



# Effective Performance Measurement for Commuter Rail Services

## Introduction

Performance measures provide a means for organisations to assess their success in achieving their objectives. Effective performance measurement can provide useful input into the development of policy options and the measurement of policy effectiveness.

This bulletin discusses some key principles for developing effective performance measures for commuter rail services. It draws on research conducted by the Independent Transport Safety and Reliability Regulator (ITSRR), including a survey of the commuter rail service procurement and monitoring practices in 21 cities in Australia and overseas.<sup>1</sup> This survey included compilation and analysis of the key performance indicators used in the surveyed cities.

The principles are discussed in the context of a service contract for commuter rail services but are nevertheless more widely applicable.

For a government purchasing commuter rail services from a rail operator, whether the operator is a public or private organisation, there are three key reasons for measuring performance:

- > to measure compliance with the government's service requirements
- > to measure progress against transport objectives
- > to inform transport policy.

Performance measurement for all three of these reasons is considered within the bulletin but there is a particular focus on the third reason because transport policy should be directed towards meeting transport objectives.

In NSW, the State Plan indicates that increased public transport patronage is a key transport objective – an 'increasing share of peak hour journeys on a safe and reliable public transport system' is a State Plan priority.

## Principles

Based on its research on key performance indicators, ITSRR suggests that performance indicators should have the following features:

- > be focused on policy objectives
- > cover various aspects of service quality
- > measure aspects of service quality that are important to customers
- > preferably measure outcomes
- > preferably be measured objectively and subjectively
- > be compared with benchmarks.

The sections below explain each of these principles in more detail. Where appropriate they include commentary on performance monitoring practices in the cities surveyed by ITSRR and examples of useful indicators.

### Be focused on policy objectives

Performance indicators should focus on the government's policy objectives, that is, they should measure what the government is trying to achieve. Ideally, there should be at least one indicator measuring the achievement of each objective.

Some of the cities surveyed by ITSRR have more than one transport objective. Their performance indicators cover a wide range of aspects such as social (e.g. mobility, service quality), economic (e.g. cost effectiveness) and environmental aspects.

There can, however, be a hierarchy in an organisation's objectives. Increased public transport use is the most common transport objective and can be considered as a key objective. Objectives that relate to service quality, such as 'deliver safe and reliable service', can be considered as intermediate objectives, that is, objectives that support the key objective (e.g. patronage is more likely to grow if the service is safe and reliable).

<sup>1</sup> ITSRR 2008, *Best Practice in Procurement of Commuter Rail Services*. The surveyed cities were Sydney, Melbourne, Brisbane, Adelaide, Perth, Auckland, Hong Kong, Singapore, Tokyo, Chicago, New York, San Francisco, Toronto, Washington DC, Amsterdam, Berlin, London, Milan, Paris, Stockholm and Zurich.

Indicators of intermediate objectives can therefore be useful for informing transport policy aimed at achieving the key objective.

Examples of useful indicators of increased patronage are measures of patronage growth and of modal shift. Other common indicators are patronage volume (e.g. passenger journeys, passenger kilometres) and modal share (e.g. percentage of all motorised trips).

### Cover various aspects of service quality

Service quality is important because people are more likely to use public transport when the service quality is perceived to be good.

Aspects of service quality can be categorised into three broad areas using a categorisation identified by Professor David Hensher:<sup>2</sup>

- > Amenity – comfort, information provision, security, cleanliness, friendliness, ease of use of facilities
- > Timetable – service adequacy and the design of the timetable, for example, frequency, connectivity, stopping patterns, and transit speed of services
- > Operational performance – how closely services operate to the advertised timetable, for example, punctuality (on-time running), cancellations, and skipped stops.

Aspects of amenity and timetable are aspects over which government has direct influence, that is, they are aspects of service whose delivery governments can ensure by specifying them in a service contract (though there may be network constraints which affect timetable aspects of service).

Aspects of operational performance are aspects over which government only has indirect influence, that is, government can put in place requirements that lead to the required results but cannot ensure the results (for example, a punctual train service requires sufficient trains and staff, well-maintained infrastructure, and a timetable that works).

