

## Performance Indicators



### Introduction

Performance indicators are part of a system to measure successful performance, according to which quantifiable measures are used to assess the management's success at achieving objectives.

As in every industry, the attainment of goals is of paramount importance for public transport firms. These targets push the company to provide better levels of service, attract new passengers and reduce costs.

Although it is generally agreed that an evaluation framework is necessary for the transit industry, there is no general or common agreement on how to define and measure the performance of a transit system. Part of the problem revolves around the sometimes ambiguous definitions of key terms and concepts of transit performance. Another part of the problem relates to differences of perception: some view transit as a business and believe it should be examined as such; for others, transit is a public service that has to accomplish a variety of often conflicting socioeconomic goals. Nevertheless, almost all participants agree that transit performance is

multi-dimensional and multi-objective and consists of efficiency, effectiveness, quality of service and societal impacts.

In using these indicators as a diagnostic gauge to improve service, it is useful to bear in mind three main lines of analysis:

- Time-trend analysis: This determines how well a system compares to itself over a series of years.
- Peer group analysis: This examines how well the system compares to other systems in its class.
- MBO analysis: Management by objectives (MBO) analysis determines how well the system has achieved the established standards.

### Performance Indicator Grouping

Various methods of grouping the different performance indicators have been proposed, with the intention of forming a coherent and integrated unit that encompasses the specific characteristics of the transport system. One such grouping outlines the following categories: cost efficiency indicators,

cost effectiveness indicators, service effectiveness indicators and service quality indicators. These are discussed below.

### Cost efficiency indicators

Cost efficiency indicators deal with the amount of public transportation services produced for the community in relation to the resources expended. This measure addresses the question, "How many resources were expended per unit of public transportation service?" Units of service produced are measured in terms of service outputs such as vehicle hours or vehicle kilometres, while resources expended include labour, capital, materials and services. Primary cost efficiency measures include total operating cost per vehicle service hour and total operating cost per vehicle service kilometre. In this category of indicators we also include the economic performance indicator known as the farebox recovery ratio, which is the percentage of operating costs that the public transport company is able to recover through passenger fare revenues.

### Cost effectiveness indicators

Cost effectiveness indicators deal with the issue of the consumption of public transportation services in relation to the resources expended. This concept addresses the question, "How many resources were expended per unit of consumption?" or "How much consumption revenue was received per unit of resource expended?" Consumption of transport service is measured by passenger trips or passenger kilometres, while resources expended to produce the service are normally measured in monetary terms (EUR) terms. Primary cost effectiveness measures include total operating cost per passenger and total operating cost per passenger kilometre.

### Service effectiveness indicators

Service effectiveness indicators attempt to capture the degree of consumption of public transportation service in relation to the amount of service available. These indicators answer the question, "How much public transportation service was consumed (or revenue received), at an established price, in relation to the amount of service available?" The primary service effectiveness measures include:

- passengers per vehicle service hour;
- passengers per vehicle service kilometre; and
- passenger kilometres per vehicle service kilometre.

### Service Quality Indicators

Service quality indicators deal with the relationship between service delivery, customer expectations and degree of customer satisfaction. These indicators address the question, "Does the delivery of public transportation service meet or exceed customer expectations?" Service quality has many dimensions and the importance of any single attribute differs from passenger to passenger. However, the attributes of quality include accessibility, availability, reliability, safety and comfort.

Two service quality indicators can be measured from actual service data: square kilometres per vehicle in peak service

and vehicle kilometres per capita. These two indicators show the intensity of the geographic service area coverage. Service quality can be also measured by quantitative measures such as mean distance between failures, accidents per 100,000 vehicle kilometres, complaints per 10,000 passenger trips and percent of on-time performance. Furthermore, service quality is also measured by conducting surveys among the population that try to capture the degree of customer satisfaction. Issues relating to comfort, safety, cleanliness, security, reliability of service and friendliness of personnel are some of the measures that should be measured on a regular basis.

