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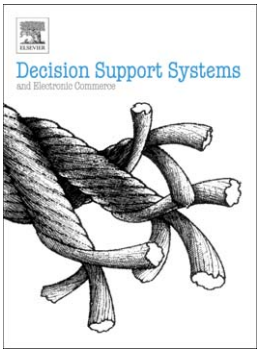

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Predictive analytics and disused railways requalification: insights from a Post Factum Analysis perspective

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Abstract

Strategic decision making problems in the public policy domain typically involve the comparison of competing options by different stakeholders. This paper considers a real case study oriented toward ranking potential actions for the regeneration of disused railways in Italy. The study involves multiple conflicting criteria such as an expected duration of construction work, costs, a number of potential users, and new green areas. Within this context, we demonstrate that Post Factum Analysis (PFA) coupled with Decision Aiding supports the development of robust recommendations. The role of PFA is to highlight how the actions' performances need to be modified so that the recommendation is changed in a desired way. In particular, it highlights the minimal improvements that would warrant the feasibility of a currently impossible outcome (e.g., achieving a better position in the ranking) or the maximal deteriorations that alternatives can afford to maintain a target result (e.g., not losing their advantage over some other options). The use of a focus group with both experts and participants in the decision making process provided insights on how PFA can support: (i) the creation of arguments in favour or against the respective options under analysis, (ii) understanding of the results' sensitivity with respect to possible changes in the performances assigned to action on different criteria, (iii) a better informed discussion about the results among the participants in the process, and (iv) the development of new/better alternatives.

Keywords: Multiple criteria analysis, Post Factum Analysis, Sensitivity analysis, Urban regeneration, Participation, Greenways

1. Introduction

The analysis of real-world problems requires consideration of multiple conflicting points of view. Nowadays, most decision situations involve economic, environmental and social considerations which need to be taken into account [69]. One of the key challenges of decision making problems is thus to cope with the conflicting nature of multiple criteria while taking into account the preferences of Decision Makers (DMs) and stakeholders. Within this context, Multiple Criteria Decision Aiding (MCDA) provides a set of tools and techniques that can support such complex decision making processes [22].

In particular, MCDA methods incorporate the procedures for building a model of the DM's preference on different criteria as well as the algorithms for exploiting an overall preference structure. However, the recommendation that is

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