Introduction

João Clímaco · David Rios Insua

Published online: 30 December 2012
© Springer Science+Business Media Dordrecht 2012

Group Decision and Negotiation are complex processes involving multidisciplinary topics from psychology, sociology, organizational and political sciences, etc. Building effective Group Decision/Negotiation Support Systems (GD/NSS) is dependent not only on new information and communication technologies (ICT) and Operations Research/Management Science (OR/MS) models, but also on individual and collective behavioral studies. Moreover, we all know that Decision Making can be a daunting task, for reasons that include the presence of uncertainty over various factors affecting the consequences of decisions; the influence of time over the whole decision process; the need to take into account multiple conflicting objectives; and, the presence of several decision makers and multiple stakeholders. This special issue of *Group Decision and Negotiation* focuses on multiple decision maker problems with alternatives evaluated with respect to multiple criteria.

Considering alternatives based on several criteria which, in turn, often reflect a combination of objective measures and qualitative/subjective judgments of the decision-makers can become highly demanding and complex, especially when the goal is to achieve effective decisions in a collective and transparent manner. Moreover, the information exchanged in the process may be in constant modification as a result of group interactions and that there is often a lack of certainty and precision about the information in the decision-making process.

Modern times bring new problems to the fore. Indeed, although there are many benefits in face-to-face meetings, nowadays groups may be totally distributed through the Internet, hence requiring to implement the decision processes in a remote and

J. Clímaco (✉)
INESC-Coimbra, Universidade de Coimbra, Coimbra, Portugal
e-mail: jclimaco@fe.uc.pt

D. R. Insua
Universidad Rey Juan Carlos, Madrid, España

asynchronous manner. The web paves the way to very promising new decision aiding environments, but also aggravates the complexity of the group decision and negotiation processes.

The papers included in this volume, after a thorough review process, illustrate the various difficulties and challenges associated with these issues, together with the added value of the proposed approaches to multicriteria decision analysis and group decision and negotiation, as well as the impact that technology is bringing along through group decision and negotiation support systems (GD/NSS), including those based on the web.

Efremov and Lotov, in *Multi-criteria Remote Asynchronous Group Decision Screening: An Experimental Study*, introduce a Group Remote Asynchronous Screening Support (GRASS) procedure that can be used by a large number of participants who are not able to meet face to face. Within a discrete multicriteria decision making problem, each participant is supported through a visual interactive goal programming model through which several alternatives are identified. Then, a modified Borda count voting scheme is used to screen the alternatives for final discussion among participants. GRASS is implemented through the web and experiments are presented.

In *Multicriteria Portfolio Modeling for the Development of Shared Action Agendas*, Vilkkumaa, Salo and Liesiö describe a framework for supporting groups of decision makers in choosing portfolios of projects evaluated under multiple criteria. Each DM's preferences is modeled through a weighted additive value function. A group value function is based on a weighted combination of the member's value functions. Imprecision over individual weights and group weights is modeled through linear constraints. Nondominated portfolios are computed and performance measures, based on standard decision making under uncertainty criteria and core indices are used to inform about the portfolios. An iterative scheme is introduced to get further information to further constrain the weights and reduce the nondominated set. When no further information is available and the set is still too big a generic negotiation scheme is proposed, possibly completed by voting.

Bana e Costa, Lourenço, Duarte and Bana e Costa present *a socio-technical approach for group decision support in public strategic planning* with a real application to the Pernambuco multi-annual plan case. The problem objectives and alternatives to be considered were prepared through a group causal mapping session. The overall benefits of the proposed programmes were evaluated with a multi-criteria group value model, built with the MACBETH methodology and voting, which was also used to assess the plan feasibility. Both criteria were used to classify them in four strategic categories: high benefit and easy to implement; high benefit but difficult to implement; easy to implement but of low added value; and low benefit and difficult to implement; which helped in deciding which programmes to select.

Vetschera, Filzmoser and Mitterhofer present *an analytical approach to offer generation in concession-based negotiation processes*, in which they propose an Analytical Concession–Advising Technology model (AC–AT) to assist negotiators in determining the size of concessions and formulating offers in a concession-based negotiation process. The approach is based on plausible requirements for offers formulated in terms of values for both the negotiator making the offer and the opponent receiving it. The underlying preference model is a weighted additive value function, although other multicriteria methods like PROMETHEE could be used. The method may be seen as

trusted third-party which formulates trade-offs between the parties' values to define a search path in the utility space, which is then mapped back into the issue space to generate actual offers. The model could be implemented, e.g., as a core element in a negotiation support system.

Finally, Bezerra, Melo and Costa, in *Visual and Interactive Comparative Analysis of Individual Opinions: A Group Decision Support Tool*, propose the use of the Visual Interactive and Comparative Analysis (VICA) methodology to encourage consensus-building in decision making processes involving multiple criteria and multiple participants working in cooperative groups. VICA uses visual aids to mitigate complexity in multicriteria group decision support to present information about the state of each participant in the decision-making process and supporting the group in its quest for consensus. The authors apply it in conjunction with the ELECTRE TRI method, in what they call VICA-ELECTRE TRI, which uses comparative analyses plus visuals and the interactive exchange of individuals' opinions within the group. The whole process is embedded with ideas of sufficient support to reach consensus, concession identification and compromise solutions. The methodology is implemented in an Excel spreadsheet to make it as accessible as possible while also facilitating its acceptance and efficient use within organizations, as a GDSS.

Cooperative versus non cooperative groups; various MCDA approaches (value functions, outranking methods, goal programming,...); face to face versus the web,...we hope to have illustrated the richness of issues, challenges and problems that remain as in this research field. As emphasized by A. Wierzbicki: *"if we accept the point that we are living in the time of changing civilization eras, and conceptual change is one of the main ingredients of the civilization change, up to the formation of the new episteme, then the need of new concepts and approaches, even new hermeneutical horizons also within group decisions and negotiation theory is evident"*. And later he also mentions that *"among other dimensions, distributed decision making may involve net technologies"*.

Indeed, we believe that the authors of the papers of this special issue all also point out to the grand challenge remaining in the field: a generic, user friendly web-based GDN support system that facilitates and promotes citizen participation that permits overcoming old and vicious ways of doing politics, benefiting from recent ICT advances. A key issue must be emphasized, to wit, dialogue should be adequate for building effective asynchronous communication settings.

We hope that the GDN community will join in solving this grand challenge.

We are grateful to the authors, the referees and Mel Shakun, the GDN editor, for their excellent input and work.