## Characteristics of Useful Performance Indicators

The usefulness of each specific performance indicator can be evaluated according to its internal characteristics, which include the following:

- **Applicability:** The indicator must be derived from a plan that has a specific objective.
- **Promptness:** How quickly the information can be made available.
- **Clarity:** Ensure that everybody measures the same thing, especially in peer analysis.
- **Economy:** Measuring the indicator should not impose an unnecessary financial burden.
- **Basis for action:** Accountability should be clearly identified and understood.

## Setting Up Performance Indicators

Implementing and updating a performance measurement program is an iterative process which includes eight main steps:

1. Define goals and objectives.
2. Generate management support.
3. Identify internal users, stakeholders and constraints.
4. Select performance measures and develop a consensus.
5. Test and implement the program.
6. Monitor and report performance.
7. Integrate results into agency decision-making.
8. Review and update the program.

## Performance Indicators – Drawbacks and Constraints

The use of performance indicators entails many constraints and drawbacks. Some of these problems are outlined below.

### Discrepancies in Data Measurement

In using performance indicators, especially when comparing them to those of other transit systems, it should be always

be remembered that discrepancies may occur if a uniform definition of the measurement of raw data has not been applied. For example, the difference between linked and unlinked trips may provide a completely different outlook regarding passenger numbers, especially if there is a high number of transfers. Different measurements will also appear in the case of vehicle kilometres or vehicle hours if one transit agency includes dead kilometres but another does not. The issue of on-time reliability should also be clarified: What is the tolerance level and at which point do these measurements take place? At the start of the line or the end of the line? Similarly, the number of employees can sometimes be misleading as some agencies make a lot of overtime payments to their employees while others opt to hire new employees. A proper count in this case should include employee hours. In addition to the above there is also the need for consistency in the measurement of a given indicator over a specific period of time. Comparison of the indicator, either internally or externally, should also be consistent.

### Unimodal Nature of Indicators

Indicators are unimodal in nature and therefore fail to capture the issues that arise in an intermodal transit environment. Of course, it is understood that different modes have different operating characteristics and thus they should not be compared (e.g. bus, trolley, tram, light rail). However, a problem does exist if a comparison is made between a standard CNG bus and an articulated diesel bus for example. In this case neither the cost efficiency nor the cost effectiveness indicators are comparable.

### 5.3 Internal Versus External Factors

We must distinguish between the internal parameters of transit service and external or "exogenous" parameters. Some elements of transit service are under the control of the transit agency while others are not. For example, the fare may be not be determined by the agency but by some form of political authority. The transit agency does not usually have control over operating speed and variability, which are crucial in terms of cost issues, the number of vehicles required and the reliability and attractiveness of the service. Likewise, the agency does not usually have control over arrangements for exclusive bus lanes or parking policy. The demand profile of the city is also outside the control of the operator. Thus the ratio of peak to base vehicles (i.e. the number of vehicles required for the peak period versus the number of vehicles re-

quired for the base period) has a big impact on costs as capital expenses (i.e. vehicles, depots) are dependent on the number of peak vehicles while the number of drivers is dependent on the peak period. This problem is more acute for those transit agencies that do not have provisions in their contracts for part-time employees or split shifts.

### Quantity Versus Efficiency

A trade-off can be noted between the measures of service quantity and efficiency/effectiveness. A transit system that operates only during peak hours and with a limited geographic scope (i.e. in high density areas) may have better efficiency indicators than a transit system that operates on a 24-hour basis and covers all productive and unproductive routes. This is why an improvement in an indicator (e.g. cost/passenger or employees/vehicle) may be misleading.

### Risk of Narrow Focus

Another criticism of performance indicators is that by relying solely on this method an agency may be too narrowly focused on processes to see the broader picture. This is the reason that management approaches can also include Total Quality Management, Total Quality Control, EFQM, Balanced Score Card etc., as these can capture elements of the transit agency's performance that are not evident through simple indicators. Some of the principles and approaches of quality management include re-engineering work processes and job responsibilities, customer focus, employee support, team goals, individual goals, values and leadership behaviour, supplier management and partnerships, learning and innovation perspectives.

### Epilogue

Measurements are the key:

If you can't measure it, you can't control it.

If you can't control it, you can't manage it.

If you can't manage it, you can't improve it!!!

**Note:** This document is based on both the cooperative desk research of Sputnik project partners and input from public transport practitioners/experts.