To be useful for informing transport policy, performance indicators should cover all three of the broad areas of service quality because (1) government has influence over aspects of amenity and timetable and they are therefore policy levers for increasing patronage, and (2) aspects of operational performance are important to customers

and provide a means of measuring the management performance of the rail service operator.

Examples of useful indicators of aspects of service quality are those that measure customer sentiment (e.g. customer satisfaction with information provision) and customer experience (e.g. percentage of customers delayed by more than 5 minutes, percentage of customers standing more than 10 minutes).

### Measure aspects of importance to customers

Performance indicators should measure aspects of service quality that are important to customers because in order to encourage public transport use, service aspects of importance to customers need to be delivered well.

Customer sentiment information is commonly sourced from customer satisfaction surveys, complaints data, and stated preference surveys. These sources help rank aspects of service in terms of their importance.

For example, in the most recent annual CityRail customer survey<sup>3</sup> crowding in trains at peak commuter times was the aspect of service (out of 37 aspects measured) that was least likely to meet customer expectations. Performance indicators measuring crowding would be a useful input to the development of crowding management policies.

### Preferably measure outcomes

Performance indicators can measure outcomes, outputs, process or inputs. Table 1 defines what is meant by these terms and gives examples of indicators.

Table 1: Components of activities

Components of activities	Examples of indicators
<i>Inputs</i> – resources that contribute to production and delivery of rail outputs	Operating costs, e.g. staff, equipments, materials
<i>Process</i> – organised activities for converting rail inputs into rail outputs	Timeliness, e.g. turnaround time for handling complaints
<i>Outputs</i> – goods and services delivered to customers	Delivery of tangible results e.g. percentage of trains operated to timetable
<i>Outcomes</i> – impact or consequences for the community of the activities of government	Impact of program or policy e.g. increased public transport use, customer satisfaction rating

<sup>2</sup> Hensher, D 2003, *Measuring Service Quality and Evaluating its Influence on the Cost of Service Provision*, Institute of Transport Studies, University of Sydney; Hensher, D, Stopher, P & Bullock, P 2001, *Service Quality – Developing a Service Quality Index in the Provision of Commercial Bus Contracts*.

<sup>3</sup> ITSRR 2008, *Survey of CityRail Customers 2008*.

Outcome indicators are the most useful as they provide insight into the effectiveness of transport policies and measure the impact or consequences of government policies.

Where outcomes are difficult to measure, output indicators may also be useful. Input and process indicators are easy to collect but are more useful for monitoring the internal management of an organisation than for informing policy.

Outcome indicators are commonly measured from the customer perspective. They can measure:

- > customer sentiment (as sourced from customer satisfaction ratings and analysis of customer complaints)
- > customer experience (such as the percentage of customers on air-conditioned trains).

Output indicators commonly measure operational performance and compliance against contract specification. Procurement arrangements between government and railways in most cities surveyed by ITSRR specify minimum service levels (e.g. service frequency, hours of operation) and minimum service standards (e.g. cleanliness). Compliance with service specifications is usually determined from service quality audits (e.g. mystery shopping<sup>4</sup>) and inspections. Useful output indicators are those that measure compliance with service obligations (e.g. percentage of timetabled connections missed) and operational performance (e.g. percentage of timetabled trains cancelled).

Sometimes aspects of amenity are measured by input indicators such as *percentage availability of passenger facilities* (e.g. ticketing machines, help points, lifts and escalators, car parks). This type of indicator may be useful for railways in terms of whether their contractors are complying with their service obligations. However, they are not useful for government as they do not indicate customer experience with using the facilities. For example, a ticket machine may be available but it (1) may not provide the correct ticket or change, (2) may be in exact fare mode, or (3) may issue tickets that are not recognised by the ticket barrier system. An example of a useful outcome indicator for ticket machines is *queuing time for tickets*.

## Preferably include objective and subjective measures

Performance indicators can be measured both objectively and subjectively. The distinction between subjective and objective indicators is the data source. Objective indicators are based on operational data that are sourced from train control systems, incident registers, train loading surveys, service audits and inspections, etc. Subjective indicators measure customer sentiment and are sourced from customer surveys and complaints. Subjective indicators complement objective indicators.

For example, punctuality may be measured by both objective and subjective indicators:

- > percentage of timetabled trains arriving on time (objective indicator)
- > customer satisfaction with train punctuality (subjective indicator).

