

PUBLIC TRANSPORT

VOLUME 4 - EVALUATION METRICS





Ministry of Housing and Urban Affairs
Government of India

ABOUT MINISTRY OF HOUSING AND URBAN AFFAIRS (MoHUA)

The Ministry of Housing and Urban Affairs is the apex authority of Government of India to formulate policies, coordinate the activities of various Central Ministries, State Governments and other nodal authorities and monitor programmes related to issues of housing and urban affairs in the country. The Smart Cities Mission was launched by the Ministry in 2015 to promote sustainable and inclusive cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions.



ABOUT WRI INDIA ROSS CENTER

The World Resource Institute is a non-governmental global research organization that aims to protect earth's environment and provide for the needs and aspirations of current and future generations, including but not limited to improving the quality of life in cities, by developing and scaling environmentally, socially, and economically sustainable urban transport solutions, with capabilities to identify and implement such solutions in over fifty countries including within Europe, United States, Mexico, Brazil, Indonesia and India.

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List of Acronyms

PT- Public Transport
MRT: Mass Rapid Transport
BRTS: Bus Rapid Transit System
MoRTH: Ministry of Road Transport and Highways

1. EXECUTIVE SUMMARY

Performance measurement is essential for effective planning and management. It includes various activities that track an organisation's ability to achieve its intended objectives:

Performance evaluation Source: VTPI, 2010: refers to a specific monitoring and analysis process to determine how well policies, programs and projects perform with regard to their intended goals and objectives.

Benchmarking Source: VTPI, 2010: refers to a process for identifying best management practices that an organisation can emulate.

Performance indicators Source: VTPI, 2010: (also called measures of effectiveness) are specific measurable outcomes used to evaluate progress toward established goals and objectives.

Baseline (or benchmark) Source: VTPI, 2010: existing, projected or reference conditions if change is not implemented.

Performance measures are an extension of our personal senses – sight, hearing, touch, smell and taste. (Littman, 2005). Performance measures are widely used in transport planning. They can have various names including, “sustainable transportation indicators”, “performance indicators” or just “transportation statistics”. Regardless of what they are called, every jurisdiction and agency should develop an appropriate set of statistics that are collected consistently, suitable for planning and evaluation purposes.

Performance measurement can support public transport planning in many ways. It allows planners and operators to determine if resources are used efficiently and equitably, identify potential problems, and to verify whether a particular improvement strategy achieves its predicted targets. It paves the way for course correction which translates into a constant effort at improving services to match the standards.

2. INTRODUCTION

Public transport performance evaluation can reflect various perspectives. Many commonly used public transport performance indicators such as load factor and cost-per-vehicle-kilometer, measure operating efficiency. Other indicators, such as rider comfort, travel speed and reliability, affordability, integration and satisfaction, reflect the user experience. User-oriented indicators are important for developing public

and satisfaction, reflect the user experience. User-oriented indicators are important for developing public transit systems that respond to user demands and so are able to attract even choice riders. It is an area that needs serious attention in most developing cities today.

Care is needed when using performance evaluation and benchmarking to ensure that they are based on appropriate assumptions and quality data. Performance indicators should not be selected simply because they are considered easy to measure. Important objectives and impacts, such as social equity and user comfort, should not be ignored simply because they require more effort to evaluate. It is also important to monitor the quality and consistency of data used for evaluation, and to ensure that the people who use data understand how it is defined, how it was obtained, its reliability, and possible sources of bias.

This document provides guidance on performance measurement program for cities. It discusses basic concepts of performance indicators. This information will prove to be of value to policy-makers, policy analysts, and practitioners involved in urban transport planning, particularly public transport planning and provision in cities.

3. PERFORMANCE MEASUREMENT

3.1. Performance measurement applications

Performance measurement involves the collection, evaluation, and reporting of data that relates to how well an organisation is performing its functions and meeting its goals and objectives (TCRP, 2003). Performance evaluation refers to a specific monitoring and analysis process to determine how well policies, programs and projects perform with regard to their intended goals and objectives.

Performance measurement can have many specific applications:

Problem identification: It can identify undesirable conditions, such as wasted resources, traffic accidents or vehicle failures, and help determine their causes.

Trend analysis: It can help identify changes that are occurring.

