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A Novel Approach For Evaluating Service Effectiveness in Urban Passenger Transportation

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Abstract

The attractiveness of public transportation systems plays an important role in the sustainability of cities. Despite the social role of urban public transport operators, their survival depends on their economic performance. Transport operators use performance evaluation tools to identify inefficient units and make improvements. Since the production (provided) of services by public transport systems does not necessarily imply their consumption, the concept of service effectiveness comes to the fore. Ease of access for users to the stop is one of the most important variables in determining the population that has the potential to use the service. It is well known that an increase in the distance of the users from the public transport stop causes a significant decrease in the preference rate for the stop and therefore for the transport system. In this study, for the first time in the literature, the potential user population of tram stops is considered as produced service variable, while the number of passengers transported through the stops is considered as a consumed service variable. Therefore, the population of the stop area, which is considered as the system input, represents the service potential of the transport system, while the number of passengers carried by the stops represents the actual output of the system. The proposed methodology for evaluating the service efficiency of stops using Data Envelopment Analysis is applied to the stops of a tram line, and important findings are presented regarding the preferability of the stops by the urban residents.

Keywords: DEA; performance evaluation; public transportation; stop