



## **EWG-DSS / DASIG Paris-2011 Joint-Workshop**

**EURO Working Group on  
Decision Support Systems  
Stream on Collaborative Decision Making**





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## **EURO Working Group on Decision Support Systems**

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**Proceedings**

**of the**

**EWG-DSS / DASIG Paris-2011 Joint-Workshop**

**on**

**Policy Analytics and Collaborative Decision Making**

**Paris, November 30<sup>th</sup>- December 1<sup>st</sup>, 2011**

**Editors:**

**F. Dargam, B. Delibasic, J. E. Hernández,  
S. Liu, R. Ribeiro, P. Zaraté**



**IRIT Institut de Recherche en Informatique de Toulouse**  
**Report : IRIT / RR--2011-21-FR, November 2011**



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## Workshop Proceedings

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## Institutional Support

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|---|--|
|    | <p><b>EURO, The Association of European Operational Research Societies</b></p> <p><b>EWG-DSS, EURO Working Group on Decision Support Systems</b><br/> <a href="http://www.euro-online.org/web/ewg/10/ewg-decision-support-systems">(<a href="http://www.euro-online.org/web/ewg/10/ewg-decision-support-systems">http://www.euro-online.org/web/ewg/10/ewg-decision-support-systems</a>)</a></p> |
|    | <p><b>Paris-Dauphine University</b><br/> <a href="http://www.dauphine.fr/">(<a href="http://www.dauphine.fr/">http://www.dauphine.fr/</a>)</a></p>   |
|   | <p><b>LAMSADE – CNRS</b><br/> <a href="http://www.lamsade.dauphine.fr/">(<a href="http://www.lamsade.dauphine.fr/">http://www.lamsade.dauphine.fr/</a>)</a></p>  |
|  | <p><b>DASIG Decision Analysis Special Interest Group</b><br/> <a href="http://www.theorsociety.com/Pages/SpecialInterest/DecisionAnalysis.aspx">(<a href="http://www.theorsociety.com/Pages/SpecialInterest/DecisionAnalysis.aspx">http://www.theorsociety.com/Pages/SpecialInterest/DecisionAnalysis.aspx</a>)</a></p>  |
|  | <p><b>Management School, University of Liverpool, UK</b><br/> <a href="http://www.liv.ac.uk/management/">(<a href="http://www.liv.ac.uk/management/">http://www.liv.ac.uk/management/</a>)</a></p>   |
|  | <p><b>School of Management, University of Plymouth, UK</b><br/> <a href="http://www.plymouth.ac.uk/">(<a href="http://www.plymouth.ac.uk/">http://www.plymouth.ac.uk/</a>)</a></p>   |
|  | <p><b>University of Toulouse, France</b><br/> <a href="http://www.univ-tlse1.fr/">(<a href="http://www.univ-tlse1.fr/">http://www.univ-tlse1.fr/</a>)</a><br/> <b>IRIT Institut de Research en Informatique de Toulouse, France</b><br/> <a href="http://www.irit.fr/">(<a href="http://www.irit.fr/">http://www.irit.fr/</a>)</a></p>   |
|  | <p><b>University of Belgrade, Serbia</b><br/> <a href="http://www.bg.ac.rs/eng/uni/university.php">(<a href="http://www.bg.ac.rs/eng/uni/university.php">http://www.bg.ac.rs/eng/uni/university.php</a>)</a></p>   |
|  | <p><b>UNINOVA - CA3 - Computational Intelligence Research Group</b><br/> <a href="http://www.uninova.pt/ca3/">(<a href="http://www.uninova.pt/ca3/">www.uninova.pt/ca3/</a>)</a></p>   |
|  | <p><b>SimTech Simulation Technology, Austria</b><br/> <a href="http://www.SimTechnology.com">(<a href="http://www.SimTechnology.com">http://www.SimTechnology.com</a>)</a><br/> <b>ILTC - Instituto de Lógica Filosofia e Teoria da Ciência, RJ, Brazil</b><br/> <a href="http://www.iltc.br">(<a href="http://www.iltc.br">http://www.iltc.br</a>)</a></p>                                      |



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## About the EWG-DSS

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The EWG-DSS is a Working Group on Decision Support Systems within EURO, the Association of the European Operational Research Societies.

The main purpose of the EWG-DSS is to establish a platform for encouraging state-of-the-art high quality research and collaboration work within the DSS community. Other aims of the EWG-DSS are to:

- 
- Encourage the exchange of information among practitioners, end-users, and researchers in the area of Decision Systems.
  - Enforce the networking among the DSS communities available and facilitate activities that are essential for the start-up of international cooperation research and projects.
  - Facilitate professional academic and industrial opportunities for its members.
  - Favour the development of innovative models, methods and tools in the field Decision Support and related areas.
  - Actively promote the interest on Decision Systems in the scientific community by organizing dedicated workshops, seminars, mini-conferences and conference streams in major conferences, as well as editing special and contributed issues in relevant scientific journals.
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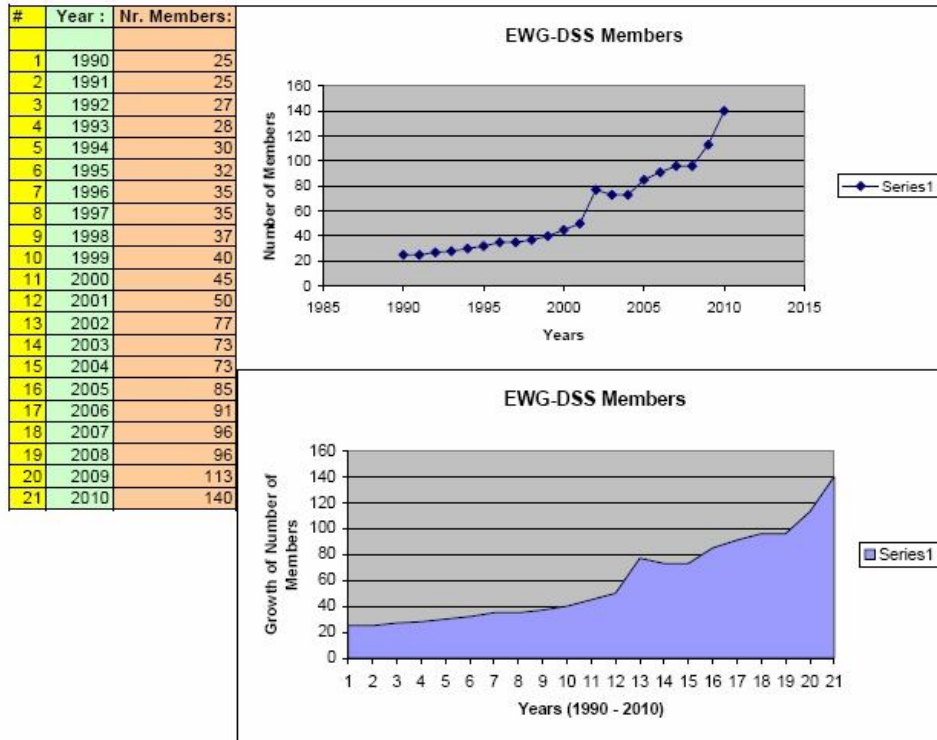
The EWG-DSS was founded during a memorable EURO Summer Institute on DSS that took place at Madeira, Portugal, in May 1989. This Summer Institute was organized by two well-known academics of the OR Community: Jean-Pierre Brans and José Paixão. It counted with the participation of 24 (at that time) young researchers of 16 different nationalities. Most of them still continue nowadays to pursue their goals, working actively in their research areas.

The number of EWG-DSS members has substantially grown along the years. Now we are over 150 members coming from various nationalities. There has also been established quite a few well-qualified research co-operations within the group members, which have generated valuable contributions to the DSS field in journal publications. Since its creation, the EWG-DSS has held annual Meetings in various European countries, and has taken active part in the EURO Conferences on decision-making related subjects.

Since 2007 the EWG-DSS has been managed by a Coordination Board. One of the aims of this coordination board is to better promote joint-work among the group members and to encourage more participation of the whole group in DSS related projects and events. In the period of June 2007 to January 2011 the EWG-DSS Coordination Board was composed by: Pascale Zaraté, Fatima Dargam and Rita Ribeiro. Since the beginning of 2011, the EWG-DSS Managing Board has doubled in number of members. Besides the old coordinators, now we count with the assistance of three new Board Members, namely: Jorge

Hernández; Boris Delibasic; and Shaofeng Liu, to better administrate the activities of the group, as well as to bring new ideas to it.

**EWG-DSS EURO Working Group on Decision Support Systems**  
**Number of Members from 1990 up to 2010**



EWG-DSS Members from 1990 to 2010

***Joining the EWG-DSS***

The EWG-DSS membership does not cost you anything.  
 If you wish to join the EURO-Working Group on Decision Support Systems,  
 all you have to do is to send an e-mail to our group at:  
[ewg-dss@fccdp.com](mailto:ewg-dss@fccdp.com), with the following information:

***Name; Affiliation; Mailing Address; Phone; e-mail; and Homepage link..***

Alternatively, you can also join the EWG-DSS via our LinkedIn Group at:  
[http://www.linkedin.com/groups?about=&qid=1961459&trk=anet\\_ug\\_grpro](http://www.linkedin.com/groups?about=&qid=1961459&trk=anet_ug_grpro)

**Thanks for your interest!**  
**The EWG-DSS Coordination Board**



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## Notes from the EWG-DSS Coordinators

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The EURO Working Group on Decision Support Systems (**EWG-DSS**), jointly with the **DASIG** Decision Analysis Special Interest Group from the British OR Society and **CNRS-LAMSADE**, in cooperation with **Paris Dauphine University**, had the pleasure to co-organize the **EWG-DSS / DASIG Paris-2011 Joint-Workshop** on **Policy Analytics** and on **Collaborative Decision Making** on the period of November 30<sup>th</sup> to December 1<sup>st</sup>, 2011, at the University Paris-Dauphine.

Following the success of the “EWG-DSS London-2011 Workshop” in June 2011, the main purpose of this Joint-Workshop is to provide an informal setting in which the participants, from both EWG-DSS and DASIG groups, can have the opportunity to meet and discuss technical, methodological and social aspects involved in the development of Decision Systems. The Workshop comprises of two Streams. The “**Stream on Collaborative Decision Making on the 30<sup>th</sup> of November, 2011**” organized by the EWG-DSS and the “**Stream on Policy Analytics on the 1<sup>st</sup> of December, 2011**” organized by the DASIG Decision Analysis Special Interest Group.

The EWG-DSS / DASIG Paris-2011 Joint-Workshop has attracted the participation and the interest of many professionals of the decision-making research area. It presents a total of 23 research contributions, 2 special talks and 1 plenary discussion. The EWG-DSS Stream on “Collaborative Decision Making” is composed of 2 invited speakers’ presentations and 14 papers short presentations related to various aspects of Decision Making approaches. The Stream on “Policy Analytics” organized by the DASIG Decision Analysis Special Interest Group from the British OR Society, includes 9 presentations and 1 plenary discussion about the topic of Policy Analytics.

The special talks of the EWG-DSS Stream on “Collaborative Decision Making” will be presented by **Denis Bouyssou**, a Senior Researcher at the CNRS in Paris, about the topic: “**Should you believe in the Shanghai ranking ?**”; and **Sihem Amer-Yahia**, Principal Research Scientist at Qatar Computing Research Center, who will speak about: “**Social Analytics to Encourage Collaboration on the Social Web of News**”.

The rich diversity of topics and approaches of Decision Making presented in this Workshop is itself an invaluable source of inspiration for further investigations in the area. We are extremely proud to be able to co-organize jointly with the **DASIG** and **CNRS-LAMSADE** such an interesting event.

