Transport Policy 66 (2018) 30–39

Contents lists available at ScienceDirect

Transport Policy

journal homepage: www.elsevier.com/locate/tranpol

A new railway tunnel under Brussels? Assessing political feasibility and desirability with competence-based multi criteria analysis

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ARTICLE INFO

Keywords:
Multi criteria analysis
Project appraisal
Multi-level governance
Cross-border planning
Multiple stakeholders
Mega-projects

ABSTRACT

Interjurisdictional infrastructure planning is a complex affair due to the multiplicity of actors representing the jurisdictions, sometimes at several institutional levels. Their priorities are likely to conflict, as the ratio between costs and benefits of infrastructure differs according to place and to scale. Yet, for evaluating strategic decisions, policy makers typically use methods that assess impacts from a single-actor viewpoint, providing little insight in the political feasibility and desirability of projects that cross institutional borders.

This paper presents a novel evaluation and group decision-making framework: Competence-based Multi Criteria Analysis (COMCA). It provides a structure for applying Multi Criteria Decision Analysis-based methods in a multi-actor, multi-level context. The framework can be used to evaluate the desirability of project alternatives for each of the actors, whose support, individually or as a group, is deemed necessary. Doing so, COMCA helps mapping local and global interests, providing valuable insight and input into the interjurisdictional decision-making and negotiation process.

The article describes how COMCA was applied in a study with the aim to assess solutions for the main bottleneck of the Belgian railway network. It was found that, in terms of desirability among stakeholders, certain little-studied alternatives potentially surpass the alternatives which for many years were regarded as the most plausible options by the key players. Based on experiences during the study, the article discusses various parameters for finding the equilibrium between methodical precision and applicability in a real-world decision-making context.

1. Introduction

Infrastructure often crosses administrative borders, as is the case in metropolitan transport networks or international transport corridors. The planning of interjurisdictional infrastructure, however, can be notoriously arduous (Damay, 2014; Fujimura, 2004; Healey, 1993; Ng et al., 2015; Taylor and Schweitzer, 2005). Without an overarching authority, decisions are to be made in a polycentric arrangement, with actors from multiple jurisdictions. Consensus is hard to reach for several reasons. First, the actors that represent the various jurisdictions might have different norms or (political) values and therefore different priorities. Second, the costs and benefits of a transport project are never equally distributed, but vary across space, scale or socio-economic groups (Altshuler and Luberoff, 2003; van Wee, 2012; Vickerman, 2008). This means that one project has different degrees of desirability in each of the involved jurisdictions. Often, the actors from whom support is needed, do not only represent multiple jurisdictions, but also multiple institutional levels. Moreover, support from civil-sector or private-sector players is often required. How to make decisions with so many different decision makers, interests and domains of competence?

For strategic choices in transport planning, decision makers often recur to appraisal techniques that evaluate the expected utility or desirability of project alternatives. In interjurisdictional projects, however, this poses two problems. First, current appraisal methods typically evaluate projects from one single perspective, whereas for the reasons mentioned above, interjurisdictional projects require a multi-perspective evaluation. Second, the practice of transport project appraisal in general has a poor track record and has been fiercely criticized for its inaccuracy, as a result of its inability to cope with complexity, uncertainty and strategic bias (De Bruijn and Leijten, 2008; Flyvbjerg, 2008; Short and Kopp, 2005). This criticism specifically concerns the dominant appraisal technique, Cost-Benefit-Analysis (CBA). This technique is often used because of its supposedly 'neutral' character (van Wee and Tavasszy, 2008) and the possibility it provides to quantify effects according to

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https://doi.org/10.1016/j.tranpol.2018.03.002
Received 25 January 2017; Received in revised form 13 February 2018; Accepted 3 March 2018

'objective' standards.

In CBA's main competitor, Multi Criteria Decision Analysis (MCDA), the choice of factors used to evaluate decisions as well as their relative importance are left to the decision maker. MCDA therefore explicitly acknowledges the subjective and political character of the evaluation. Proponents of MCDA such as Munda (2004) and Dimitriou et al. (2013) argue that it is especially the subjective component that makes MCDA suitable for incorporating social complexity.

Even though numerous authors have developed frameworks for including stakeholders in MCDA (Bana e Costa, 2001; Banville et al., 1998; Munda, 2004; Saaty and Peniwati, 2008; Stirling and Mayer, 1999; Macharis, 2005), the question of how to involve stakeholders of different hierarchical levels with divergent interests has not yet been addressed. This article presents a novel framework to apply MCDA to problems that demand joint decisions by stakeholders with different functions or responsibilities: Competence-based Multi Criteria Analysis (COMCA). Following Multi Actor Multi Criteria Analysis (Macharis, 2005), it allows actors to define their individual priorities during the process. In addition, it allows for making hierarchical distinctions between the actors. Yet, instead of duplicating the nominal hierarchy of institutions into the framework, it classifies actors and their preferences according to their role in the project that is being evaluated. Doing so, COMCA can be applied for assessing the socio-political desirability and feasibility of decision alternatives, but also for providing a preliminary listing of the stakeholders' accountabilities once the decision will be implemented.

The first part of this article briefly discusses the challenges of multi-actor multi-level decision making, the application of MCDA-based appraisal techniques and the specific features that make COMCA a suitable tool in this context. In the second part COMCA is demonstrated through its application in a strategic planning study on the main bottleneck in the Belgian railway network. The article finishes with a discussion on the lessons learned during the application.

