Proceedings of the EURO Mini-Conference on Collaborative Decision Systems in Economics and in Complex Societal and Environmental Applications

EURO Mini-Conference on Collaborative Decision Systems in Economics and in Complex Societal and Environmental Applications

organised by:
EWG E-CUBE
EWG-DSS
EWG-MCSP
EWG-ORAFM

Graz, Austria
October 17-19th, 2013

http://eurominiconferencegraz2013.wordpress.com/

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EURO Mini-Conference Graz-2013

Proceedings

of the

EURO Mini-Conference Graz-2013

on

Collaborative Decision Systems in Economics and
in Complex Societal and Environmental Applications

Graz, Austria
October 17th - 19th, 2013

Editors:

U. Leopold-Wildburger, F. Dargam,
S. Pickl, D. DeTombe, L. Plá,
S. Liu, J. Hernández, B. Delibasic,
R. Ribeiro, P. Zaraté
EmC Graz-2013 Proceedings

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<td>EURO - The Association of European Operational Research Societies</td>
<td><a href="http://www.euro-online.org/">http://www.euro-online.org/</a></td>
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<tr>
<td>EWG-DSS - EURO Working Group on Decision Support Systems</td>
<td><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></td>
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<td>EWG-MCSP - EURO Working Group on Methodology for Complex Societal Problems</td>
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<td>EWG-ORAFM - EURO Working Group on OR in Agriculture and Forest Management</td>
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<td>Karl-Franzens University of Graz Institute of Statistics and Operations Research</td>
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<td>Institutional Support &amp; Sponsors</td>
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<tr>
<td>SimTech Simulation Technology, Austria (<a href="http://www.SimTechnology.com">http://www.SimTechnology.com</a>)</td>
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<tr>
<td>ILTC - Instituto de Lógica Filosofia e Teoria da Ciência, Brazil (<a href="http://www.iltc.br">http://www.iltc.br</a>)</td>
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<tr>
<td>Management School, University of Liverpool, UK (<a href="http://www.liv.ac.uk/management/">http://www.liv.ac.uk/management/</a>)</td>
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<td>IRIT Institut de Research en Informatique de Toulouse, France (<a href="http://www.irit.fr/">http://www.irit.fr/</a>)</td>
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<td>UNINOVA - CA3 - Computational Intelligence Research Group (<a href="http://www.uninova.pt/ca3/">www.uninova.pt/ca3/</a>)</td>
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<td>School of Management, University of Plymouth, UK (<a href="http://www.plymouth.ac.uk/">http://www.plymouth.ac.uk/</a>)</td>
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<td>University of Macedonia, Thessaloniki, Greece. (<a href="http://www.uom.gr/">http://www.uom.gr/</a>)</td>
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## Institutional Support & Sponsors

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<td>Universität der Bundeswehr München, Germany</td>
<td><a href="http://www.unibw.de/">Website</a></td>
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<td>ÖGOR</td>
<td>Austrian Society of Operations Research <a href="http://www.oegor.at/">Website</a></td>
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<td>Lumina Decision Systems</td>
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<td>Simio</td>
<td>Forward Thinking</td>
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<td>BANXIA software</td>
<td>Arena</td>
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<td>GRAZ</td>
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University of Graz – Welcome Notes

**Welcoming Words from the Rector of the University of Graz: Univ.-Prof. Dr. Christa Neuper**

“The University of Graz is happy to host the EURO Mini-Conference 2013 and warmly welcomes the Association of European Operational Research Societies with its interdisciplinary Working Groups. I thank the organizers for their commitment. I am sure the conference will be an important contribution to the promotion of Operational Research throughout Europe. At the University of Graz, Operational Research, integrated in the Faculty of Business, Social and Economic Sciences, enjoys a high reputation and is embedded in a world-wide international network. May the EURO Mini-Conference 2013 provide further stimulation of the discipline and offer a forum for many fruitful discussions”.

**Welcoming Words from the Dean of the School of Business, Economics and Social Sciences of the University of Graz: Univ.-Prof. Dr. Thomas Foscht**

“On behalf of the School of Business, Economics and Social Sciences I welcome you to the EURO Mini-Conference 2013. Operational Research is an important and well established research area at our School located in the department of Statistics and Operations Research, which built a stellar reputation in the last decades. The organization of the EURO Mini-Conference this year in Graz is another milestone in this development. I hope the conference will offer you a good basis for academic discussions and the exchange of ideas. Special thanks go to the faculty and staff of the department without whom this conference would not have been possible”.

---

EURO Mini-Conference Graz-2013
The EmC Graz-2013 Organizing Committee

Local Arrangements & Organization:

**Univ.-Prof. Dr. Ulrike Leopold-Wildburger**
Institut für Statistik und Operations Research
KarlFranzens-Universität Graz
ReSoWi Zentrum, Universitätsstraße 15/E3
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E-mail: ulrike.leopold@uni-graz.at

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E-mail: F.Dargam@SimTechnology.com

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**Mag. Dipl. Ing. Gerald Senarclens de Grancy**
Institut für Produktion und Logistik
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**Mr. Karl Meister**
KarlFranzens-Universität Graz
E-mail: karl.meister@uni-graz.at

Conference Homepage & Updates:
SimTech Simulation Technology, [www.SimTechnology.com](http://www.SimTechnology.com)
EURO Working Group on Decision Support Systems

**EWG-DSS Coordination Board:**

Dr. Fátima C.C. Dargam  
SimTech Simulation Technology, Austria  
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Prof. Dr. Shaofeng Liu  
University of Plymouth, UK  
E-Mail: shaofeng.liu@plymouth.ac.uk

EURO Working Group on European Experimental Economics

**EWG E-CUBE**

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Universität der Bundeswehr München, Germany  
E-mail: stefan.pickl@unibw.de

Univ.-Prof. Dr. Ulrike Leopold-Wildburger  
Institut für Statistik und Operations Research  
Karl-Franzens-Universität Graz, Austria  
E-mail: ulrike.leopold@uni-graz.at
EURO Working Group on Methods for Complex Societal Problems

**EWG-MCSP**

Prof. Dr. Dorien J. DeTombe  
International Research Society on Methodology of Societal Complexity  
P.O. Box. 3286, 1001 AB Amsterdam, The Netherlands  
E-Mail: DeTombe@nosmo.nl

EURO Working Group on OR in Agriculture and Forest Management

**EWG-ORAFM**

Dr. Lluis M. Plá  
University of Lleida / Mathematics, Spain  
E-Mail: Impla@matematica.udl.es
The EmC Graz-2013 Program Committee