Last, but not least, we - the Coordinators of the EWG-DSS - want to express here our deep gratitude to **EURO** for the financial support directed to the EWG-DSS Stream; and special thanks to our colleague and EWG-DSS founding member **Alexis Tsoukias**, Professor at LAMSADE - University Paris-Dauphine, for his great support in organizing this meeting in Paris. We are extremely grateful to all the local arrangements and help received from him and his Team. **Many Thanks!**

*We hope you all enjoy the Workshop as much as we will !*

### The EWG-DSS Coordinators

|  |  |
|--|--|
|  | <p><b>EWG-DSS</b> Coordination Board: <a href="mailto:ewg-dss@fccdp.com">ewg-dss@fccdp.com</a></p> <p><a href="#">Pascale Zaraté</a> (Coordinator) IRIT / Toulouse University , France<br/><a href="#">Fátima Dargam</a> (Coordinator) SimTech Simulation Technology / ILTC, Austria<br/><a href="#">Rita Ribeiro</a> (Board Chair) UNINOVA - CA3, Portugal<br/><a href="#">Jorge Hernández</a> (Board Assistant) University of Liverpool, UK<br/><a href="#">Boris Delibasic</a> (Board Assistant) University of Belgrade, Serbia<br/><a href="#">Shaofeng Liu</a> (Board Assistant) University of Plymouth, UK</p> <p><a href="http://www.euro-online.org/web/ewg/10/ewg-decision-support-systems">EWG-DSS EURO Homepage</a>: <a href="http://www.euro-online.org/web/ewg/10/ewg-decision-support-systems">http://www.euro-online.org/web/ewg/10/ewg-decision-support-systems</a><br/><a href="http://ewgdss.wordpress.com/">EWG-DSS Blog</a>: <a href="http://ewgdss.wordpress.com/">http://ewgdss.wordpress.com/</a><br/><a href="http://www.linkedin.com/groups?about=&amp;gid=1961459&amp;trk=anet_ug_grpro">EWG-DSS LinkedIn</a> : <a href="http://www.linkedin.com/groups?about=&amp;gid=1961459&amp;trk=anet_ug_grpro">http://www.linkedin.com/groups?about=&amp;gid=1961459&amp;trk=anet_ug_grpro</a><br/><a href="https://wwwsecu.irit.fr/listes/info/ewg-dss">EWG-DSS IRIT Server</a>: <a href="https://wwwsecu.irit.fr/listes/info/ewg-dss">https://wwwsecu.irit.fr/listes/info/ewg-dss</a><br/><a href="mailto:ewg-dss@irit.fr">EWG-DSS Mailing List</a> : <a href="mailto:ewg-dss@irit.fr">ewg-dss@irit.fr</a> (only for Members)</p> |
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## Organizing & Program Committees

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### **EWG-DSS Organizing Committee:**

**Pascale Zaraté**, IRIT / Toulouse University , France  
**Fátima Dargam**, SimTech Simulation Technology, Austria  
**Rita Ribeiro** UNINOVA – CA3, Portugal  
**Jorge Hernández** University of Liverpool, UK  
**Boris Delibašić** University of Belgrade, Serbia  
**Shaofeng Liu**, University of Plymouth, UK

### **DASIG:**

**Nadia Papamichail**, Manchester Business School, UK  
**Alexis Tsoukias**, Universite Paris Dauphine, France

### **Special Local Organization Support:**

**Alexis Tsoukias**, Professor at LAMSADE CNRS, Paris Dauphine University, France

### **EWG-DSS Stream Program Committee:**

**Ana Respício**, University of Lisbon, Portugal  
**Antonio Rodrigues**, University of Lisbon, Portugal  
**Boris Delibašić**, University of Belgrade, Serbia  
**Csaba Csaki**, University College Cork, Ireland  
**Dragana Becejski-Vujaklija**, Fac.Org. Sciences, Univ. Belgrade, Serbia  
**Fátima Dargam**, ILTC, Brazil & SimTech Simulation Technology, Austria  
**Frédéric Adam**, University College Cork, Ireland  
**Jason Papathanasiou**, University of Macedonia, Greece  
**Joao Lourenço**, IST, Technical University of Lisbon, Portugal  
**Jorge Freire de Souza**, Engineering University of Porto, Portugal  
**Jorge Hernández**, University of Liverpool, UK  
**Jorge Pinho de Sousa**, Engineering University of Porto, Portugal  
**José María Moreno**, Zaragoza University, Spain  
**Pascale Zaraté**, IRIT / Toulouse University , France  
**Peter Keenan**, University College Dublin, Ireland  
**Philip Powel**, Birkbeck, University of London, UK  
**Rita Ribeiro**, UNINOVA – CA3, Portugal  
**Rudolf Vetschera**, University of Vienna, Austria  
**Shaofeng Liu**, University of Plymouth, UK



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## Workshop Program

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**Day 1, Wednesday – November 30<sup>th</sup>, 2011**  
**Université Paris Dauphine, room A709**  
**Place du Maréchal de Lattre de Tassigny, 75775 Paris**

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### **EWG-DSS Stream on Collaborative Decision Making**

8:30-9:00: Registration /Distribution of Workshop Material

**Welcome to the EWG-DSS Paris-2011 Workshop at Univ. Paris Dauphine**  
**Opening Session by the Workshop Organisers**

9:00 – 10:00: **Session 1: Invited Talk –**

**Denis Bouyssou: “Should you believe in the Shanghai ranking ?”**

**Chair: Pascale Zaraté**

10:00 – 11:00: **Session 2: DSS Cases Studies**

**Chair: Fatima Dargam**

**S.2.1.** 10:00 – 10: 20: An Integrated decision support framework for green operations management. Authors: S. Liu, F. Annansingh, L. Liu, W. Sun

**S.2.2.** 10: 20 – 10: 40: Flocking behaviour-based model to support the management of strategic decision-making in supply chains. Authors: J. Hernandez, M. Dalziel, A. Lyons