2. COMCA: why and how?

2.1. Making decisions in a multi-actor multi-level context

Interjurisdictional decision-making is a challenging process. Indeed, without an overarching tier of government, the rational behavior of actors is likely to result in decisions that are acceptable for each of the individuals but less-then-optimal for the group as a whole. As the cost-benefit ratio of projects varies across place and scale, each actor is likely to support decisions that are optimal for their own jurisdiction rather than the project area in its entirety (Altshuler and Luberoff, 2003; Bana e Costa, 2001; Vickerman, 2008). As Hooghe and Marks (2003) put it, institutions do not internalize the positive or negative externalities of their decisions. In this social dilemma, the ideal solution for the group might not be the ideal solution for each of the individuals separately and is therefore likely to be blocked by the actors to whom it does not benefit. Therefore, in situations where actors have a de facto veto right, rather than maximizing common utility, decisions tend towards the solutions that are acceptable for all actors, i.e. the lowest common denominator or *joint decision trap* (Scharpf, 1988). To provide insight in the problem, group evaluation techniques, such as COMCA, can be used to map the tension between individual interests and group interests.

In many cases interjurisdictional transport planning is complicated even further by the involvement of multiple institutional levels. Here, interest conflicts are both horizontal, between jurisdictions of the same institutional level (e.g. region vs. region), and vertical, between jurisdictions of different scales (region vs. state) (Bana e Costa, 2001). How to deal with these hierarchical differences in group decision making?

2.2. Including and hierarchizing stakeholders in MCDA

MCDA refers to a family of evaluation techniques to support problem owners in making decisions. Many different techniques exist, including MAUT/MAVT (Multi Attribute Utility/Value Theory) (von Neumann and Morgenstern, 1947), AHP (Analytic Hierarchy Process) (Saaty, 1980), PROMETHEE (Preference Ranking Organization METHod for Enrichment of Evaluations) (Brans and Vincke, 1985) and ELECTRE (ELimination Et Choix Traduisant la REalité) (Roy, 1968; Roy et al., 1986). The result of these techniques generally is a preference ranking of decision alternatives based on multiple incommensurable and often intangible criteria.

Numerous frameworks have been developed for including stakeholders in MCDA, including group applications of AHP and ANP (Analytic Network Process) (Saaty and Peniwati, 2008), Multi Criteria Mapping (Stirling and Mayer, 1999), Social Multi Criteria Evaluation (Munda, 2004), MAMCA (Multi Actor Multi Criteria Analysis) (Macharis, 2005; Macharis et al., 2012), TEBA (Transportation Elimination-By-Aspects) (Khraibani et al., 2016) and Policy-led Multi Criteria Analysis (Ward et al., 2016). Most frameworks refer to existing stakeholder analysis techniques, such as proposed by Savage et al. (1991) or Whitehead et al. (1989), for including stakeholders in the process.

In one group of participatory MCDA methods (Bana e Costa, 2001; Banville et al., 1998; Munda, 2004; Saaty and Peniwati, 2008) stakeholders use a common set of criteria, resulting in a single preference ranking of alternatives representing the common interest and priorities of the group. However, reaching consensus on the criteria set might prove difficult in groups with markedly divergent interests and perspectives on the problem. Moreover, when stakeholders have different functions or responsibilities, a group preference ranking without stakeholder differentiation provides little information on the feasibility of the alternatives. Indeed, in large-scale infrastructure projects and associated decision problems stakeholders typically have distinctive functions or levels of responsibility. If the aim of the evaluation is to indicate the socio-political feasibility of project alternatives, these differences must be taken into account.

Another group of methods, including MAMCA (Macharis, 2005) and MCM (Stirling and Mayer, 1999), bypasses both problems. Here, each actor defines its individual criteria set, leading to individual preference rankings. There is no group ranking; individual rankings are simply juxtaposed with the aim to facilitate comparison. Doing so, the problem of stakeholder hierarchy is circumvented, but the decision maker is left with a considerable degree of complexity to cope with.

Various techniques exist for quantifying differences in salience between stakeholders in MCDA, but they seem unsuitable for application in a political context. For example, Ramanathan and Ganesh (1994) suggest attributing weights to actors by means of pairwise comparison within the AHP framework (Saaty, 1994) performed by each actor individually. Also based on subjective judgements between actors, Van Den Honert (2001) proposes a multiplicative model for assessing actor weights to express the existing power gradient. When applied in a decision-making context with conflicting interests, however, such inter-judgmental methods are prone to various practical problems such as the difficulty to quantify salience or how to deal with coalition formation among actors (Bogetoft, 1992; Van Den Honert, 2001).

2.3. Classifying stakeholders by competence

In COMCA, the perceived salience of actors is not quantified by according numerical values to them. Instead, actors are classified according to their competence in the project that is being evaluated. The socio-political feasibility of a project can be estimated by examining the willingness to collaborate among the actors that are competent for each of the project's tasks. An actor's salience therefore depends on how necessary the actor's collaboration is deemed in the project. What task is the actor competent in, and how many other actors can perform the same task? It is important to note that a competence can either be active, with an actor actively contributing to the project, or passive, by not obstructing the project. 'Competence' can refer to any necessary skill or resource, being it technical, financial intellectual or legal.