Adiel Teixeira de Almeida – GPSID - Federal University of Pernambuco, Brazil
Arleta Rasmussen - University of Graz, Austria
Alex Brodsky - George Mason University, USA
Alexis Tsoukiás - University Paris Dauphine, France
Alfons Oude Lansink - Wageningen University (WAU), Netherlands
Ana Respício - CIO - University of Lisbon, Portugal
Anders Kristensen - University of Copenhagen, Denmark
Andrew Higgins – CSIRO, Australia
Antoinette J. Muntjewerff - Faculty of Law - University of Amsterdam, Netherlands
Antonio Rodrigues - CIO - University of Lisbon, Portugal
Boris Delibashi - University of Belgrade, Faculty of Organizational Sciences, Serbia
Carlos Romero - Politechnic University of Madrid (UPM), Spain
Cor van Dijkum - Utrecht University, Netherlands
Csaba Csaki - University College Cork, Ireland
Dorien DeTombe – Int. Research Soc. on Methodology of Societal Complexity, Netherlands
Dragana Becejski-Vujaklija - University of Belgrade, Fac. of Organizational Sciences, Serbia
Fatima Dargam - ILTC, Brazil / SimTech Simulation Technology, Austria
Kathrin Kirchner - University of Jena, Germany
Isabelle Linden - University of Namur, Belgium
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Jason Papathanasiou - University of Macedonia, Greece
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João Lourenço - Technical University of Lisbon, Portugal
João Paulo Costa – University of Coimbra, Portugal
Jorge Freire de Souza - Faculty of Engineering / University of Porto, Portugal
Jorge Hernandez - University of Liverpool, UK
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Lluis Plá - University of Lleida, Spain
Manfred Gronalt - University of Natural Resources and Life Sciences (BOKU), Austria
Marko Bohanec - Jožef Stefan Institute, Slovenia
Nadia Papamichail - University of Manchester, Business School, UK
Nikolaos Matsatsinis - Technical University of Crete, Greece
Pascale Zaraté - University of Toulouse, France
Peter Keenan - University College Dublin, Ireland
Rita Ribeiro - UNINOVA, Portugal
Rudolf Vetschera - University of Vienna, Austria
Shaofeng Liu - University of Plymouth, UK
Stefan Pickl - Universität Bundeswehr München, Germany
Stephen G. Taylor - Champlain Regional College, Canada
Ulrike Leopold-Wildburger - University of Graz, Austria
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<th>Time</th>
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<tbody>
<tr>
<td>09:00</td>
<td>Registration / Distribution of Conference Material</td>
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<td></td>
<td>EmC Graz-2013 Registration Desk</td>
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<td></td>
<td>Karl-Franzens University of Graz, ReSoWi Building</td>
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<td></td>
<td>Universitätsstr. 15, 8010 Graz</td>
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<td></td>
<td>ReSoWi Building - Lecture Room 15.04, Ground Floor, Wing E</td>
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<tr>
<td>9:30</td>
<td>Session 1 - EmC Graz-2013 - Conference Opening</td>
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<tr>
<td></td>
<td>ReSoWi Building - Lecture Room 15.04, Ground Floor, Wing E</td>
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<tr>
<td>09:30-10:00</td>
<td>Welcome by Univ.-Prof. Dr. Peter Scherrer</td>
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<td></td>
<td>Vice-Rector of the University of Graz, Austria.</td>
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<td>On behalf of Univ.-Prof. Dr. Christa Neuper</td>
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<td></td>
<td>Rector of the University of Graz, Austria</td>
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<td>Welcome by Prof. Dr. Thomas Foscht</td>
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<td>Dean of the Faculty for Economics &amp; Social Sciences, University of</td>
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<td>Graz, Austria</td>
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<td></td>
<td>Welcome by the representatives of the EURO Working Groups</td>
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<td>(EWG-E.CUBE, EWG-DSS, EWG-MCSP, EWG-ORAFM) &amp; Announcements</td>
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<td>Chairs: Local Organizers Ulrike Leopold-Wildburger &amp; Fátima Dargam</td>
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<tr>
<td>10:00–12:00</td>
<td>Sessions 2 &amp; 3 - Special Talks</td>
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<td>- Lecture Room 15.04, Ground Floor, Wing E</td>
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<tr>
<td>10:00-10:45</td>
<td>Invited Talk by Jakob Krarup</td>
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<td></td>
<td>Professor Emeritus of the Department of Computer Science of the</td>
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<td>University of Copenhagen, Denmark</td>
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<td>Chair: Ulrike Leopold-Wildburger</td>
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<tr>
<td>10:45-11:00</td>
<td>Coffee Break served at the hall of the Lecture Room 15.04</td>
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<tr>
<td>11:00-11:45</td>
<td>Invited Talk by Rita Ribeiro</td>
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<td>Professor at CA3, UNINOVA, Portugal</td>
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<td>Chair: Fátima Dargam</td>
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<tr>
<td>Time</td>
<td>Session 4 - Invited Talk - Lecture Room 15.04, Ground Floor, Wing E</td>
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<tr>
<td>11:45</td>
<td>“Rapid Designs, Scenarios and Schedules with Simio”</td>
</tr>
<tr>
<td></td>
<td>Chair: Jason Papathanasiou</td>
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<tr>
<td>12:30-14:00</td>
<td>Lunch – Mensa - University Restaurant</td>
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<tr>
<th>Time</th>
<th>Session 5 - Special Talk - Conference Room 15.22 (G2), 2nd. Floor, Wing G</th>
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<tbody>
<tr>
<td>14:00</td>
<td>“The multiple dimensions of negotiations: A unified approach”</td>
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<td></td>
<td>Invited Talk by Rudolf Vetschera</td>
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<td></td>
<td>Professor at the University of Vienna, Austria. Department of Business Administration / Division of Organization and Planning</td>
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<td>Chair: Pascale Zarâte</td>
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<tr>
<td>14:45-15:00</td>
<td>Coffee Break served at the hall of Room 15.22 (G2), 2nd. Floor, Wing G</td>
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<tr>
<th>Time</th>
<th>Session DSS-06 - Room 15.22 (G2), 2nd. Floor, Wing G</th>
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<tbody>
<tr>
<td>15:00</td>
<td>&quot;A Decision Support System for Solving Linear Programming Problems&quot;</td>
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<td>Nikolaos Ploskas, Nikolaos Samaras and Jason Papathanasiou</td>
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<tr>
<td>15:00-15:20</td>
<td>EmCG-2013-DSS-01</td>
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<tr>
<td>Time</td>
<td>Room 15.22 (G2) 2nd. Floor, Wing G</td>
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<tr>
<td>15:20-15:40</td>
<td>EmCG-2013-DSS-02 &quot;Modeling the macroprudential oversight process: A supply chain perspective&quot; Peter Sarlin and Henrik Nyman</td>
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<td>15:40-16:00</td>
<td>EmCG-2013-DSS-03 &quot;Consumers attitude to good (or bad) depending on the degree of its non-privacy&quot; Andrejs Jaunzems and Normunds Norkuss</td>
</tr>
<tr>
<td>16:00-16:20</td>
<td>EmCG-2013-DSS-04 &quot;Expert knowledge and decision support system to help a power distributor plan its call center&quot; Thárcylla Clemente, Jadielson Moura, Adiel Almeida-Filho, Ana Paula Gusmão, Ana Paula Costa and Adiel T. de Almeida</td>
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<tr>
<td>Time</td>
<td>Session 7 - Special Talk - Conference Room 15.22 (G2), 2nd. Floor, Wing G</td>
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</tbody>
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| 16:40-17:00 | EmCG-2013-DSS-06  
"An integrated approach to support decision makers in shaping problems and reducing uncertainties in complex projects"  
Maria Franca Norese, Diana Rolando and Elena Fregonara |
|          | EmCG-2013-MCSP-06  
"Demand dynamics of construction materials in Europe - Lessons learned: Combination of resource and knowledge management as a contribution to successful decision making and investment plans"  
Mimoza Allaraj and Susanne Lind-Braucher |
|          | EmCG-2013-ECUBE-06  
"Empirical study on bullying"  
Nina Bialowas |
| 17:00    | Session 7 - Special Talk - Conference Room 15.22 (G2), 2nd. Floor, Wing G |
| 17:00-17:50 | “Complexity is more than complicated. Investigating, simulating and handling complexity: a challenge for system dynamics” |
| Room G2  | Invited Talk by Cor van Dijkum  
Professor at Utrecht University, Department of Methodology and Statistics / Faculty of Social Sciences & Sokrates Consultancy and Engineering, The Netherlands |
|          | Chair: Dorien DeTombe |

**Day 1**  
Thursday, October 17th, 2013 – Social Event

**EmC Graz-2013 Reception at the Orangerie - Grazer Burggarten**  
Hofgasse, 8010 Graz

18:30

Hosted and sponsored by Land Steiermark, the Government of Styria, Austria.
## The EURO Mini-Conference Graz-2013 – Program