**S.2.3.** 10: 40 – 11: 00: A conceptual model for MRP IV  
Authors: M. Diaz-Madronero, J. Mula, D. Peidro

**11:00 – 11:15: Coffee Break**

11:20 – 12:40: **Session 3: Formal Tools for DSS**

**Chair: Jorge Hernandez**

**S.3.1.** 11:20 – 11:40: Decision making as a Theorem Proving Process. Author . J. Calmet

**S.3.2.** 11:40 – 12:00: New Belief Functions based methods for multicriteria decision making  
Authors: J.M. Tacnet, J. Dezert

**S.3.3.** 12:00 – 12:20: A Regression Based Algorithm for Optimizing Top-K Selection in Simulation Query Language. Authors: S. Farley, A. Brodsky, C.H.Chen

**S.3.4.** 12:20 – 12:40: Toward Online Optimization Through Preprocessing and Decomposition in Decision Guidance Query Language. Authors: N. Egge, A. Brodsky, I. Griva

**12:40 – 14:00: Lunch**

14:00 – 15:20: **Session 4: Invited Talk**

**Sihem Amer-Yahia:**

**“Social Analytics to Encourage Collaboration on the Social Web of News”**

**Chair: Shaofeng Liu**

14:00 – 15:20: **Session 5: Collaborative Decision Making**

**Chair: Pascale Zaraté**

**S.5.1.** 14:00 – 14: 20: Experts Collaboration for Wealth and Estate Planning Using the SEPlanS Platform. Authors: I. Linden, J.M. Jacquet, M.O. Staicu, G. Ospina

**S.5.2.** 14:20 – 14:40: Decision-making to Collective Action through System Dynamics Modelling and Simulation in Discussion Network. Authors: W. Sun, G. Zong, J. Scott, S. Liu

**S.5.3.** 14:40 – 15:00: Multi-Agents Model for Distributed Group Decision Support Systems  
Authors: B. Nachet, A. O. Mahraz, A. Adla

**S.5.4.** 15:00 – 15:20: Collaborative Dynamic Decision Making: A B2B Supplier Selection case study. Authors: G. Campanella, A. Pereira, R.A. Ribeiro, L.R. Varela

**15:20 – 15:40: Coffee Break**

15:40 – 16:40: **Session 6: Knowledge Management for DSS**

**Chair: Rita Ribeiro**

**S.6.1.** 15:40 – 16:00: Organizational knowledge to support project selection activities in the public administration. Authors: M.F. Norese, V. Torta

**S.6.2.** 16:00 – 16:20: Ontology bridging Knowledge Management and Decision Making  
Authors: A.C.S. Branco, F.C.C. Dargam

16:40 – 17:00: **Session 7: Closing Session**

**Chair: EWG-DSS Coordination Board**

Workshop Closing: R. Ribeiro

EWG-DSS 2011 Newsletter: F. Dargam

DITIA - Action Cost News: P. Zaraté

PIKES Project Presentation: S. Liu

EWG-DSS Workshop Liverpool-2012: J. Hernandez

EURO XXV 2012 – EWG-DSS Stream: F. Dargam

Acknowledgements: P. Zaraté

17:00 – 18:00: **Session 8: EWG-DSS Board Business Meeting**

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**19:30: EWG-DSS / DASIG Paris-2011 Joint-Workshop Dinner**

**Note:**

The workshop dinner on Wednesday 30/11/2011 is not covered by the Workshop Registration. Participants should cater for their own expenses at the restaurant.



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## Workshop Program

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**Day 2, Thursday – December 1<sup>st</sup>, 2011**  
**Université Paris Dauphine, room A709**  
**Place du Maréchal de Lattre de Tassigny, 75775 Paris**

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### **DASIG Stream on Policy Analytics**

**9:00 – 10:30: Session 1: Introductory session**  
**Chair: A Tsoukiàs**

**S.1.1.** 09:30 – 10: 00: Policy Analytics: what is about?  
*A Tsoukiàs (Paris-Dauphine)*

**S.1.2.** 10: 00 – 10: 30: The Green Move projectDSS Cases Studies  
*A Colomi and E Scaloni (Milan)*

**10:30 – 10:45: Coffee Break**

**10:45 – 12:45: Session 2: Efficiency and Performance**  
**Chair: A Morton**

**S.2.1.** 10:45 – 11:15: The NAO's view of evidence based policy design  
*T McBride and A Scharaschkin (UK National Audit Office)*

**S.2.2.** 11:15 – 11:45: Cross-country comparisons of health: an OECD perspective  
*M Borowitz (OECD)*

**S.2.3.** 11:45 – 12:15: Towards a Framework for Public Values in Policy Analytics  
*G Montibeller, L White, A Franco (LSE, Bristol, Warwick)*

**S.2.4.** 12:15 – 12:45: Ratio-based Efficiency Analysis and Benchmarking of Healthcare Services  
*A Salo (Aalto, Helsinki)*

**12:45 – 14:00: Lunch**

14:00 – 15:30: **Session 3: Inequality and Poverty**  
**Chair: N Papamichail**

**S.3.1.** 14:00 – 14: 30: Ordinal Comparison of Multidimensional Deprivation: theory and application. *L P Østerdal, C Sonne-Schmidt and F Tarp (Copenhagen).*

**S.3.2.** 14:30 – 15:00: Poverty Measurement  
*V Kana, (Ouagadougou)*

**S.3.3.** 15:00 – 15:30: Equitable preferences: representation and use in practical problems  
*N Argyris, Ö Karsu, A Morton (LSE)*

**15:30 – 15:45: Coffee Break**

15:45 – 16:30: **Session 4: What have we learned?**  
**Chair: A Tsoukiàs**

**Plenary Discussion:**

What is policy analytics?

What are the intellectual challenges and barriers to successful application?

