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## Finding the right way - a new approach for route selection procedures?

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### Abstract

All over the world, governments, transporters, and operators are seeking available places and corridors to invest in the improvement of transport infrastructure such as new tracks for railways, new roads, and highways. Due to various reasons - from ongoing urban sprawl, rising awareness among society about possible social and environmental impacts to last but not least increasing cost pressure, it is more and more difficult to find suitable routes for new transport infrastructure. Serious discussions and even public resistance is forcing decision-makers and politicians to think about new approaches for realizing transport infrastructure projects, taking into consideration aspects of sustainability and public consultation without losing track of the costs. The objective of this article is to demonstrate a recently developed comprehensive approach for route selection procedures, combining elements of traditional cost-benefit analysis, multi-criteria analysis, and integrating public consultation.

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### 1. Introduction

There are several reasons for building new transport infrastructure such as new high-speed railway lines, highways or airports. Most of them are based on the continuous growth of the population and economy which stimulates demand for new investments in transport systems to convey people, goods, and data. However, limited public financial

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resources force officials as well as infrastructure operators worldwide to justify such public investments in more detail before starting their implementation:

- Increased efficiency and effectiveness of transportation due to lower operating costs, reduced travel times, higher capacities, higher revenues
- Increased awareness of environmental and social impacts which forces operators as well as governments to reduce the negative impacts of existing as well as new transport infrastructure
- Investment programs to boost national economies
- Reducing dependencies, e.g. dependence on oil if building new railway lines

However, decisions in the transport sector are rarely made by a single person or entity such as transport infrastructure operators or government officials without consulting other parties. Even if responsibility for a final route decision does ultimately rest with a railway, highway or airport authority, the decision will generally be the product of interaction between the preferences of the operator and politics (Roy, 1996). During the last 10-15 years, changes in the appraisal methods for transport investment required adaptations to the criteria traditionally included in the standard cost-benefit analysis (CBA) (Sayers et. al., 2003). Nowadays, decisions can only be made if they are based on a well-grounded set of arguments, elaborated by support techniques which must include multiple criteria.

This article is, however, not about the question of whether a transport project should be realized or not. It is assumed that the general decision for realizing a project has already been made so the focus is on the next step: to define the transport project in more detail – the engineering part. Such planning processes of new transport infrastructure are now becoming increasingly complex due to a large number of environmental laws and regulations, social responsibility, public awareness, and economic constraints. Additionally, they are always related to various contradictory interests as well. Taking all these aspects and divergent interests into consideration, it seems almost impossible to find a suitable solution which might be acceptable to all parties and stakeholders involved. The key to a way out is the right mixture between a method which allows the integration of all the aspects mentioned without anticipating the results and, on the other hand, public involvement in the decision-making process.

Project modifications due to public resistance or requirements by authorities in late planning stages are often difficult, require financial resources and can be a huge setback for the whole project. Wherever possible, investors will do their best to avoid them. Hence, they seek a decision process which guarantees to find options with maximum benefit and minimum financial input and risks.

Starting with a critical review of traditional decision support methods in transport planning, this paper describes a newly developed approach combining elements from CBAs and multi-criteria decision analysis for a comprehensive assessment of technical, economic, social as well as ecological impacts within transport projects. The theoretical description will be proven by experiences recently made in several high-speed railway projects and a case study previously conducted for a cross-border, high-capacity railway project between Austria and Germany.

## **2. Traditional approaches for route selection procedures**

Methodologies for the evaluation and appraisal of transport infrastructure projects have always incorporated political and social values; hence, it might be justified to call them a reflection of the current influential political and social environment.

For a long period of time, economic analysis techniques have been the state-of-the-art methodology used by many transport and engineering companies in the private and public sector for the evaluation and appraisal of alternatives in route selection procedures. The most common methodology applied so far to the evaluation of transport systems has been the conventional ‘pure monetary’ Economic Analysis Technique (EAT). Classified into a class of single-objective models, it evaluates particular alternatives (alignments) on the basis of ‘revenues’ and ‘costs’. Traditionally,

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