<table>
<thead>
<tr>
<th>Day 2 Morning</th>
<th>Friday, October 18(^{th}), 2013</th>
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<tbody>
<tr>
<td><strong>Session 8</strong></td>
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<tr>
<td><strong>Session 8 - Invited Talk</strong></td>
<td>Conference Room 15.22 (G2), 2(^{nd}). Floor, Wing G</td>
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<tr>
<td>Invited Talk by Marion Sabine Rauner</td>
<td>Professor at the University of Vienna, Austria. School of Business, Economics, and Statistics, Department of Business Administration</td>
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<tr>
<td>Chair: Ulrike Leopold-Wildburger</td>
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| **Session 9** | 9:50-10:30 |
| Room G2 | Room 15.35 (G2) 3\(^{rd}\). Floor, Wing E |
| **Parallel Sessions** | |
| 9:50-10:30 | |
| Session DSS-09 | Session E-CUBE-09 |
| Chair: Fátima Dargam | Chair: Alexandra Rausch |

| 9:50-10:10 | EmCG-2013-DSS-07 |
| EmCG-2013-DSS-07 | EmCG-2013-ECUBE-07 |
| “A DSS User is a Happy Negotiator: The Impact of Decision Support on the Dynamics of Emotional Expressions in Text-Based Online Negotiations” | “Residual income measurement & the emergence of cooperation: Results of an agent-based simulation of budget coordination” |
| Patrick Hippmann | Stephan Leitner and Doris A. Behrens |

<p>| 10:10-10:30 | EmCG-2013-DSS-08 |
| EmCG-2013-ECUBE-08 | EmCG-2013-ECUBE-08 |
| “On the use of a Multicriteria Decision Support Tool to Evaluate Green Economy in the State of Rio de Janeiro” | “Vehicle Routing Problems with Time Windows and Multiple Service Workers - A Systematic Comparison between two Metaheuristics” |
| João Climaco and Rogério Valle | Gerald Senarclens de Grancy and Marc Reimann |</p>
<table>
<thead>
<tr>
<th>Time</th>
<th>Session 10 Parallel Sessions</th>
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<tr>
<td>10:30-10:40</td>
<td><strong>Coffee Break</strong> - Halls of Room 15.22, 2nd Floor (G) &amp; Room 15.35, 3rd Floor (E)</td>
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<tr>
<td>10:40-11:40</td>
<td><strong>Session DSS-10</strong> Chair: Pascale Zaraté</td>
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<td><strong>Session ORAFM-10</strong> Chair: Manfred Gronalt</td>
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<td><strong>Session E-CUBE-10</strong> Chair: Stefan Palan</td>
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</tbody>
</table>
| 10:40-11:00  | EmCG-2013-DSS-09 “Relevance of formal education for ensuring food safety – current situation and future perspectives” Ande
|              | rj Ovca, Mojca Jevšnik and Peter Raspor                                                   |
|              | EmCG-2013-ORAFM-01 “On decomposition—coordination methods for the generation of Pareto points for complex systems” Alar Leibak and Otu Vaarmann |
|              | EmCG-2013-ECUBE-09 “It’s about how the task is set – The inclusion and exclusion effect in pre-processing management information” Alexander Rausch and Alexander Brauneis |
| 11:00-11:20  | EmCG-2013-DSS-10 “A Conceptual Model of Senior Executives’ Information Behaviour” Olga Dolgorukova |
|              | EmCG-2013-ORAFM-02 “Selecting an efficient woodchips supply chain strategy in organized small-scale forestry with a simulation-based AHP-TOPSIS approach” Christian Trinks |
|              | EmCG-2013-ECUBE-10 “Merit norms in the ultimatum game. An experimental study of the effect of merit on individual behavior and aggregate outcomes” Jürgen Fleiß |
| 11:20-11:40  | EmCG-2013-DSS-11 “Knowledge Management and Business Intelligence relationship in the cloud” Ana Pajic and Dragana Becejski-Vujaklija |
|              | EmCG-2013-ORAFM-03 “Landowner decisions and public access rights to privately owned land” Jussi Uusivuori |
|              | EmCG-2013-ECUBE-11 “The effects of honesty and social preferences on reporting behavior” Arleta Rasmußen and Ulrike Leopold-Wildburger |
| 11:40        | **Session 11 - Special Talk** - Conference Room 15.22 (G2), 2nd Floor, Wing G               |
| 11:40-12:30  | “Replicating forest owner behavior in Decision Support Systems: 2 examples of programming formulatio
|              | ns”                                                                                         |
|              | Invited Talk by Ljusk Ola Eriksson                                                        |
|              | Professor at the Department of Forest Resource Management & Forest Planning of the Swedish University of Agricultural Sciences, Sweden |
|              | **Chair**: Manfred Gronalt                                                                  |

EURO Mini-Conference Graz-2013 XV
<table>
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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>12:30-14:00</td>
<td>Lunch – Mensa - University Restaurant ReSoWi Building, First Floor</td>
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<tr>
<td>14:10</td>
<td><strong>Session 12 - Invited Talk</strong> - Conference Room 15.22 (G2), 2nd. Floor, Wing G</td>
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<tr>
<td><strong>Session 12</strong></td>
<td><strong>Web-Presentation on “COST: a pan-European science and technology network”</strong></td>
</tr>
<tr>
<td>14:10-14:50</td>
<td>by Prof Tatiana Kovacikova, Head of Science Operations from the COST Office. COST: European Cooperation in Science and Technology Chair: Jason Papathanasiou</td>
</tr>
<tr>
<td><strong>Room G2</strong></td>
<td>Room G2 2nd. Floor, Wing G</td>
</tr>
<tr>
<td>14:50-15:50</td>
<td><strong>Session 13 Parallel Sessions</strong></td>
</tr>
</tbody>
</table>
| 14:50-15:10| EmCG-2013-DSS-12  
"The Use of Modulo Risk Manager™ Integrated With Social Networks as a Collaborative Decision Support System for the World Youth Day – Rio2013"  
Paulo Dargam and Bettina Federici |
| 15.10-15.30| EmCG-2013-ORAFM-04  
"The box assignment problem in log yards"  
Maria Anna Huka, Jörn B. Rathke and Manfred Gronalt |
| 15.30-15.50| EmCG-2013-ECUBE-14  
"Reciprocity as an Individual Difference"  
Kurt A. Ackermann, Jürgen Fleiß and Ryan O. Murphy |
| 14.50-15.10| EmCG-2013-DSS-13  
"Negotiation Support System: An Approach to Making Use of Negotiators’ Personal Traits in the Negotiation Process"  
Jadielson Moura and Ana Paula Costa |
| 15.10-15.30| EmCG-2013-ORAFM-05  
"DEA models for the analysis of efficiency of agricultural farms"  
Iryna Deineko and Victor Podinovski |
| 15.30-15.50| EmCG-2013-ECUBE-14  
"Applications of the Inverse Infection Problem on banking data"  
András Bóta, András Csernenszky, Gyula Kovács, Miklós Krész and András Pluhár |
| 14.50-15.10| EmCG-2013-DSS-14  
"A framework for the measurement and reduction of user-perceivable complexity of group decision-making methods"  
Andrej Bregar |
| 15.10-15.30| EmCG-2013-ORAFM-06  
"Quantifying Urban Sprawl using Land Use Data"  
Miriam Steurer and Caroline Bayr |
| 15.30-15.50| EmCG-2013-ECUBE-14  
"Multi-Criteria Analysis of Local Economic Development Issues: Evidence from Serbia"  
Jelena Stankovic, Nikola Makojevic and Milan Randjelovic |
<table>
<thead>
<tr>
<th>Day 2</th>
<th>Friday, October 18\textsuperscript{th}, 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:50-16:00</td>
<td>\textbf{Coffee Break} served at the hall of Room 15.22 (G2), 2\textsuperscript{nd}. Floor, Wing G</td>
</tr>
<tr>
<td>16:00</td>
<td>\textbf{Session 14 - Invited Talk} - Conference Room 15.22 (G2), 2\textsuperscript{nd}. Floor, Wing G</td>
</tr>
</tbody>
</table>

\textbf{Session 14}  
16:00-16:30  
Room G2  
Web-Seminar on “Exploring Lower Carbon Futures for the Automobile in the USA with ATEAM”  
by Dr. Max Henrion, Chief Executive Officer, Lumina Decision Systems, Inc.  
Chair: Jason Papathanasiou