Peer comparisons: It allows a particular organisation or group to be compared with peers (similar organisations or groups).

Evaluating changes: It can be used to track the results

Evaluating changes: It can be used to track the results of specific changes, including policies and programs to determine if they are successful, and for research purposes.

Target setting: It allows managers to set specific targets to be achieved.

Incentives: It can be used to establish rewards for managers and employees. “Benchmarking is the process of systematically seeking out best practices to emulate. Benchmarking involves direct contact with other organisations, delves into the reasons for their success, and seeks to uncover transferable practices applicable to the organisation performing the analysis” (TCRP, 2010).

Performance measurement and benchmarking are different concepts. A performance report is not the desired end product of a benchmarking effort; rather performance measurement aids benchmarking by providing a set of indicators that are then used to provide insights, raise questions, compare with/identify other organisations from which one may be able to learn and improve. For example, NOVA, an international rail benchmarking program comprising a consortium of sixteen middle-sized metros from around the world, defines benchmarking as “a structured approach to identify actions that lead to superior performance. Benchmarking is not merely a comparison of performance data or a creation of league tables. Performance measures, for example, deliver little benefit on their own, but they stimulate productive questions and lines of enquiry for more in-depth analysis and research”.

Benchmarking can be used to highlight areas of low or high performance and to show where an organisation is in rankings. Performance measurement forms the initial steps of a benchmarking exercise.

3.2. Uses of performance measurement in the transit industry

Performance evaluation is now increasingly being used by transit agencies all over the world and several new tools and information systems are being created that make it easy and more efficient to apply this technique. Practitioners particularly find this useful in the following ways:

Reporting performance of public transport to the authorities and public which in many places is required by law or as per a directive of the government. Usually

Figure 1 | **Benchmarking Steps**



in most places where it is undertaken, performance evaluation results are published and shared with all stakeholders. In Hong Kong, for example, this information is included in the annual report and in the sustainability report that shareholders receive annually.

Monitoring Service improvements, assessing past interventions, attracting more riders and appeal of public transport.

Diagnosing problems and the health of the system, making course corrections and refining strategy – this means that performance evaluation helps practitioners identify areas in the system which are not functioning adequately and where service standards are not being met, and rectify those.

Providing the public with information on transit performance so they can choose it and use it.

Setting service standards.

Aiding internal communications and management.

Noting community benefits: say increase in modal share of public transport over time, increased literacy rates and health improvements due to better access by public transport, etc.

Better quality and nature of data collected today on public transport performance in most developing cities is limited and redundant, focusing largely on operational efficiencies and very little on quality and other user-related parameters. If modal shares for public transport have to be preserved and increased, it becomes very important that cities engage in performance evaluation of public transport from various perspectives-operator, user, local authority and community at large. A good starting point for initiating performance evaluation for public transport services in developing cities would be its inclusion in the overall policy framework. While in many countries (for example India), an urban transport policy (or a draft) exists at the national level, it is not complimented by a policy evaluation and monitoring program, nor governed by regulations and not linked to the budgeting process.

3.3. Performance points of views

Performance measurement can be carried out from different perspectives: from an enterprise perspective or from a customer perspective. It can take place at different levels: at policy level (regulatory framework, infrastructure provision) and at microeconomic or enterprise level (transport companies and operators). Many current public transport system performance indicators focus on operating efficiency (e.g. load factors and cost per vehicle-kilometer) rather than performance as experienced by users (convenience, comfort, speed, reliability, affordability, integration, etc.).

Measures can be either outcome or descriptive indicators. Outcome indicators describe the performance achieved by the organisation, given a set of inputs, and should be the majority of the measures used in the analysis. In a public transport context, many outcome indicators are performance ratios that compare an outcome (e.g. ridership) to an input (e.g. revenue hours).

As Rickert (2005) describes, performance indicators can be direct (e.g. “Disabled passengers took 250 trips in March on Bus route # 17”) or they can be proxy measures which are substituted for the direct measure (e.g. “Following the deployment of low-floor buses at newly improved bus stops on Bus route # 17, Rehabilitation Center A reports that 20 additional

per- sons living near this route are now using their services.”). Both the direct and the proxy measures provide helpful data to understand the results. Both measures can be compared a year later to indicate if usage is increasing or decreasing. Both measures permit comparisons to the situation prior to initiating accessible bus service as well as a comparison to some stated objective for anticipated performance.