*On-time running* is a good indicator of the railway's ability to keep to the timetable and is therefore an important operational measure of performance. However *on-time running* does not measure punctuality from the customer's perspective. ITSRR has proposed a customer-based measure of delay<sup>5</sup> that could be used to complement the train-based measure *on-time running*. The measure is *average customer delay*, (customer delay being the difference between actual and scheduled times of passenger arrival at destination). The *average customer delay* is an objective outcome indicator as it measures customer experience.

## Preferably compared with benchmarks

Performance indicators provide a more useful measure of performance if they can be compared with a benchmark such as with a previous period's performance, with minimum standards or targets or, using a benchmarking process, with performance of similar organisations elsewhere (e.g. in other cities, with other industries).<sup>6</sup>

Clear and concrete performance expectations can be set using minimum standards or targets. A common train punctuality standard is for *timetabled trains to arrive within five minutes of scheduled time*. A common train punctuality target is for *92% of timetabled trains to arrive on time*.

4 Mystery shopping is a tool used to measure the quality of service or to gather specific information about products and services. Mystery shoppers pose as normal customers performing specific tasks such as asking questions and making observations, and then provide detailed feedback about their experiences.

5 ITSRR 2004, *Review of On-Time Running of CityRail Services*. The report describes how a measure of customer delay could be developed.

6 Definition from Benchmarking European Sustainable Transport (BEST) website <http://www.besttransport.org/cadrebest.html>: Benchmarking is a practical tool for improving performance by learning from best practices and understanding the processes by which they are achieved.

Ideally, minimum standards should be set for aspects of service quality of importance to customers.

In its survey of 21 cities ITSRR found that targets or standards are commonly based on past performance, government commitments and/or customer expectations. Some are sourced from industry benchmarks.

Comparative data and information on rail systems is available from international benchmarking networks such as the Benchmarking European Sustainable Transport (BEST)<sup>7</sup>, the European Metropolitan Transport Authorities (EMTA) Barometre<sup>8</sup>, and CoMET/Nova.<sup>9</sup>

Performance comparison with other organisations should always be accompanied by an understanding of the background information, contextual data and the processes by which such organisations achieved their performance.

## Examples of rail performance indicators

Tables 2a, 2b and 2c provide examples of performance indicators. The examples are drawn from ITSRR's research findings.

The indicators are presented in terms of:

- > the three broad areas of service quality (amenity, timetable and operational performance)
- > their nature (outcomes, outputs, process or inputs, subjective or objective).

Outcome indicators are highlighted in Tables 2a, 2b and 2c as they are the most useful for informing transport policy. They could either be objective outcome indicators (i.e. measure of customer experience) or subjective outcome indicators (i.e. measure of customer sentiment). Output indicators can also be useful, particularly where outcomes are difficult to measure.

**Table 2a: Examples of rail performance indicators – Operational performance**

Aspect of service quality	Nature of indicator	Performance indicator
Punctuality	outcome (subjective)	customer satisfaction with train punctuality
	outcome (objective)	average delay for customers
	output	% of timetabled trains arriving on time (e.g. at destination, at junction) % of timetabled trains departing on time (e.g. at origin, at junction) minutes of delay by cause of delay
Reliability	outcome (subjective)	customer satisfaction with train reliability
	output	% of timetabled trains cancelled % of timetabled trains skipped stopped number of operations-related failures by cause of failure

**Table 2b: Examples of rail performance indicators – Timetable**

Aspect of service quality	Nature of indicator	Performance indicator
Service delivery (connections, frequency, journey time)	outcome (subjective)	customer satisfaction with service frequency, with journey time, with ease of transfer, with overall service delivery
	output	compliance with minimum service levels for service connection, for service frequency, e.g.: % of timetabled trains not operated to timetable % of timetabled connections missed % of timetabled trains under consist

<sup>7</sup> BEST is a benchmarking project of European transport policy makers, railways and experts.

<sup>8</sup> EMTA web reference: <http://www.emta.com/>

<sup>9</sup> CoMET/Nova web reference: <http://66.70.70.162/cometNova/> CoMET, the Community of Metros is a consortium of twelve of the world's largest metropolitan railways (metros), each of which transport more than half a billion passengers per year. Nova is made up of a consortium of fifteen medium sized metro systems.