<table>
<thead>
<tr>
<th>Day 2</th>
<th>Friday, October 18\textsuperscript{th}, 2013 – Social Events</th>
</tr>
</thead>
</table>
| 17.00 | \textbf{EmC Graz.2013 Reception at Graz City-Hall}  
Rathaus, Hauptplatz, A-8010 Graz |

Sponsored and hosted by the Mayor of Graz, Mag. Siegfried Nagl.

| 19:00 | \textbf{EmC Graz.2013 Special Event:}  
Candle Walking Tour through Eggenberg Castle |

Participants joining this event will take Tram Nr.1 together with the organizers from the Hauptplatz to Eggenberg and then back.
### Day 3 Morning

**Saturday, October 19th, 2013**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session 15 - Special Talk - Conference Room 15.22 (G2), 2nd. Floor, Wing G</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00</td>
<td>Invited Talk by Herman Maurer (Professor of Informatics, Graz University of Technology, Austria)</td>
</tr>
<tr>
<td></td>
<td><em>“Long range predictions are still more difficult than is usually assumed”</em></td>
</tr>
<tr>
<td></td>
<td>Chair: Ulrike Leopold-Wildburger</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Time</th>
<th>Coffee Break served at the hall of Room 15.22 (G2), 2nd. Floor, Wing G</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:00-11:15</td>
<td>Web-Seminar about HORIZON 2020: The EU Framework Programme for Research and Innovation</td>
</tr>
<tr>
<td></td>
<td>Chairs: Jason Papathanasiou &amp; Fatima Dargam</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Prizes Award Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00-12:15</td>
<td>Best papers presented in this EURO Mini-Conference will be awarded with free licenses of the softwares:</td>
</tr>
<tr>
<td></td>
<td>• “Simio Enterprise Edition”, sponsored by Simio (<a href="http://www.simio.com">http://www.simio.com</a>);</td>
</tr>
<tr>
<td></td>
<td>• “Analytica”, sponsored by Lumina Decision Systems, Inc. (<a href="http://www.lumina.com">www.lumina.com</a>).</td>
</tr>
<tr>
<td></td>
<td>Chairs: Representatives of the EURO Working Groups (EWG-E.CUBE, EWG-DSS, EWG-MCSP, EWG-ORAFM)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Official Closing Session by the representatives of the EURO Working Groups (EWG-E.CUBE, EWG-DSS, EWG-MCSP, EWG-ORAFM) &amp; Announcement about the Post-Publication Special Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:15-12:30</td>
<td>Thanks &amp; Good-Bye by the Organizers</td>
</tr>
</tbody>
</table>
Notes from the Organizers

The EURO Mini-Conference on “Collaborative Decision Systems in Economics and in Complex Societal and Environmental Applications” is jointly organized by the EURO Working Groups on Decision Support Systems (EWG-DSS); Experimental Economics (EWG-E-CUBE), the EURO Working Group on Methodology for Complex Societal Problems (MCSP) and the EURO Working Group on OR in Agriculture and Forest Management (ORAFM), in cooperation with the Institute of Statistics and Operations Research of the Karl-Franzens Universität Graz in Austria, during the period of October 17th to 19th, 2013.

The purpose of this EURO Mini Conference is to bring together researchers in the areas of Decision Support Systems, Operations Research, Methodology of Societal Complexity and their respective areas of applications. Due to its interdisciplinary flavour, this conference brings together researchers of the areas of Decision Sciences, Operations Research, Economics, Societal Complexity, Environmental Management and their respective fields of applications. Collaborative Decision Systems in the areas of Economics, Societal and Environmental Applications.

The EURO Mini Conference Graz-2013 counts with 4 Streams, namely: Stream of Decision Support Systems (chaired by the EWG-DSS); Stream of Experimental Economics (chaired by the EWG E-CUBE); Stream of Complex Societal Problems (chaired by the EWG-MCSP); and Stream of OR in Agriculture and Forest Management (chaired by the EWG-ORAFM).

For the organization of this Mini-Conference we had the honor to count with the support of the Coordinator of the EWG E-CUBE: Ulrike Leopold-Wildburger, Professor of the Institute of Statistics and Operations Research of the University of Graz, to bring this event to scene. Prof. Ulrike Leopold-Wildburger enabled us to organize this Mini-Conference in Graz, the second-largest city in Austria and the best preserved medieval city in Central Europe. Graz charmingly combines a longstanding historical tradition with the young flair of an university town. As members of the EURO Working Groups and of the Organizing Committee of this Conference, we are extremely grateful to all the local arrangements and support received from her and from her University team.

The EURO Mini Conference Graz-2013 has attracted the participation and the interest of many decision science professionals. It received a total of 44 research contributions, from which a selection is presented in 4 Streams. Additionally, it counts with 7 special talks, one sponsor invited talk and 3 web-seminars from sponsors and EC project funding platforms. The special talks were presented by Jakob Krarup, Professor Emeritus of the Department of Computer Science of the University of Copenhagen, about the topic "On the Origins of OR and its Institutions"; Rudolf Vetschera, Professor at the University of Vienna, Austria, Department of Business Administration / Organization and Planning, about: "The multiple dimensions of negotiations: A unified approach"; Rita A. Ribeiro, Professor at CA3, UNINOVA, Portugal, about the topic "Dynamic Multi-criteria Decision Making (MCDM):
A framework"; Cor van Dijkum, Professor at Utrecht University, Department of Methodology and Statistics / Faculty of Social Sciences & Sokrates Consultancy and Engineering, The Netherlands, about: "Complexity is more than complicated. Investigating, simulating and handling complexity: a challenge for system dynamics"; Marion Sabine Rauner, Professor at the University of Vienna, School of Business, Economics, and Statistics, Department of Business Administration, Austria, about: "Prevention of Occupational Injuries at the General Accident Insurance Institution (AUVA): Design and Application of Decision Support Systems for Predicting Subsequent Costs from 2001 to 2011"; Ljusk Ola Eriksson, Professor at the Department of Forest Resource Management & Forest Planning of the Swedish University of Agricultural Sciences, Sweden, about: "Replicating forest owner behavior in Decision Support Systems: 2 examples of programming formulations"; and Hermann Maurer, Professor of Informatics, Graz University of Technology, Austria, with the talk about "Long range predictions are still more difficult than is usually assumed". We would like to acknowledge the interest and cooperation of all the authors and invited speakers who submitted their research work for presentation in this conference.

Taking into consideration the high quality of the special talks and the whole program of this event, it can be observed that the conference developed a research agenda that identified key challenges to be explored as new approaches and tools for future collaborative decision making, including the use of web resources, dynamic spatial-temporal decision making, and technical and social aspects of web-based decision processes, mainly in the areas of Economics and Complex Societal and Environmental Applications.

Another highlight of the conference’s organization was the reviewing support received by the Program Committee Members, who themselves are mid or long-term members of the four EURO Working Groups involved in the organization. The reviewing process was planned to be performed in a concise and fast way, so that authors could count with the referees’ evaluation not only to help them to finalize their full papers to be submitted to the Journal Special Issues promoted by this event, but also to improve their presentations. We have managed to achieve our reviewing goals without delays, thanks to our engaged team of reviewers. We are very grateful to all of them, for their constructive feedback and prompt cooperation. Thanks!

Thanks to our sponsors and to the efforts of Jason Papathanasiou from EWG-DSS, who was responsible to contact them, the following licenses of Simulation and DSS-related software packages were sorted among the participants as prizes for best papers, during the EURO Mini Conference Graz-2013: ♦ 1 License of Analytica, sponsored by Lumina (http://www.lumina.com/); ♦ 1 Full academic license of Decision Explorer, sponsored by Banxia (http://www.banxia.com/); ♦ 1 License of Arena, sponsored by Rockwell Automation (http://www.arenasimulation.com/); and ♦ 3 Licenses of Simio Enterprise Edition, sponsored by Simio (http://www.simio.com). We are extremely thankful to those sponsors, for their trust in our research community, and we hope that the prize winners will be able to develop further high quality work using the tools they have received.

