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Introduction

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Biographical notes: Alessio Ishizaka is a Professor in Decision Analysis and research lead at the University of Portsmouth. He received his PhD from the University of Basel (Switzerland). He has been visiting professor at several universities. His research is in the area of decision analysis, where he has published more than 70 papers. He is regularly involved in large European funded projects. He has been the chair, co-organiser and guest speaker of several conferences. Alongside his academic activities, he acts as a consultant for companies in helping them to take better decisions. He wrote the key textbook *Multicriteria Decision Analysis: Methods and Software*.

Salem Chakhar is within Portsmouth Business School, University of Portsmouth, UK. He received his PhD in Computer Science from the University of Paris Dauphine (France). Before joining the Portsmouth Business School, he worked for the University Laval (Québec, QC, Canada) and the University of Paris Dauphine (France). His main current research interests include multicriteria analysis and application, group decision making, rough set and soft computing, time series analysis and spatial analysis. He has been involved in different real world projects and has published more than 70 journal and conference papers.

This special issue contains a selection of full and revised papers that have been presented during the fourth International Workshop PROMETHEE Days 2017. The workshop has been held on May 11–12, 2017 at Portsmouth Business School, University of Portsmouth, UK. The aim of the workshop is to bring together researchers and practitioners from all the disciplines that engage with the PROMETHEE methods. The PROMETHEE methods have effectively been functional in many areas of research and several case studies. The number of practitioners who are applying the PROMETHEE method to operational multiple criteria decision problems, and researchers who are interested in studying the PROMETHEE method in-depth, increases constantly.

The workshop covers theoretical advances and real-world applications of the PROMETHEE methods. About 18 abstracts have been submitted to PROMETHEE Days 2017. These abstracts come from Belgium, Canada, Great Britain, Italy and Poland. All abstracts have been reviewed by at least two members of the Program Committee. After full consideration of the review reports, 15 papers have been accepted as they are, two papers have been accepted after revisions and one paper has been rejected. The keynote speakers of 2017 version of PROMETHEE Days are Professor Jean-Pierre Brans (Vrije Universiteit Brussel, Belgium), Professor Bertrand Mareschal (Université Libre de Bruxelles, Belgium), and Professor Pierre Kunsch (Université Libre de Bruxelles, and Vrije Universiteit Brussel, Belgium). The Jean-Pierre Brans – PROMETHEE Award for best paper has been granted to Federico Dell'Anna (Politecnico di Torino, Italy) for his paper titled 'A PROMETHEE-based approach for exploring cultural-gastronomic values in Monferrato Region (Italy)'.

Seven full papers have been submitted to this special issue and three of them have been accepted after the standard revision process of the *International Journal of Multicriteria Decision Making*. The first paper is authored by Nikolaos I. Tegos and Georgios N. Aretoulis and titled 'Proposal for an effective decision support system for the pre-selection of the type of concrete highway bridges'. The main objective of this first paper is the design and development of an effective and a reliable decision support system for the pre-selection of the type of concrete highway bridges, utilizing the analytic hierarchy process and the PROMETHEE method. Through the application of these methods, the respective optimal selection of the bridge type can be achieved, among a number of potentially suitable alternatives. Additionally, the implementation of the proposed decision support system was deemed necessary in a case study of a famous bridge in Greece.

The second paper is authored by Marta Carla Bottero, Federico Dell'Anna and Gian Luca Gobbo and titled 'A PROMETHEE-based approach for designing the reuse of an abandoned railway in the Monferrato Region (Italy)'. The main objective of this paper is to investigate the use of PROMETHEE method for supporting the decision process of the recovery and the reuse of an abandoned railway for the creation of a new infrastructure in the Monferrato Region (Northern Italy). The project represents an important opportunity for the economic survival of the area, contributing to valorise local resources and to promote cultural values. In this project, PROMETHEE method has been used to define the most suitable locations among the considered stations for the realization of specific functions. In this sense, four different functions have been identified as possible elements of the reuse project, namely a touristic office, a teaching farm, a bike-hotel and office, and an agriculture cooperative. With the help of a panel of actors, the objective of the evaluation is to support the design process showing a multifunctional path for valorising the territory and its resources.

The third paper is authored by Issam Banamar and titled 'An interpolation-based method for the time weighed vector elicitation in temporal PROMETHEE II applications'. The general aim of this paper is to extend PROMETHEE methods to explicitly support the decision problems involving time-dependant criteria and alternatives. The specific aim of this third paper is to tackle the elicitation of the instantaneous weights required in temporal PROMETHEE II by using a novel method based on interpolation. Assuming that each periodic assessment has a relative temporal weight, the proposed method derives, from the decision maker, a subset of these weights. Then the remained ones are found by an appropriate linear interpolation. Simulation

results show that a few elicited weights are sufficient to determine an effective approximation of the whole set of the desired temporal weights. Practically, the new approach proceeds in two steps:

1   reducing the size of the elicitation problem

2   using an elicitation method which ensures time and cognitive effort saving for the decision maker on one hand, and reliable results on the other hand.

As the editors of this special issue and co-chairs of the workshop, we would like to thank all authors for their valuable contributions. We would also like to thank all the reviewers for spending their precious time reviewing the papers and for providing valuable comments and suggestions to improve the papers. The organization of the workshop could not be achieved without the help of many people. A special thank go first to the other colleagues and members of the Organising Committee, namely: Professor Salvatore Greco (University of Catania, Italy; and Portsmouth Business School, University of Portsmouth, UK), Dr. Maria Barbari (Portsmouth Business School, University of Portsmouth, UK) and Mr. Menelaos Tasiou (Portsmouth Business School, University of Portsmouth, UK). The editors would also like to thank Mrs. Mandy McCartney and Mrs. Allyson Hunt for their precious help. Finally, the editors would like to thank Professor Andy Thorpe (Associate Dean Research, Portsmouth Business School, University of Portsmouth, UK) and Professor Dylan Jones (Director of Centre for Operational Research and Logistics, University of Portsmouth, UK) for their introductory speech.