16:30: **Closing Session**



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## Workshop Abstracts

### Special Talks

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#### Special Talk 1

**Denis Bouyssou**

**Senior Researcher (Directeur de Recherche) at CNRS  
Centre National de Recherche Scientifique in Paris, France**

Denis Bouyssou has an MBA from ESSEC in Paris, France. He obtained his PhD in OR in 1984 and his *Habilitation à diriger des Recherches* in 1990 from the Université Paris Dauphine in France. He is currently Senior Researcher at CNRS. From 1987 to 2001 he has been professor of Decision Science at the ESSEC Business School, Paris, France. He has held invited research positions at the Université Libre de Bruxelles (Brussels, Belgium) and Université Laval (Québec, Canada). He has been a consultant for various private and public firms in France. Denis Bouyssou is a former president of ROADEF, the French OR Society, and former secretary of EURO (the European association of OR societies). He is also the former co-editor-in-chief of *4OR*. He is a member of the editorial committee of *Theory and Decision*, advisory editor of the *Journal of Multi-Criteria Decision Analysis* and on the editorial board of *Risk, Decision and Policy*. Denis Bouyssou is co-author of four books on MCDM. He has published over 50 articles in various journals and contributed volumes. His main current research interests are centered on Decision Theory (Preference modeling, Decision under Risk and Uncertainty, Social Choice Theory and MCDM).

#### Talk:

**“Should you believe in the Shanghai ranking?”**

#### Abstract

This talk proposes a critical analysis of the “Academic Ranking of World Universities”, published every year and more commonly known as the Shanghai ranking. After having recalled how the ranking is built, we first discuss the relevance of the criteria and then analyze the proposed aggregation method. Our analysis uses tools and concepts from Multiple Criteria Decision Making (MCDM). Our main conclusions are that the criteria that are used are not relevant, that the aggregation methodology is plagued by a number of major problems and that the whole exercise suffers from an insufficient attention paid to fundamental structuring issues. Hence, our view is that the Shanghai ranking, in spite of the media coverage it receives, does not qualify as a useful and pertinent tool to discuss the “quality” of academic institutions, let alone to guide the choice of students and family or to promote reforms of higher education systems. We outline the type of work that should be undertaken to offer sound alternatives to the Shanghai ranking. This talk is based on a joint paper with Jean-Charles Billaut and Philippe Vincke.

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## Special Talk 2

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### **Sihem Amer-Yahia**

**Principal Research Scientist at Qatar Computing Research Center (QCRI) &  
Leader of the Social Computing group in Doha, Qatar**

Sihem Amer-Yahia is Principal Research Scientist at Qatar Computing Research Center (QCRI), where she leads the Social Computing group. She is also CNRS DR1 at Laboratoire d'Informatique de Grenoble since December, 2011. Her research is centered around the development of scalable models and algorithms for organizing, mining and managing large volumes of social breadcrumbs left by millions of users online. Her current projects include a collaboration with Al Jazeera and MIT to help journalists organize and understand user-generated input in the form of comments on news articles, tweets, Facebook likes and shares. Dr. Amer-Yahia has over 80 publications in major Web data management and social conferences. Prior to joining QCRI in May 2011, she was Senior Scientist at Yahoo! Research for 5 years and worked on revisiting relevance models and top-k processing algorithms on datasets from Delicious, Yahoo! Personals and Flickr. Before that, she spent 7 years at AT&T Labs in NJ, working on XML query optimization and XML full-text search. Dr. Amer-Yahia is editor of the W3C XML full-text standard. She is a member of the VLDB Endowment and the ACM SIGMOD executive committee. She is a senior ACM member and member of IEEE. **Dr. Amer-Yahia** regularly participates in research panels and chairs multiple conferences. She also serves on the editorial boards of prestigious journals: ACM TODS, the VLDB Journal and the Information Systems Journal. Dr. Amer-Yahia received her Ph.D. in Computer Science from Univ. Paris-Orsay and INRIA in 1999 and her Diplome d'Ingenieur from INI, Algeria in 1994.

#### **Talk:**

### **“Social Analytics to Encourage Collaboration on the Social Web of News”**

#### **Abstract**

The proliferation of social media is undoubtedly changing the way people produce and consume news online. Editors and publishers in newsrooms heavily rely on citizen journalism to cover the latest events. Yet, the Social Web has yet to provide value to encourage collaboration. We conjecture that value lies in aggregating millions of user actions along three dimensions: topic, geography, and time. I will present SPAUE and MAQSA, two systems for social analytics on news. SPAUE analyzes user traffic while MAQSA is content-centric. SPAUE uses graph traversal primitives to aggregate the collective behavior of users represented as a set of actions such as browsing, posting an opinion and sharing news stories. MAQSA provides an interactive topic-centric dashboard that summarizes social activity around news articles. Both SPAUE and MAQSA rely on scalable algorithms that enable an interactive specification of topics, actions, and dates and dynamically process large collections of relevant articles.



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## **EWG-DSS Stream on Collaborative Decision Making**

### **Abstracts**

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## An Integrated decision support framework for green operations management

**Shaofeng Liu<sup>\*</sup>, Fenio Annansingh<sup>1</sup>, Li Liu<sup>2</sup>, and Wei Sun<sup>3</sup>**  
University of Plymouth, Plymouth, UK  
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### ABSTRACT

Traditionally, operations management has been defined as the management (i.e. design, planning, control and improvement) of the transformation process that produces usable products and services. The inputs of the transformation process can be any types of resources (such as materials, information and people). Subsequently, performance objectives for operations management include quality, speed, cost, flexibility and dependability. In recent years, Green Operation Management (GOM) has emerged to simultaneously address environmental, social and economic issues in operations. Existing work has acknowledged that, in the past, there was a lack of integration of environmental management and business ethics into operations management. To truly achieve the Triple Bottom Line sustainability, there is an urgent need to investigate the coherent integration of environmental and social values into GOM performance objectives through the operations manager's holistic decision making.

