Introduction

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Project assessment in the field of mobility and logistics are by their nature, on the one hand, multi-dimensional and, on the other hand, impacting and involve many stakeholders. Awareness about the multi-dimensionality of projects has been growing over the last decades through including different sustainability dimensions in the appraisal of mobility projects, for example, by increasingly using Multi Criteria Analysis as an assessment method or by including external costs in the Cost-Benefit Analysis (CBA) framework. The awareness that involving stakeholders is important in achieving successful implementations is being voiced more and more. Also, in large and exceptional events like the Olympic Games, Metropolitan areas need a broader means of appraisal, beyond just functional and economic assessment criteria.

However, bringing this explicitly into the evaluation process was missing. Consequently, we developed the Multi Actor Multi Criteria Analysis (MAMCA) framework some 20 years ago. With the MAMCA, the involvement of the stakeholders and their multi-dimensional preferences is made possible from the very beginning of the decision-making process in a structured and sound way. In this book we bring the state of the art on the MAMCA methodology and its software together. We invited the chapter authors to write about their experiences of MAMCA in the field of mobility and logistics in order to show the multitude of applications that are possible.

MAMCA is mostly used as an *ex ante* evaluation tool, so before the actual implementation, to obtain insight on the support for different options. MAMCA gives as an output a good overview of the advantages and disadvantages of the different options. By using it as an *ex ante* tool, it enables policy makers and project developers to get an insight of what is at stake. MAMCA can also be used as an *ex post* evaluation tool. In this case, more data on the real impact of the different options can be gathered to get a structured overview of the impacts of the options for each stakeholder. In addition, MAMCA can be used for participation in real-life workshops in which case, a fruitful discussion can take place

and a complete set of preferences and evaluations can be gathered and discussed in a few hours.

Fighting against climate change, designing and implementing sustainability policy, raising people's awareness about sustainable development and so on – one cannot enumerate the wide range of problem settings that require people empowerment and multi-dimensional analysis to move towards a more sustainable society. Beyond the case studies that are presented in this book, MAMCA mainly aims at strengthening the interaction between sciences and society by fostering the empowerment of stakeholders and enabling consideration of a wide range of sustainability issues, including those which cannot be expressed in monetary value. Through this book, the authors want to bring forward the MAMCA methodology and methodological advances that have been realized to reach these objectives. The first part aims at providing the reader with the theoretical basis concerning the MAMCA methodology to enable its replicability. The second part illustrates the deployment of the methodology through different but complementary real-life case studies.

Part I comprises five chapters. In Chapter 1 Cathy Macharis and Gino Baudry present the MAMCA methodology, step by step, through an educative case study. The chapter positions the MAMCA methodology within the multi-criteria group decision-making literature and presents some applications. In Chapter 2 Cathy Macharis, Klaas De Brucker and Koen Van Raemdonck develop a decision tree for the *ex ante* evaluation of transport projects to guide decision-makers in choosing the most appropriate evaluation method(s).

Over the years, an associated software has been developed¹ which enables the support of MAMCA applications in a very user-friendly way. In Chapter 3 Gino Baudry, Koen Van Raemdonck and Cathy Macharis present this software and describe how to use it alongside MAMCA. The authors also explain the mathematical methods behind MAMCA that can be used within the software.

In recent years, the methodology has been extended to include institutional levels (Competence-based Multi Criteria Analysis or COMCA, developed by Geert te Boveldt, Cathy Macharis and Koen Van Raemdonck) and uncertainty (the range-based MAMCA, developed by Gino Baudry, Thomas Vallée and Cathy Macharis). These frameworks are presented in Chapters 4 and 5, respectively. The COMCA was developed to cope with complex decision problems where different institutional actors are involved and who also might have different competences to get the solution

¹ <http://www.mamca.be/en/> (accessed 4 June 2018).

implemented. The range-based MAMCA was developed to cope with high uncertainty contexts. It combines the traditional MAMCA and a Monte-Carlo Simulation within a unique framework to model how uncertainty may affect the decision-making process.

Part II comprises six chapters that present different applications in various countries in the field of sustainable transport and mobility. In Chapter 6 Marco Dean and Robin Hickman compare CBA and MAMCA methodologies by evaluating three potential alternative improvements of a rail line between Blackpool and Preston (United Kingdom). Based on this analysis, the authors contend that, particularly in areas characterized by severe social deprivation problems, a MAMCA approach to appraisal may be preferable to analyst-led, economic-centric tools such as CBA.

The effectiveness of applied transport financing policies depends significantly on the level of agreement among stakeholders, making collaboration a prerequisite for success. In Chapter 7 Anastasia Roukouni, Cathy Macharis and Socrates Basbas propose an assessment of financing options for urban public transportation using the MAMCA in the context of the under-construction of the metro system of Thessaloniki (Greece). The approach provides valuable insight into the extremely critical and sensitive issue of transportation financing and it is expected to stimulate and enhance interaction between actors on the policy level in Greece. It demonstrates that an in-depth dialogue with all involved stakeholders is needed before the introduction of new financial mechanisms for transportation infrastructure to achieve the challenging task of planning sustainable cities.

Logistics is a key sustainable issue for cities. In Chapter 8 Tom van Lier, Dries Meers, Heleen Buldeo Rai and Cathy Macharis propose a MAMCA application that evaluates the interest of stakeholders for innovative solutions impacting city logistics in Mechelen (Belgium). The local authorities decided to implement the two alternatives that were supported by most stakeholder groups and tried to mitigate the drawbacks for the stakeholders who were negatively affected.

Chapter 9 describes how the MAMCA has been used by Susanne Balm for educational purposes at the Amsterdam University of Applied Sciences. As part of the Minor Urban Logistics, the use of the MAMCA framework proved to be in line with the goals of practical-oriented research as it helps to make education more responsive, improves the quality of graduates and enhances innovation in professional practice.

In Chapter 10 Gino Baudry and Thomas Vallée present an application of the range-based MAMCA extension in the field of energy policy design. The authors assess stakeholder support for different biofuel options in France by 2030. The results show that the biomass to liquid biodiesel is

the most suited option with a probability of 80 per cent support. More importantly, the application demonstrates that uncertainty unequally affects different stakeholders. For some groups, such as non-governmental organizations, the biofuel ranking is unchanged whatever the uncertainty. In contrast, for other groups such as distributors or producers, the evolution of our complex socio-economic system may imply rank reversal and lead to support for unsuited options. The framework may thus help in coping with such uncertainty.

The last chapter presents a MAMCA application beyond the scope of transport and mobility to demonstrate that it can fit a wide range of decision-making problem settings. In Chapter 11, a MAMCA application developed by Ewa Chojnacka and Dorota Górecka is presented that focuses on the evaluation of non-profitable organizations in Poland to help donors make reliable decisions regarding financial support.

Over the years, the MAMCA has been deployed in various ways and contexts, for example, to support real-life decision-making in the transport sector and beyond, and to raise students' awareness through role play, and so on. This book is based on such a wide range of contributions and hopefully will lead to even more applications and cooperation in the years to come.