Transportation Research Procedia

Volume 15, 2016, Pages 100–112

ISEHP 2016. International Symposium on Enhancing Highway Performance

Evaluating the Service Quality in multi-modal Transport Networks

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Abstract

The paper presents an approach for evaluating the service quality of entire journeys between an origin and a destination point using an evaluation scheme based on six levels of service (LOS). It suggests evaluation functions for the indicators trip time ratio, direct speed and detour factor and shows how the functions were estimated. Then it reports on experiences with the evaluation scheme collected in two example applications for public transport and one multimodal example application for car and public transport. It shows how the evaluation results can be used to recognize shortcomings in the network not only on the level of OD-pairs but also to identify critical network elements.

Keywords: Service quality, multi-modal networks, evaluation function

 Selection and peer-review under responsibility of the Scientific Programme Committee of ISEHP 2016

doi:10.1016/j.trpro.2016.06.009

1 Introduction

Transport networks connect places thus enabling the movement of persons and goods. Evaluating the service quality provided by a transport system is therefore a fundamental task in transport planning. Methods for evaluating the service quality can be classified in various ways:

- Spatial level: Typical spatial levels are single transport facilities, network sections, origin-destinations pairs or an entire network.
- Qualitative or quantitative framework: Quality can be described by means of observed or calculated indicator values or by means of a verbal description.
- Indicators: Depending on the spatial level and the scope of an assessment an evaluation of service quality may include indicators describing aspects of time expenditure, safety, reliability, pavement quality, comfort or availability of public transport services.
- Absolute or relative evaluation: Indicator values can be compared to target values (absolute evaluation) or to values of a base scenario, e.g. the current network state (relative evaluation).
- Objective or subjective evaluation: Target values can be determined based on objective physical constraints (e.g. technical capacity of a transport facility), on distributions of observed values or on subjective perceptions of travelers (travelers satisfaction).
- Modes: An evaluation may consider only one mode or several modes (car, public transport, bike, walking).

The following table summarizes the characteristics of selected methods for evaluating the service quality. Most of the listed methods employ an evaluation scheme based on six levels of service (LOS). This paper presents the evaluation approach listed in the last row of Table 1. This approach is embedded in the German Guideline for Integrated Network Planning RIN (RIN, 2008) which is used for categorizing transport networks and for evaluating the service quality in multi-modal networks on the level of OD-pairs.