Table 2c: Examples of rail performance indicators – Amenity

Aspect of service quality	Nature of indicator	Performance indicator
Passenger comfort (crowding, standing time)	outcome (subjective)	customer satisfaction with crowding levels
	outcome (objective)	% of customers in excess of benchmark train load capacity % of customers standing longer than benchmark standing time
	output	compliance with minimum service standards for loading, for standing time, e.g.: % of timetabled trains with load in excess of load benchmarks % of timetabled trains where standing is in excess of benchmark standing time
Passenger comfort (temperature, seating)	outcome (subjective)	customer satisfaction with train comfort, seat comfort
	outcome (objective)	% of customers on air-conditioned trains
	output	compliance with minimum train temperature standards, e.g.: % of timetabled trains with air conditioning
Ticketing facilities	outcome (subjective)	customer satisfaction with ticketing facilities
	outcome (objective)	queuing time for tickets at sales offices, ticket vending machines
	input	% availability of ticketing machines, of ticket barriers
Personal safety and security	outcome (subjective)	customer satisfaction with personal safety and security
	outcome (objective)	number of offences against persons by type of offence
	input	% availability of help points, CCTVs presence of security personnel
Complaint handling	outcome (subjective)	customer satisfaction with complaint handling number of complaints by category of complaint
	process	turnaround time for dealing with complaints compared with benchmark
Staff performance	outcome (subjective)	customer satisfaction with staff service
	input	% of staff undergoing customer relations training
Cleanliness	outcome (subjective)	customer satisfaction with cleanliness of trains, stations
	output	compliance with minimum cleanliness standards cleanliness rating of trains, stations
Information and communication	outcome (subjective)	customer satisfaction with information provision
	output	% of correct messages in case of delays on trains, at stations % of timetabled trains with correct signage or on-board information
	input	% availability of public address systems, of electronic displays, of information screens
Service accessibility	outcome (subjective)	customer satisfaction with ease of access to trains, stations
	output	compliance with disability standards
	input	% availability of lifts, of escalators

## Summary

Drawing from ITSRR's research on commuter rail procurement arrangements and performance monitoring practices in Australia and overseas, this bulletin has identified a set of key principles that should be followed in developing effective performance indicators for informing public transport policy. These principles specify that performance indicators should:

- > be focused on the government's transport objectives
- > cover all three areas of service quality (amenity, timetable and operational performance)
- > measure aspects of service quality that are important to customers because these aspects are likely to provide the biggest impact on the achievement of policy objectives
- > preferably measure outcomes (as they provide insight into the effectiveness of transport policies) or measure outputs where outcomes are difficult to measure

- > preferably include subjective and objective measures
- > be compared with benchmarks (such as previous performance, minimum standards, targets or industry standards).

Examples of useful outcome indicators for informing and measuring effectiveness of transport policies include:

- > patronage growth, modal shift
- > measures of customer sentiment through customer surveys and analysis of customer complaints
- > measures of customer experience such as queuing time for tickets and a measure of customer delay.

Examples of useful output indicators for monitoring the railway's performance against the government's service specification include:

- > compliance with service obligations (for example, minimum service levels and standards)
- > measures of operational performance (such as on-time running and service cancellations).

## Contact details

**Independent Transport Safety and Reliability Regulator**

Level 22, 201 Elizabeth Street, Sydney NSW 2000

Phone: 02 8263 7100 Fax: 02 8263 7200

Email: [contact@transportregulator.nsw.gov.au](mailto:contact@transportregulator.nsw.gov.au) Web: [www.transportregulator.nsw.gov.au](http://www.transportregulator.nsw.gov.au)

ISSN 1836-9898

July 2009

© Independent Transport Safety and Reliability Regulator 2009.

This material may be reproduced in whole or in part, provided the meaning is unchanged and the source is acknowledged.

### DISCLAIMER

The Independent Transport Safety and Reliability Regulator (ITSRR) has made all reasonable efforts to ensure that the contents of this document are factual and free of error, omission or inaccurate information. ITSRR shall not be liable for any damage or loss that may occur in relation to any person taking or not taking action on the basis of this document.