Last, but not least, we wish to express here our deep gratitude to EURO for their trust on the DSS, E-CUBE, MSCP and ORAFM Working Groups to organize this Mini-Conference and for their financial support directed to it. Special thanks go to Ulrike Leopold-Wildburger, and Fátima Dargam, for their great job in locally organizing this event in Graz. We are extremely grateful to all the local arrangements, local sponsors, and help received from them and their teams. We also wish to thank Stefan Pickl (from E-CUBE) and all the coordination members of the EURO Working Groups involved in this joint conference organization for their support. Many Thanks!

We hope you all enjoy Graz and the Conference!

The EURO Mini-Conference Graz-2013 Organizing Committee

Notes from the Organizers XX
EURO Mini Conference Graz Organizing Committee:

EWG-DSS Coordination Board: Pascale Zaraté, Fátima Dargam, Jorge Hernández, Boris Delibasic, Shaofeng Liu
EWG-E.CUBE Coordination Board: Ulrike Leopold-Wildburger, Stefan Pickl
EWG-MCSP Coordination Contact: Dorien DeTombe
EWG-ORAFM Coordination Contact: Lluis Plá

EWG E-CUBE: http://www.euro-online.org/web/ewg/22/
EWG-DSS: http://www.euro-online.org/web/ewg/10/
EWG-MCSP: http://www.euro-online.org/web/ewg/19/
EWG-ORAFM: http://www.euro-online.org/web/ewg/26/
EURO Mini Conference Homepage: http://eurominiconferencegraz2013.wordpress.com/
EURO Mini-Conference on
“Collaborative Decision Systems in Economics and in Complex Societal and Environmental Applications”
October 17th-19th, 2013. Graz, Austria

Decision Support Systems
About the EWG-DSS

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.

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 230 members coming from various nationalities. There has also been established quiet 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, Fátima Dargam and Rita Ribeiro. Since the beginning of 2011, the EWG-DSS Managing Board counts with the assistance of other three Board Members, namely: Jorge Hernández; Boris Delibašić; and Shaofeng Liu. From 2013 onwards, the board will count with two extra members: Isabelle Linden and Jason
Papathanasious to better administrate the activities of the group, as well as to bring new ideas to it.

The EWG-DSS in the EURO Mini-Conference Graz-2013

The growing demand for specific approaches of decision making and decision support, keeps us aware of the importance of frequently getting in contact with professionals and colleagues, working in the area within a cooperative environment. In the 2013 - EURO Mini-Conference in Graz, the EWG-DSS Stream particularly focuses on the research advances in the field of Decision Sciences for meeting the challenges of paradigm shift in decision making and decision support brought by recent developments of Web 2.0 and 3.0 technologies.

In this conference the exchange of new ideas involving topics like: Decision-Making using Social Networks and Web Resources; Spatial-temporal Web-based Decision-Making; Group Support Systems; Distributed, Collaborative Decision Making; Web 2.0 Systems for Decision Support; Spatial-temporal Decision Support Systems; Knowledge Management & Resource Discovery for Decision Making; among others, has been strongly encouraged.

For more details about the EWG-DSS organized events and publications, check the homepage: http://ewgdss.wordpress.com/.
EWG-DSS Coordination Board

Pascale Zaraté  (Coordinator) IRIT / Toulouse University, France
Fátima Dargam  (Coordinator) SimTech Simulation Technology / ILTC, Austria
Rita Ribeiro  (Board Chair) UNINOVA - CA3, Portugal
Jorge Hernández  (Board Assistant) University of Liverpool, UK
Boris Delibasic  (Board Assistant) University of Belgrade, Serbia
Shaofeng Liu  (Board Assistant) University of Plymouth, UK

EWG-DSS EURO Homepage - EWG-DSS Blog - EWG-DSS LinkedIn - EWG-DSS IRIT Server

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, please send an e-mail to: 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=&gid=1961459&trk=anet_ug_grppro

Thanks for your interest!
The EWG-DSS Coordination Board
The EWG-E CUBE is a Working Group on European Experimental Economics within EURO, the Association of the European Operational Research Societies. The EWG-E CUBE was founded during the EURO Conference in Budapest in 2000 with the help of the former EURO President, Professor Jakob Krarup from Denmark.

The main purpose of the EWG-E CUBE is to establish a platform for encouraging state-of-the-art high quality research and collaboration work within the academic community using the tool of experimental and behavioural studies. Further on, we want to exchange information among economics, business people and psychologists all our experience about behaviour of human beings.

The E-CUBE in the EURO Mini-Conference Graz-2013

In the EURO Mini-Conference Graz-2013, the general plan of the EWG E-CUBE is to bring together researchers from the field of Experimental Economics and related disciplines like business administration, behavioral sciences, and Operations Research. The main topics of the contributions of the EWG E-CUBE Stream relate to the current "Methodologies and Applications in Experimental Economics". Furthermore, we want to announce that we intend to edit a special issue of the Central European Journal of Operations Research, covering the Stream of the EWG-E.CUBE.

This Mini-Conference joint event with the EURO Working Groups of Decision Support Systems (EWG-DSS); Experimental Economics (EWG E-CUBE), Methodology for Complex Societal Problems (MCSP) and OR in Agriculture and Forest Management (ORAFM), started its preparations a bit more than a year ago, during the EURO Conference in Vilnius in 2012. The organizing idea has been fulfilled with the support of EURO and the local support of the University of Graz and we are very happy about it.

As the hosts of this event in Austria, we want to welcome all participants in Graz, especially at the Karl Franzens University and in particular at the Faculty of Social Sciences and Economics. We hope that you will have an exciting stay in Graz and we wish you a pleasant conference!

For more details about the EWG E-CUBE, check the homepage: http://www.euro-online.org/web/ewg/22/

Notes from the Organizers

XXV
Joining the EWG E-CUBE

The European Working Group E-Cube membership does not cost you anything. If you wish to join the E-Cube Group on Experimental Economics, all you have to do is send an e-mail to Ulrike Leopold-Wildburger (ulrike.leopold@uni-graz.at), with the following information: Name; Affiliation; Mailing Address; Phone; e-mail; and personal Homepage (if available).

Thanks for your interest!
The EWG E-CUBE Coordination Board
EURO Mini-Conference on
“Collaborative Decision Systems in Economics and in Complex Societal and Environmental Applications”
October 17th-19th, 2013. Graz, Austria

The EWG-MCSP is a Working Group on Methodology of Societal Complexity within EURO, the Association of the European Operational Research Societies. The main purpose of the EWG-MCSP is to establish a platform for encouraging state-of-the-art of high quality research and collaboration work within the MCSP community.

The subject of Methodology Societal Complexity

Methodology of Handling Complex Societal Issues focuses on methods and tools for analyzing, structuring, guiding and evaluating complex societal problems. Complex societal problems are policy problems that can occur in many fields, like in the Agro-industry (Mad-Cow disease, BSE; Foot- and Mouth disease; Fowl Plague), in the transportation sector, in healthcare (Malaria, HIV/AIDS, Flu), in Water affairs and in economy (credit crisis). The field addresses local safety problems like large city issues, natural disasters as flood and hurricanes and global safety problems like war, terrorism. Although many of these issues have different causes, they have so much in common that they can be approached in the same way.

Complex societal problems are unstructured, dynamical and constantly changing problems. They have an impact on macro, meso and on micro level of the society. Handling complex societal problems needs a special multi-disciplinary approach. The content knowledge comes from content experts. The process knowledge comes from facilitators. The power is in the hand of actors. The facilitator use methods specially created for the field of societal problems combined with methods and insights derived from mono-disciplinary fields like medicine, law, economics, societal sciences, methodology, mathematics, computer sciences, technology, engineering sciences, chaos theory and operational research combined with content knowledge of the problem. Often a combination of methods is needed. In this way the field of societal complexity uses all kind of methods from social sciences and operational research. The attention of the research group EWG-MCSP is on the methods and tools facilitators need for supporting these kinds of problems.

