

Performance Evaluation and Planning for Road Safety Measures Using Data Envelopment Analysis and Fuzzy Decision Making

Authors : Hamid Reza Behnood, Esmaeel Ayati, Tom Brijs, Mohammadali Pirayesh Neghab

Abstract : Investment projects in road safety planning can benefit from an effectiveness evaluation regarding their expected safety outcomes. The objective of this study is to develop a decision support system (DSS) to support policymakers in taking the right choice in road safety planning based on the efficiency of previously implemented safety measures in a set of regions in Iran. The measures considered for each region in the study include performance indicators about (1) police operations, (2) treated black spots, (3) freeway and highway facility supplies, (4) speed control cameras, (5) emergency medical services, and (6) road lighting projects. To this end, inefficiency measure is calculated, defined by the proportion of fatality rates in relation to the combined measure of road safety performance indicators (i.e., road safety measures) which should be minimized. The relative inefficiency for each region is modeled by the Data Envelopment Analysis (DEA) technique. In a next step, a fuzzy decision-making system is constructed to convert the information obtained from the DEA analysis into a rule-based system that can be used by policy makers to evaluate the expected outcomes of certain alternative investment strategies in road safety.

Keywords : performance indicators, road safety, decision support system, data envelopment analysis, fuzzy reasoning

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