This paper discusses the path from traditional operations management to GOM, defines GOM performance objectives, identifies key challenges of GOM decision making, and proposes an integrated decision support framework for GOM. In the integrated framework, three key technologies will be explored coherently to support GOM decision making: Life Cycle Assessment (LCA), Multi-Criteria Decision Analysis (MCDA) and Business Intelligence (BI). A key contribution of the framework is that it provides a more comprehensive understanding of the GOM decision evaluation from multiple perspectives. It is concluded that systematic sustainability analysis within the integrated framework can provide more efficient and effective decision support for GOM.

**Keywords:** Green operations management, integrated decision support framework, product life cycle, operational life cycle

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## **Flocking behaviour-based model to support the management of strategic decision-making in supply chains**

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### **ABSTRACT**

The organizational behaviour considers the management process about how people, individuals, and groups act in the organizations. This management process, under a long-term focus, base their efforts in to support the strategic decision-making in the organization along the main decisional levels (strategic, tactic and operative). When the management process is extended to more than one organization, in where they have to interact for supporting products, information's and decision's flows among them, the whole environment belongs to what is named supply chain management, which may also consider different types of typologies. In this case, the management behaviour turns a complex issue due to the local, global and distributed decision-making process which, in the most of the cases, has to be handled by the stakeholders by considering the different types of organizational behaviours'. Further, to understand and to model the main complexities linked to this kind of environments', some nature behaviour examples can be considered to support this issues.

As established by [1], the flocks represent a good example of self organized behaviour in a group who consider similar properties to explain some of the organization dynamics of human groups. Moreover, the distributed behaviours' can be also modelled from the particle principle and geometric flight characterised in the flock behaviours. In addition, the basic models of flocking behaviours are to be controlled by three simple rules: Separation (avoids crowding neighbours'), Alignment (steer towards average heading of neighbours') and Cohesion (steer towards average position of neighbours'). Within these three simple rules, the flock moves can be modelled in an extremely realistic way by considering the complex motion and interaction of them. Then, based on the proper method and tools selection, this can be linked to realistic organizational behaviours' management issues.

Hence, to cover the main strategic decision-making issues in the organization, the purpose of this paper is to give a model for supporting the main behavioural relationship among the organization. Thus, based on the multiagent system technology, this paper conceptualise the main strategic decision making issues in different supply chain typologies. Thereafter, the flocking behaviours are considered as the main behaviour pattern to be included in every agent's behaviour rule. Further, the supply chain strategic decision-making model is supported, on one hand, by a standard modelling language and technology and, on the other hand, by a well studied organisational behaviour pattern, giving another contribution to the organizational decision-making research field.

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## **A conceptual model for MRP IV**

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### **ABSTRACT**

In both the commercial and scientific domains, MRP and its variants focus on materials requirement and production capacities planning. Thus, they are a disadvantage in those supply chains where delocalization of their raw materials and components suppliers is significant. In these settings, transport planning plays an essential role because of high transport costs and logistic restrictions, but particularly due to its impact on production planning decision-making. In this context, production planning modules based on MRP-MRP II systems generate production and replenishment decisions which must generally be replanned manually because transport planning is not considered to avoid stockouts. To date, this aspect has been covered mainly by safety stocks planning, planning lead times or the use of flexible materials lists.

We hypothesize that a new production technology, MRP IV, is required which integrates production planning and provisioning transport into the same model. This will avoid continuously replanning production decision making, cut transport costs, lower inventory levels and improve customer service levels. This article presents a conceptual model for MRP IV, which integrates decision making relating to materials planning, production resources capacities and transport in the supply chain for the purpose of avoiding suboptimal plans which, currently, are normally generated sequentially and independently.

The proposed conceptual model for MRP IV contemplates various inputs (which could be considered in generic MRP and provisioning transport planning models) that generate different outputs (e.g. MPS, planned ordering of raw materials, number of vehicles, routes and number of shipping units per vehicle, inventories and delayed demand at the end of each period) to achieve one objective or several objectives. After obtaining the outputs for the MRP IV model, their feasibility has to be evaluated. When outputs are infeasible, it is necessary to especially examine production and transport capacities, and to adjust them suitably before rerunning the MRP IV. On the other hand, if outputs are feasible, it is necessary to economically evaluate the solution obtained taking into consideration the different costs associated with the model. Moreover, the MRP IV model should include a period that reviews the transport network and the production system so that it can adapt to the various changes taking place in the environment.

**Keywords:** MRP, integration, production planning, transport planning

## Decision Making as a Theorem Proving Process

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### ABSTRACT

There are several methods and techniques to design a DSS (decision support system). A DSS is basically defined to be a computer-based tool to support business or organizational decision-making activities. An additional critical feature is to trust the result delivered by a DSS. These are the goals of a new approach which considers a decision making process as a kind of theorem proving system. We model this approach along what is achieved in the mechanization of mathematics. Also, we assume virtual knowledge communities (VKC) in the framework of multiagent systems. We outlined in a previous work that enterprises are modeled by their corporate knowledge represented by VKCs. The proposed methodology is based on a series of abstractions for each of the relevant concepts. A key one to import ideas from mathematical reasoning is ABIT: Abstraction Based Information Technology [1,2]. It states that in any field of knowledge, including humanities, knowledge can be thought of as a theory on which a control is exercised and is then imbedded in a computational environment. To make ideas simple, it is enough to think of a theory as a module of procedures. The second level of abstraction is closer to the implementation level. We define a semantic for knowledge bases as we do for programming languages. It relies on three concepts: type, operators and their properties. Types are the domains of validity of the knowledge. Operators are defined on types and bound to a given domain. Their properties characterize the functions of these operators. For business an example is a virtual enterprise (type). Operators can be partner search or contract writing while properties can restrict the profile of partners or the security issues in contract writing. This defines a semantic on knowledge.

Topological tools are being designed to bound types. Logical fibering enables to store and to filter grains of knowledge. Such tools deliver an approach to inter- and trans-disciplinarity. Because we build our method on VKCs, we also have a mean to design a new theory of cognitive trust. Its mechanism consists in the exchange and mixing of KBs. Instead of being based mainly on beliefs as usual it relies on semantics.