Handling societal problems in an interdisciplinary way has become a must for our society and a challenge for the human sciences. The problems society is confronted with are difficult to handle. There is a growing gap between the complexity of these problems and the human capacity to deal with them. There is a need for better methods and tools, more knowledge and imagination. Scientific knowledge is needed to survive amidst these...
problems. Combining the effort of scientists who are working in this field is an inspiring serious challenge from the perspective of a number of disciplines. Combining existing knowledge and creating new insights with methods and tools for supporting complex societal problems is a challenge for scientists from different fields.

The EWG-MSCP work close together with the International Society on Methodology of Societal Complexity, which has departments in Africa, Asia, South-America, North-America and Europe.

The goal of the Research Groups on Methodology for Complex Societal Problems is to increase and to combine the available scientific knowledge regarding the handling of complex societal problems. Means to reach this goal are organizing workshops and conferences, publishing articles and books in which the discussion on this subject can take place. The number of members of the research group is steadily growing. The members of the research groups come from different fields and are working at universities and research institutes all over the world. There is a high degree of activity and interaction amongst the members of the group.

The EWG-MCSP in the EURO Mini-Conference Graz-2013

The field of Methodology of Societal Complexity focus on decision making in large organisations and in politics. Decision making is one moment in the problem handling process from awareness to evaluation of the interventions. However before the decision making can be fruitful one has to define the problem. The Methodology of Societal Complexity emphasize that complex societal problems should be handled by groups of people. Experts of different fields can make a (simulation) model of the problem and actors, who have the power, can support the decisions. Both groups are included in the decision making process for finding interventions.

At the EURO Mini-Conference Graz-2013 the EWG-MSCP will discuss the contributions on the subject of decision making on complex societal problems.

For more details about the EWG-MCSP, check the homepages: http://www.euro-online.org/web/ewg/19/ and www.complexitycourse.org/doriendetombe.html.

EWG-MCSP Coordination Board

Dorien DeTombe < DeTombe@nosmo.nl > Founder of the MSCP

- Prof. Dr. Dorien J. DeTombe, Chair EWG Methodology of Societal Complexity, Operational Research Society / Greenhill & Waterfront International Scientific Research Institute, The Netherlands
- Prof. Dr. Cathal Brugha, University College, Ireland
- Prof. Dr. Dick Duke, Michigan University, USA
- Prof. Dr. Cor van Dijkum, Utrecht University, Department of Social Sciences, The Netherlands
- Prof. Dr. Annette Hohenberger, Middle East Technical University, METU-ODTU, Faculty of Social Sciences. Ankara, Turkey
- Prof. Dr. Ludmila Koshlai, Glushkov Institute of Cybernetics, Department of Mathematical Cybernetics Kiev, Oekrain
- Ass. Prof. Mr. Dr. Antoinette Muntjewerff, University of Amsterdam, Faculty of Law, The Netherlands
- Prof. Dr. Elmar Stuhler, University of Munich, Germany
- Prof. Dr. Steve Taylor, University of Concordia, Canada
- Prof. Dr. Marjan Vezjak, University of Ljubljana, Slovenian
- Honorary Coordinator Prof. dr. Gerhard-Wilhelm Weber, Institute of Applied Mathematics, METU-ODTU, Ankara, Turkey
Joining the EWG-MCSP

The European Working Group MCSP membership is free. For joining the EWG-MCSP Group on Methodology for Complex Societal Problems, all you have to do is send an e-mail to Dorien DeTombe (DeTombe@nosmo.nl), with the following information: Name; Affiliation; Mailing Address; Phone; e-mail; and personal Homepage (if available).

[www.complexitycourse.org/doriendetombe.html](http://www.complexitycourse.org/doriendetombe.html)

Thanks for your interest!
The EWG-MCSP Coordination Board
EURO Mini-Conference on
“Collaborative Decision Systems in Economics and in Complex Societal and Environmental Applications”
October 17th-19th, 2013. Graz, Austria

OR in Agriculture and Forest Management
About the EWG-ORAFM

As declared by the EURO Council, the main purpose of the EWG's is to encourage communication and research between small groups of members specialising in particular topics. The WG is open to people with different backgrounds (like industry, university, etc) and who are interested on OR methods and its application in Agriculture and Forest Management in order to exchange ideas, experiences and research results. In this context, we invite everyone interested in this topic to join us.

The group started in 2003 with approximately 40 members from different countries. Soon afterwards, the first meeting of the WG was held in September 2004 at Silsoe Research Institute (UK). The number of members has been increased since then and now we are more than 150. People belong mainly to EU countries but we have also a significant representation from America and Asia. The full list of members is shown at the webpage of the group (www.orafm.org).

The next meeting of the group, the seventh one of the WG will be held in Lleida (Spain), in July 2014. Furthermore, a Summer Institute in July 2014 (soon after the IFORS Conference) is being prepared with the support of EURO (More info: http://orafm.udl.cat/?page_id=233)

The EWG-ORAFM in EURO Mini-Conference Graz-2013

Many OR models are being developed for Agriculture and Forest Management and the most practical way to deliver them to potential users is by a DSS. People involved in such kind of projects need of interdisciplinarity and exchange between researchers with different background. In the 2013 - EURO Mini-Conference in Graz, the EWG-ORAFM Stream particularly focuses on the research advances in the field of Sustainability, Experimental Economics, Decision Sciences developed or applied to Agriculture and Forest management.

In this conference the exchange of new ideas involving topics like: Decision-Making using Collaborating or Multicriteria decision methods, sustainability, DEA methods, assignment and allocation models for Agriculture and Forestry and how these developments can be embedded into handful and useful DSS for the sector, has been strongly encouraged.

For more details about the EWG-ORAFM, check the homepage: www.orafm.org
Joining the EWG-ORAFM

The European Working Group ORAFM membership does not cost you anything. If you wish to join the EWG-ORAFM Group on OR in Agriculture and Forest Management, all you have to do is send an e-mail to Lluis Plá <mpla@matematica.udl.es>, with the following information: **Name; Affiliation; Mailing Address; Phone; e-mail; and personal Homepage (if available).**

Thanks for your interest!
The EWG-ORAFM Coordination Board
EmC Graz-2013 – Special Talks

Jakob Krarup
Professor Emeritus of the Department of Computer Science of the University of Copenhagen, Denmark

Talk: “On the Origins of OR and its Institutions”

Rita A. Ribeiro
Professor at CA3, UNINOVA, Portugal


Rudolf Vetschera
Professor at the University of Vienna, Austria, Department of Business Administration / Organization and Planning

Talk: “The multiple dimensions of negotiations: A unified approach”
**EmC Graz-2013 – Special Talks**

**Cor van Dijkum**
Professor at Utrecht University, Department of Methodology and Statistics / Faculty of Social Sciences & Sokrates Consultancy and Engineering, The Netherlands

**Talk:** “Complexity is more than complicated. Investigating, simulating and handling complexity: a challenge for system dynamics”

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**Marion Sabine Rauner**
Professor at the University of Vienna, Austria. School of Business, Economics, and Statistics, Department of Business Administration

**Talk:** “Prevention of Occupational Injuries at the General Accident Insurance Institution (AUVA): Design and Application of Decision Support Systems for Predicting Subsequent Costs from 2001 to 2011”

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**Ljusk Ola Eriksson**
Professor at the Department of Forest Resource Management & Forest Planning of the Swedish University of Agricultural Sciences, Sweden

**Talk:** “Replicating forest owner behavior in Decision Support Systems: 2 examples of programming formulations”

---

**Hermann Maurer**
Professor of Informatics, Graz University of Technology, Austria

**Talk:** “Long range predictions are still more difficult than is usually assumed”
Invited Talk

On the Origins of OR and its Institutions *

Prof. Emeritus, D.Sc. & h.c. Jakob Krarup
DIKU, Dept. of C.S., University of Copenhagen
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Operational Research (OR) is the science of decision-making. From its military origin on the eve of World War II, OR has over the past seven decades matured to become a discipline that is recognised worldwide for its contributions to managerial planning and complex operations on all levels within both private companies and public institutions. Besides being an indispensable tool as a means of decision support, OR is today a well-established academic discipline and a field with its own institutions. Thus, OR-professionals are joined in national societies worldwide, assembled since 1959 in the global organization International Federation of OR Societies (IFORS) which again is subdivided into four Regional Groupings. Among those is the Association of European OR Societies (EURO) having as members the national societies of 32 countries notably in Europe. Two questions will be addressed: “What is OR all about?” and “How do national OR societies fit within the frameworks of IFORS and EURO?” Partial answers will be provided to both.