In broad terms, performance measures could be of the following kinds:

Ratios (e.g. cost per revenue km, passenger per seat);

Indices (e.g. a measure combining capacity, route coverage, and frequency);

Level of service (e.g. frequency levels);

Stand-alone individual quantitative or qualitative measures (e.g. ridership, frequency, presence of digital information systems at bus stops);

Percentages (% increase in school/college enrolments after introduction of bus services in an area, percentage times when the bus arrived within a 5-minute delay, etc.) General sustainability indicators can be integrated with other types of accounting statistics in transport. Indicator sets should be derived as much as possible from existing accounting data sets, while existing accounting data should be extended towards sustainable development requirements (Littman, 2005).

Performance measures should be simple, intelligible to all concerned, and relevant to the most important goals of the agency. Cities should carefully look at trade-offs between the time and cost of collecting data for performance indicators, on the one hand, and the utility of the data, on the other. But most importantly, cities should first define its goals and targets from which the performance measures flow.

4. SUGGESTED PERFORMANCE EVALUATION AREAS

Relevant parameters, in the form of questions, and examples of performance indicators for these parameters are listed below. Cities and public transport agencies should define start collecting public transport statistics and performance indicators on these guidelines, as part of setting up a performance evaluation system. It will give a good idea of the ‘health’ of the system. Once this is done and measures for correction identified, then agencies could look at setting bench- marks and start comparisons between cities.

PARAMETER	ISSUES TO BE ADDRESSED	EXAMPLES OF POSSIBLE INDICATORS*
Modal share	Is public transport the most preferred mode of travel in the city? Which user groups constitute the public transport riders?	Share of trips made by public transport (by user groups);
Availability	The presence of a public transport network or mode in an area/locality;	Number, frequency, No. of hours for which service is available; headways
Accessibility	The ability to reach the mode within a reasonable time period, by a reasonable path (unobstructed infrastructure) and presence of information systems to access public transport;	Percentage of areas having public transport accessible within 500 meters by walking/cycling, walkability in areas being served by public transport, availability of user information via phone, internet, SMS; information accessible and understood by all user groups;
Reliability	How well does the public transport follow published schedules?	Number of breakdowns share on on-time trips;
Safety and Security	Feeling of safety from accidents and injury while using public transport and feeling personal security;	Accidents and injuries per 100, 000 trips, safety of pedestrians accessing public transport, number of incidents of thefts and sexual harassment, agency responsiveness to incidents, visibility and lighting;
Equity (inclusiveness)	How easily disadvantaged groups (people with low incomes, physical disabilities or other disadvantages) reach & use the system?	Physical accommodation and facilities for disabled in vehicles and stations, baggage carrying facilities;
Affordability and payment	How affordable is using public transport? How easy is it to pay to use various modes?	Fares as shares of incomes, fares in comparison to other modes, multiple payment options available, intermodal fare integration;
Intermodal connectivity	How easily can transfers be made from one mode to another-both physically and fare-wise?	Integration between service providers, other modes, fares;
Quality, speed, attract-tiveness and comfort	How attractive is public transport to retain existing users and attract personal vehicle users? Does it get priority on road? Does it have differentiated services? Is it complimented by supporting measures to discourage personal vehicle usage? Do operators have incentives to maintain and improve service quality?	Boarding and alighting ease, availability of seats, cleanliness, gender separated seating (in some countries this makes services more attractive to women commuters), passenger air quality, basic amenities at stations, air conditioning, bus only lanes, courteous staff, onboard internet facilities;
Environmental impact	What is the level and savings of energy and emissions as a result of increased usage of public transport;	Emissions per km, fuel efficiency, share of fleets run on clean fuels;
Economic aspects	Are investments, fare policies, taxation structures, costs borne by operators, subsidy mechanisms in the transport sector conducive to improving the availability and efficiency of public transport?	Trends in investment in public transport and supporting non-motorised transport improvements, tax and subsidy burden on public transport
Operational performance of public trans- port systems	How well are the services doing financially, technically?	Revenue per km, No. of bus breakdowns, etc.
HR policies and internal management	Organisational performance and business management;	Staff to bus ratio, performance-based appraisal;