**Keywords:** Decision support, Knowledge abstraction, Mechanized reasoning, Trust.

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## **New Belief Functions based methods for multicriteria decision making**

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### **ABSTRACT**

Any decision is closely linked to the quality and availability of information. Innovative methodologies are proposed to help decisions based on imperfect information provided by more or less reliable and conflicting sources in uncertain context. These methods combine new uncertainty theories and multicriteria decision making.

The ER-MCDA methodology associates the Analytic Hierarchy Process (AHP), used as a conceptual analytical framework, fuzzy sets, possibility and belief function theories. DS<sub>m</sub>T-AHP replaces the initial AHP aggregation principles by a fusion process and introduces specific discounting factors able to make a difference between importance and reliability of criteria. Finally, COWA-ER is the newest method that allows multicriteria decision making under uncertainty. All these methods are fitting perfectly to the domain of expert assessment in the context of natural hazards in mountains. This paper proposes a synthesis of the principles of the methods developed and described in details in other specific papers.

**Keywords:** Multicriteria Decision making, Expert assessment, Information imperfection, Information fusion, belief function theory, Dempster-Shafer Theory, Dezert-Smarandache Theory, Fuzzy sets theory, Possibility theory,



## **A Regression Dependent Iterative Algorithm for Optimizing Top-K Selection in Simulation Query Language**

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### **ABSTRACT**

In this paper we propose an extension of the algorithm General Optimal Regression Budget Allocation Scheme (GORBASH) for iteratively optimizing simulation budget allocation while minimizing the total processing cost for top-k queries. We also implement this algorithm as part of SimQL: an extension of SQL that includes probability functions expressed through stochastic simulation.

**Keywords:** Decision-guidance management systems, stochastic simulation, uncertain data, optimal computation budget allocation, database languages, GORBASH.



## **Toward Online Optimization Through Preprocessing and Decomposition in Decision Guidance Query Language**

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### **ABSTRACT**

We consider optimization problems expressed in Decision Guidance Query Language that may involve linear arithmetic constraints, as well as finite domain and binary variables, and focus on a class of Multi-Stage Production problems in which only a part of the problem is dynamic, i.e., the demand for the output product in a manufacturing process, whereas the rest of the problem is static, i.e., the connectivity graph of the assembly processes and the cost functions of machines. We propose the online-decomposition algorithm (ODA) based on offline preprocessing that optimizes each static problem component for discretized values of shared constraint variables, and approximate the optimal aggregated utility functions. ODA uses the pre-processed approximated aggregated cost functions to decompose the original problem into smaller problems, and utilizes search heuristics for the combinatorial part of the problem based on the pre-processed look-up tables. We also conduct an initial experimental evaluation which shows that ODA, as compared with MILP, provides an order of magnitude improvement in terms of both computational time and the quality of found solutions for a class of problems for which pre-processing is possible.

## **Experts Collaboration for Wealth and Estate Planning Using the SEPlanS Platform**

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### **ABSTRACT**

When it comes to tax duties, Belgian fiscal authorities never forget a citizen. Not only that his revenues, whatever they are, are taxed along all his life but, when he dies, an important part of his assets is taken by the state as a death tax, to be paid by his heirs. Consequently, many Belgians are looking for strategies to minimize these taxes and are helped in this task by advisers who offer several forms of support, often consisting of investments or take actions being bought. However, wealth and estate planning is actually a very complicated and highly unstructured process. In this paper, we identify the profiles of the key players; present the SEPlanS platform and analyse how it can contribute to support collaboration among them.

**Keywords:** Decision Support, Collaboration Tool, Expert System, Wealth planning, Estate planning.

## Decision-making to Collective Action through System Dynamics Modelling and Simulation on Discussion Network

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### ABSTRACT

Social discussion network includes a wider arrange of topic scope, therefore, it could be determined usually according to the study of particular discussion issue along with the network. In recent years, the pace of urbanization process has been accelerating in Beijing. The government transforms collective land into state-owned to pursue comprehensive development and effective utilization of land through land reservation strategy. Meanwhile, the villagers attached to acquisition land need to migrate from rural area to urban area under the land reservation policy. According to the ongoing rural-urban migration event, the formation of social discussion network in the paper is defined as whether to exchange or consult migration information between villagers under the land reservation policy.

Based on the existing empirically relational data of whole network structure of information exchanging and decision-making influencing ties between villagers relating to rural-urban migration, the paper calls attention on two ways of simulating villagers making decisions to collective action in a system dynamics model. One approach is to built up the reinforcement process of collective action against migration that is an accumulation of individual decision-making to collective action until reaching an unanimous action. In this dimension, we summarize the parameters of exponential random model that would be appropriated to reflect a positive effect on action mobilization, although they might have different network diffusion mechanisms to incorporate individuals. The other approach is to capture the disaggregating propensity that villagers make decision to migrate instead of collective action. With regard to the outside influence-such as increasing compensation and improving welfare, it is defined as negative effect because it counterweights the wave of mobilizing collective action. It presumes that the cooperative behaviors would be declined with the intimacy contact with who has decided not to contribute on collective action and the increase of individual marginal benefits on deciding not to collective action.

As a result, the equilibrium point would be reached using the empirical findings about the migrant personal support network and the whole network structure to interpret the comparative role that network plays in decision making of collective action process.

**Keywords:** Decision-making, Collective Action, Discussion Network, System Dynamics

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## **Multi-Agents Model for Distributed Group Decision Support Systems**

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### **ABSTRACT**

The multi-agent system paradigm represents one of the most promising approaches to address decision making problems. Agents are designed to be autonomous problem-solvers, possibly communicating with other agents and users, and are therefore endowed with sufficient cognitive abilities to reason about a domain, make certain types of decisions themselves, and perform the associated actions.

In this paper, we propose a Distributed Group Decision Support System based on a Multi-agent architecture in which a facilitator and group decision makers are supported by agents. We have integrated agents into GDSS for the purpose of automating more tasks for the decision maker, enabling more indirect management, and requiring less direct manipulation of the DSS. Specifically, agents were used to collect information and generate alternatives that would allow the user to focus on solutions that were found to be significant.