Invited Talk

Dynamic Multi-criteria Decision Making (MCDM): A framework

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The classic multiple-criteria decision making (MCDM) model assumes that, when taking a decision, the decision maker has a pre-defined fixed set of criteria and is presented with a clear picture of all available alternatives. The task then reduces to computing the score of each alternative, thus producing a ranking, and choosing the one that maximizes this value. However, most real-world decisions take place in a dynamic environment, where the final decision is only taken at the end of some exploratory process. Exploration of the problem is often beneficial, in that it may unveil previously unconsidered alternatives or criteria, as well as render some of them unnecessary.

In this paper we introduce a flexible framework for dynamic MCDM, based on the classic model, which can be applied to any dynamic decision process. Some illustrative applications, from business-to-business to selecting the best place for landing spacecraft in very diverse fields, will be presented to highlight the framework versatility.
Invited Talk

The multiple dimensions of negotiations: A unified approach

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Like all forms of social interactions and collective decision making, negotiations involve several distinct layers at which the parties involved interact. First, negotiations are conducted to resolve a substantive problem, so negotiators make proposals how to resolve this problem and exchange offers describing various aspects of a solution. These offers can be evaluated quantitatively by mapping them onto utility values of both parties. But negotiation strategies and tactics involve more than offers. Negotiators exchange information about their positions and priorities, which might be correct or strategically distorted, they might use threats or exhibit empathy with their counterparts. All these communication acts not only influence the immediate, substantial outcome of negotiations, but also have an impact on the long term relationship between parties. Finally, there is another, hidden level beyond the manifest content of communication acts (like information requests or explanations), the level of emotions which are consciously or unconsciously transmitted through the communication between the negotiators. All these levels of interaction take place in face to face negotiations, but they are also present in negotiations carried out via electronic media, which are at the focus of the research presented here.

In this paper, we first introduce a general method to analyze negotiation processes, the Standardized Interpolated Path Analysis (SIPA). SIPA maps different negotiation processes (e.g. from different negotiations carried out in the context of a larger experiment) onto a standardized time frame and thus makes them comparable and makes aggregation across processes possible. In contrast to other methods (which e.g. considered distinct phases of negotiations), SIPA considers negotiations as continuous time processes, of which individual offers or messages are just observations at different points in time.

We illustrate the application of SIPA to the various levels of negotiations in an exemplary empirical study. Using data from one online negotiation experiment, we first describe the methods used to measure the different levels of negotiation processes, and then show some results that can be obtained by applying SIPA to negotiation data at these levels.
Invited Talk

Complexity is more than complicated. Investigating, simulating and handling complexity: a challenge for system dynamics

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Social scientists realized in the last decennia, inspired by colleagues in the natural sciences, that many phenomena in the social world can be viewed as complex social systems (Dijkum 1997, DeTombe1996). Through systems theory one recognizes that events are interrelated, interact with each other and make up systems. With dynamic systems theory one understand that social systems evolve in time, moved by cause-effect relations between events that can be described mathematically in differential equations. With the idea of ‘complex social systems’ one comprehend that those differential equations are non linear, reflecting systems that are difficult to follow and predict, just as many phenomena in the world. It is the start of a promising program of research in the social sciences including system dynamics.

However progress in science is slow, the concept of complexity does not fit the logic of many social scientists and therefore the tendency is to leave the difficult parts out. Phenomena are described as complex when there are: many actors, a lot of interdependencies between actors, many influencing variables, several cause-effect relations, multiple values to take care. One aspect is then most of the times missing: the non linear feedback relations between variables to be expressed in non linear differential equations. A reason for this omission: understanding non linear differential equations seemed to exceed human cognitive capacity (Sterman 1994). But with advances in non linear mathematics, faster computers and more sophisticated software this is no more excuse. Some researchers from system dynamics take this updated challenge serious (Groesser 2011).

However mathematical concepts to understand the logic of non linear patterns such as Lyapunov exponents (Verhulst 1996) are hardly to be found in system dynamics literature. Here, there is a world to win. Another striking feature is that the verification and the falsification of (non linear) models is most of the times absent. An argument for this is that the usual quantitative method of validation of models is not well suited for the many variables and feedback models of system dynamics (Barlas 1996). But times are changing. It is realised (Barlas 2007) that quantitative validation is to be paired with qualitative validation, that is pattern recognition. Examples how to do this are given, in simple and more advanced ways (Zouwen 2001, Dijkum 2008, 2013) illustrated by real life examples.
**Keywords:** Methodology; System Dynamics; Complex Systems; Non-linear Differential Equation; Lyapunov Exponent; Qualitative Validation; Quantitative Validation.

**References:**


Invited Talk


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ABSTRACT

Shrinking budgets and decreasing economic growth force accident insurance institutions to focus on cost reduction programs as well as on prevention measures. For this reason, sophisticated decision support systems (DSS) were developed from 2001 to 2011 by a scientific team under the lead of ao.Univ.-Prof. Dr. Marion Rauner from the University of Vienna, Austria for the General Accident Insurance Institution (Allgemeine Unfallversicherung, AUVA), the largest of the four Austrian accident insurance institutions [1-5]. These DSS covered the following three main aspects for the policy makers at AUVA.

First, complex calculation schemes predicted the occupational accident costs on an individual case basis for the AUVA. Beside the prediction of short-term costs directly related to an individual occupational accident case, long-term subsequent costs were forecasted for each case even until beyond his/her death.

Second, a further analysis of these costs allowed for defining risk groups which was

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essential to derive prevention programs and their corresponding budgets. Among others, occupational accidents directly at the working place enforced the utilization of personal protective equipment. High costs for travel accidents to and from the working place disclosed high-risk areas and the need of suitable prevention programs.

Third, the project team revealed possible improvements in collecting and structuring data for the AUVA’s Data Warehouse which then could lead to a more comprehensive forecasting of subsequent occupational accident costs and disclosure of related risk-groups.

Beyond the focus on AUVA interests, the project team integrated two other main aspects that were affected by occupational accidents. On the one hand, occupational accident costs such as legally defined continued remuneration or loss in productivity were incurred for the companies where the casualties were working. On the other hand, the whole economy had to bear external costs in form of loss of productivity for professional/non-professional work and sickness benefit paid for casualties.

**Keywords:** Decision Support System, Occupational Injuries, General Accident Insurance Institution (AVUA), Subsequent Cost Prediction, Prevention Programs, Resource Allocation

**References:**

Replicating forest owner behavior in Decision Support Systems: 2 examples of programming formulations

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Forestry is an essential branch of the economy in many countries; it is of major importance for preserving biodiversity and is of great value to many people for recreation or for just by being there. It could play an important part in mastering climate change through carbon sequestration and forest fuel substitution. Almost everything we do to our forests has long term implications, affects often large areas and involves multiple stakeholders and different policy areas. It is no surprise that policy makers and forest owners have turned to Decision Support Systems (DSS), to grapple with this complexity. Since the 60’s numerous systems, of varying sophistication and scope, have been created and applied, and with some success. (In the semantic wikipedia created by the COST network project FORSYS you will find about 60 of those systems; see www.forestdss.org.)

