A Comprehensive Methodology for Measuring the Performance of Transit Networks

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Abstract

The performance of transit networks must be measured on a regular basis to understand how well these complex systems fulfill their intended purpose and to identify potential opportunities for improvement. Measuring transit network performance is only achievable by defining a specific set of transit network performance indicators (TNPIs). Different schemes have been proposed to identify TNPIs and to use these TNPIs to measure transit network performance. The main motivation of this research was the lack of evidence of prior work that has attempted to develop TNPIs to assess the performance of a public transit network based not only on its physical and operational characteristics, but also on the demand and population changes experienced in the area the transit network serves. Population changes (i.e., increases or decreases) in the area served by the transit system is arguably one of the main drivers of demand. A significant advantage of considering the effects of population changes on the performance of a transit system is that it enables transit planners to predict the performance of the transit system based on future population changes and apply any necessary changes in advance, thus potentially preventing a decrease in the level of service provided by the transit system.

The results obtained from two case studies demonstrate that the proposed methodology can help transit planners to estimate the effects on the performance level of a transit network due to fluctuations in demand driven by population changes. The proposed methodology also facilitates the analysis that hypothetical changes to the transit network (e.g., adding a new route, increasing service frequency, etc.) have on the level of performance of the transit network.

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