sales outlets			
Customer satisfaction			
Headway regularity			
Passenger environment			
Customer loyalty			

Table 3. Core Fixed-Route Safety and Security Measures

Large	Medium	Small	Under 50,000
Accident rate			
Number of incidents of vandalism			
Crime rate			
Number of vehicles with specified safety devices			
Passenger safety			
Ratio of police officers to transit vehicles			

Table 4. Core Fixed-Route Community Input Measures

Large	Medium	Small	Under 50,000
Personal economic impact			
Demographics			
Communications			
Mobility			
Service equity			
Community economic impact			
Environmental impact			
Visual impact			

NOTE: Shaded areas in Tables 1-7 indicate measures not included in the core set of performance measures for a particular agency size.

Table 5. Core Fixed-Route Maintenance Measures

Large	Medium	Small	Under 50,000
Road calls			
Average spare ratio vs. scheduled spare ratio			
Fleet cleaning			
Maintenance work orders: model vs. fleet			
Average life of vehicle components			
Average age of vehicle components			
Mean vehicle age			
Maintenance program effectiveness			
Fleet maintenance performance			

Table 6. Core Fixed-Route Financial Performance Measures

Large	Medium	Small	Under 50,000
Ridership			
Productivity			
Cost-effectiveness			
Cost-efficiency			
Energy consumption			
Risk management			

Table 7. Core Fixed-Route Agency Administration Measures

Large	Medium	Small	Under 50,000
Percent positive drug/alcohol tests			
Employee productivity			
Employee relations			
Employee work days lost due to injury			
Administrative performance			

DEMAND-RESPONSIVE MEASURES

ADA complementary paratransit and general demand-responsive service operate in significantly different environments than fixed-route and fixed-guideway services do. However, both modes are public transit services designed to meet various goals, and most of the guidebook’s performance measure categories apply to both types of services.

The seven general categories of performance measures applicable to ADA complementary paratransit and general demand-responsive service are availability, service monitoring, community, travel time, safety and security, maintenance and construction, and economic measures. Vehicle capacity measures are not critical for demand-responsive services.

Recommended core demand-responsive measures are listed below.

Availability measures:

- Service coverage,
- Span of service,
- Service hours,
- Revenue hours, and
- Service denials.

Service monitoring measures:

- On-time performance,
- Missed trips,
- Complaint rate,
- Percentage of missed phone calls (for systems serving more than 100 trips per day), and

- Response time to customer inquiries.

Community measures:

- Welfare-to-work accessibility,
- Personal economic impact,
- Community economic impact, and
- Provision of transportation service to human and social service agencies (number of trips, persons, agencies).

ADA paratransit's role in community measures should be viewed as a component of the agency's overall benefits and impact of transit service, rather than viewed separately.

Travel time measures:

- Travel time and
- System speed.

Safety and security measure:

- Accident rate.

Maintenance and construction measure:

- Road calls.

Economic measures:

- Ridership,
- Cost-efficiency,
- Cost-effectiveness,
- Productivity, and
- No-shows and late cancellations.

The guidebook provides detailed descriptions of all of the measures listed above, along with their data and resource requirements.

HYPOTHETICAL EXAMPLE

Chapter 4 of the guidebook provides a hypothetical example of how an agency could implement a performance-measurement program by following the steps and taking advantage of the resources provided in the guidebook. The example also serves the purpose of summarizing the eight steps involved in setting up a program.

ADDITIONAL RESOURCES

This summary has served as a brief introduction to transit performance measurement and the guidebook's contents. To learn more about this subject, the resources listed below are also available from TCRP.

GUIDEBOOK

The guidebook is provided in two forms: a printed document (*TCRP Report 88*) and an electronic version available on *CRP-CD-25* or on the Internet. The printed version will be useful to those who want to read the material one chapter at a time to gain a basic understanding of transit performance measurement. The electronic version will be useful to those who are already familiar with transit performance measurement and who want to find specific items of interest quickly. The electronic version is extensively hyperlinked, allowing users to jump immediately to related material and to

navigate the performance measure selection menus. The reference section contains a number of links to other related documents available on the Internet at the time the guidebook was published.

BACKGROUND DOCUMENT

A background document is available on the accompanying CD-ROM and on the Internet from TCRP. This background document provides 21 case studies not included in the guidebook, an annotated bibliography of nearly 200 documents relating to transit performance measurement, and other relevant material used to develop the guidebook.

CD-ROM REFERENCE MATERIAL

The CD-ROM also contains a library of related TCRP documents on performance

measurement and software developed for the Florida Department of Transportation that assists in analyzing NTD data and helps identify and compare peer agencies. A “Read Me” text file on the CD lists all of the files included.

OBTAINING THE GUIDEBOOK

Copies of the guidebook (*TCRP Report 88*) and its accompanying CD-ROM can be obtained from the following sources:

- The TCRP Dissemination site hosted by APTA: www.tcrponline.org.
- The TCRP website hosted by TRB (electronic version only): www.trb.org/trb/tcrp, then click “Web Documents” followed by TCRP Project Reports.
- The TRB Bookstore: www.nationalacademies.org/trb/bookstore.

REFERENCES

1. Kittelson & Associates, Inc., in association with Texas Transportation Institute and Transport Consulting Limited, *TCRP Web Document 6: Transit Capacity and Quality of Service Manual*, Transportation Research Board of the National Academies, Washington, D.C., 1999. http://nationalacademies.org/trb/publications/tcrp/tcrp_webdoc_6-a.pdf.
2. Nakanishi, Yuko J., and G. F. List, *Regional Transit Performance Indicators: A Performance Measurement Model*, Rensselaer Polytechnic Institute, Troy, New York, 2000.
3. Eccles, Robert G., “The Performance Measurement Manifesto,” *Harvard Business Review on Measuring Corporate Performance*, President and Fellows of Harvard College, Cambridge, Massachusetts, 1998.
4. Furth, Peter G., *TCRP Synthesis of Transit Practice 34: Data Analysis for Bus Planning and Monitoring*, Transportation Research Board of the National Academies, Washington, D.C., 2000.