The decision making process, applied to the boilers defects in an oil plant, relies on a cycle that includes recognition of the causes of a defect (diagnosis), plan actions to solve the incidences and, execution of the selected actions.

**Keywords:** Group Decision Support Systems, Multi-Agents Systems, Collaborative Decision Making



## **Collaborative Dynamic Decision Making: A B2B Supplier Selection case study**

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### **ABSTRACT**

The problem of supplier selection can be easily modeled as a multiple-criteria decision making (MCDM) problem: businesses express their preferences with respect to suppliers, which can then be ranked and selected. This approach has two major pitfalls: first, it does not consider a dynamic scenario, in which suppliers and their ratings are constantly changing; second, it only addressed the problem from the point of view of a single business, and cannot be easily applied when considering more than one business. To overcome these problems, we introduce a method for supplier selection that builds upon the dynamic MCDM framework of Campanella and Ribeiro [5] and, by means of a linear programming model, can be used in the case of multiple collaborating businesses planning their next batch of orders together.

## **Organizational knowledge to support project selection activities in the public administration**

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### **ABSTRACT**

An investigation was required to analyze how the departments of the Piedmont Region evaluate projects, programs, feasibility studies and all the other different requests of financing, from public or private proponents. NUVAL, the regional center for the evaluation and verification of the public investments, required this analysis with the aim of acquiring knowledge on the evaluation procedures and models the whole organization develops, to transfer elements of knowledge to the different units and then to improve the internal decision processes.

The investigation produced a map of the situation that was used to transfer indications and guide lines (on terminological definitions, structure of the processes, structure of the more frequently used models, procedures of criteria development and aggregation in global judgments) to the actors of the project selection process.

The investigation results could be easily used also to evaluate the performances of the involved institutional units, but this second type of result is 'delicate' and has to be used with a lot of attention.

In order to disseminate the results in the Region and to use them for the future, a decision support system was created, using a multi-criteria decision aiding method, ELECTRE Tri.

The DSS aims to support sectors, that have to introduce innovative procedures that finance projects, associating the innovative procedure to the most similar that had been developed in other sectors of the same organization and using knowledge and experiences that are present in the organization to develop the new procedure. The analysis and its results, in terms map and DSS, will be presented and discussed.

**Keywords:** Organizational knowledge, Decision Map, ELECTRE Tri

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## Ontology bridging Knowledge Management and Decision Making

\*  
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### ABSTRACT

This work introduces a cooperation research project, which focus at the promising intersection of Ontology and Knowledge Management (KM) and the role of both in Decision Making (DM) and consequently in Decision Support Systems (DSS). Apart from studying suitable methods, we aim at exploiting ontology and KM, via experimental case-studies, to allow both individuals and institutions to more easily distil knowledge from complexity and make policies and decisions using knowledge based processes.

Since we all know that *knowledge is constantly evolving and expanding* and that *knowledge is most likely the only thing that grows the more you share it*, it becomes unnecessary to justify the need of applying Knowledge Management principles to effectively administrate knowledge in its various forms and application areas. Within the scope of collaborative DSS, KM acts much beyond well designed IT models and properly stored information data. It deals with the intelligent interaction of people, teams and networks with processes and technology. Moreover, it is meant to help transform organisations to new levels of efficiency in DM and in operation scope, by properly capturing, storing, recovering and most importantly sharing and re-using key-knowledge across its application area.

It is well known that KM adds value to organisations in many different ways, namely: *Innovation* - via the introduction of innovative knowledge-based processes and products; *Collaboration* - via bringing improved knowledge and understanding through open and clear communication, as well expertise transfer; *Experience Learning* - via systematic re-use of knowledge to improve results; *Expertise Retention* - via prevention of tacit knowledge loss with staff retirements; and *Easy new Interaction* - enabled via fast training and operational knowledge transfer among the organisation staff. By incorporating also ontologies into KM approaches, we can bring those values to DSS solutions and therefore bridge the gap between KM and DM. This concept allows the development of decision support systems which combine knowledge through an integration between knowledge-based systems and ontologies, thus providing better results. In this research we also envisage tackling open questions like: *How decision making processes can be structured to take maximum advantage of knowledge*; and *How ontologies can be leveraged to help improve knowledge management and allow organisations to make better decisions*.

**Keywords:** Ontology, Knowledge Management, Decision Making, Decision Support Systems DSS

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## **Incorporating collective functions to multicriteria disaggregation – aggregation approaches for small group decision making**

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### **ABSTRACT**

Multicriteria Disaggregation – Aggregation (UTA\* and UTA II) approaches and the corresponding Decision Support Systems (DSS) MINORA and MIIDAS for discrete alternative actions lead to the construction of preference models (usually of additive value) based on Decision Makers (DMs) global preferences and the exploitation of linear programming techniques. DMs global preferences are expressed by rank-ordering (pre-ranking) of a subset of the alternative actions called reference set. This research work examines the incorporation of voting collective functions coming from theory of committees and elections to support the estimation of a global pre-ranking of the alternative actions in decision problems, where the opinion of many actors is required. In this work, Cook and Seiford, De Condorcet, Dodgson, Borda and Eigenvectors techniques were used in order to support the aggregation of DMs different individual preferences to a collective function, which leads to a total pre-ranking of the reference set. Also, a new software (Rankings Aggregation for Committees and Elections Subsystem - RACES) developed to support small group decision aid process, accompanying the MINORA system is presented and illustrated in this research work. RACES realizes the estimation of collective functions in small decision making group, including two more modules. The former concerns the control of the consistency of the total estimated rankings with the individual ones utilizing Kendall's  $\tau$  and the latter embodies voters' weights in order to be used in cases, where there is no equality of votes in the decision making process (Councils, Committees, etc). The above is illustrated through an example presenting the significant features of this new software.

**Keywords:** Multicriteria Decision Aid, Group Decision Making

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