An analysis of the forest would normally start with a strategic, or long-term, analysis. It would stretch in time at least one rotation of the forest, in many cases some 50 to 100 years. Given the freedom you would expect for a strategic analysis and the long time frame, it is obvious that the number of different options are innumerable and their consequences multidimensional and uncertain. Two different areas of DSS application can be distinguished for strategic analysis. One concerns policies, typically initiated by governments or regional authorities. The other concerns management strategies of a forest, typically (but not necessarily) the concern of the forest owner. In the former case the search is for regulations, subsidies or other policy instruments that could motivate the forest owners and managers to pursue forest management in agreement with societal objectives, whereas the latter analysis is directed towards finding the best way of managing the forest from owner perspective.

Even though both analyses aim at a purposeful management of the forest they differ in their basic assumptions. The policy analysis must take forest owner/manager behavior into account. Instead, the forest owner can often assume full control, which makes the problem more a matter of finding an optimal solution to a management problem. There is no surprise, then, that policy analysts much more often use DSS that in some way simulate the system, accounting for forest owner behavior (more often implicitly than explicitly) than DSS that is aimed at optimization, and forest owners use DSS with optimizers.
It is, however, not a self-evident that policy analysts would use simulating (or “what-if”) DSS even if you want to take account of the fact that forest owners span a broad array of behaviors and objectives. My presentation will give two examples of forest policy analysis where the socio-ecological system is turned into an optimization problem. In one, the diversity of interests (and constraints) among forest owners is reflected by the entropy of the system. In the other, some known global in- and outputs from the forest system are taken as the basis for describing the system. In both approaches there is a basic assumption of forest owner rationality which drives the system within the set properties of the system.
Invited Talk

Long range predictions are still more difficult than is usually assumed

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It is easy to understand that predictions about future developments for the next 10-20 years are essential, if we want to make the right decisions on important matters, like public vs. private traffic, and in each case using what kind of energy? Or what are the subjects that we should teach at school to 8 year olds that will still be relevant when they leave their university with a Bachelor degree 15 years later? That long range predictions are difficult is usually attributed to the fact that "developments are happening very fast and it seems even at accelerating speed". In this talk we will show a number of much deeper reasons, why predictions in most cases are indeed not just hard, but impossible. Some of the reasons are very surprising, and shed a light on how we think, and how we have to change our thinking to at least grasp a bit of what is going to happen. Surprisingly, it also turns out that some reasons show the weaknesses of our information age and how knowing this, we can become better in handling complicated situations and negotiations. If this sounds all a bit vague, it is, and it is vague on purpose: the speaker wants to surprise everyone in the audience a few times by presenting concrete samples and does not want to give away some of the highlights in this abstract.

* If you have not heard the speaker before on the same topic in the last two years, you will get a free bottle of Austrian wine if you are not surprised by some of the examples given by the speaker.
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Rapid Designs, Scenarios and Schedules with Simio

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Find out why leading companies and universities worldwide are converting to Simio. This talk will describe some of the innovations that allow rapidly solving even complex problems. Simio includes a powerful object-based modeling and integrated 3D animation system with patented process logic that allows you to customize objects and achieve unprecedented flexibility without writing Java or proprietary user code. Simio also extends simulation capabilities into daily operational support to reduce risk and costs by analyzing your schedules in ways never before possible. Explore the Simio academic grants and on-line resources that let faculty and students use and learn Simio at no cost.
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Exploring Lower Carbon Futures for the Automobile in the USA with ATEAM

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Automobiles generate over 40% of the USA’s greenhouse gas emissions today. How might the USA best reduce these emissions and its dependence on oil? Should it focus on expanding its use of biofuels, natural gas, electric vehicles, or hydrogen fuel cells? How far can simple improvements in vehicle efficiency make a difference? Or changes in driving patterns and consumer preferences for large vehicles? ATEAM (Analytica Transportation Energy Assessment Model) is an agile decision support model designed to support rapid interactive exploration of policy scenarios. It models the light-duty and heavy-duty vehicle fleets in the US using a wide variety of fuels and technologies. It projects the effects of fuel and electricity costs, fuel infrastructure, and consumer preferences. It helps users explore the effects of a variety of assumptions and uncertainties about technology, economics, and environmental impacts.

I will illustrate use of ATEAM to explore a variety of policy questions. I will also discuss how this kind of agile decision support can be used by multiple stakeholders to illuminate areas of agreement and controversy, and so develop deeper insights and shared understanding of this complex dynamic system.
ABSTRACTS
The EmC Graz-2013 – List of Referees

Adiel Teixeira de Almeida – GPSID - Federal University of Pernambuco, Brazil
Arleta Rasmußen - University of Graz, Austria
Alexis Tsoukiàs - University Paris Dauphine, France
Ana Respício - CIO - University of Lisbon, Portugal
Anders Kristensen - University of Copenhagen, Denmark
Andrew Higgins – CSIRO, Australia
Boris Delibašić - University of Belgrade, Faculty of Organizational Sciences, Serbia
Cor van Dijkum - Utrecht University, Netherlands
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Fatima Dargam - ILTC, Brazil / SimTech Simulation Technology, Austria
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Shaofeng Liu - University of Plymouth, UK
Stefan Pickl - Universität Bundeswehr München, Germany
Stephen G. Taylor - Champlain Regional College, Canada
Ulrike Leopold - University of Graz, Austria
Abstracts of the EWG-DSS Stream on Decision Support Systems
A Decision Support System for Solving Linear Programming Problems

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ABSTRACT

Linear programming algorithms have been widely used in Decision Support Systems. Decision Support Systems for real world applications, i.e. supplier selection, forest management, energy planning, resource allocation etc., have already been proposed. These systems have incorporated linear programming algorithms for the solution of the given problems. Yet, the special structure of each linear problem may take advantage of different linear programming algorithms or different techniques used in these algorithms.

In this paper, we propose a web-based Decision Support System that assists decision makers in the solution of linear programming problems with a variety of linear programming algorithms and techniques. Two linear programming algorithms have been included in the Decision Support System: (i) revised simplex method and (ii) exterior primal simplex algorithm. Furthermore, a variety of different techniques have been implemented for each step of the algorithms. Ten scaling techniques, five basis update methods and eight pivoting rules have been incorporated in the Decision Support System. The decision maker can either select the desired algorithm and the appropriate methods to solve a linear programming problem or perform a computational study with all combinations of algorithms and methods in order to export a detailed report.

All linear programming algorithms and methods have been implemented using MATLAB and converted to Java classes using MATLAB Builder JA, while the web interface of the DSS has been designed using Java Server Pages.

Keywords: Decision Making, Web-based Decision Support Systems, Linear Programming, Revised Simplex Method, Exterior Primal Simplex Algorithm.
ABSTRACT

The current financial crisis has highlighted the importance of a system-wide, or macroprudential, approach to safeguarding financial stability, rather than one being only concerned with the stability of individual financial institutions. Macroprudential oversight can be viewed as a process, which is characterized by vast amounts of data, inherent complexities related to temporal and cross-sectional dimensions, decision-making based upon numerical methods and expert judgment, and a few central parties orchestrating an interconnected system of entities. However, the characteristics of the macroprudential oversight process are not unique; commercial firms face challenges of similar nature in their day-to-day operations. Activities that firms use to manage these complexities have in the past few decades been referred to as supply chain (SC) management. SC management deals with the management of large amounts of complex information to allow for informed decision-making. Typically, there is a focal company in the supply network that acts as a central node, assimilating data from a large number of partners in the network.

To adapt to needs set forth by the transition to a system-wide perspective, we apply practices and concepts describing how firms orchestrate their SCs in a macroprudential context. In this vein, this paper presents the macroprudential supply chain. The macroprudential oversight process, as described in Figure 1, comprises the following tasks: risk identification, risk assessment and risk communication, as well as the assessment and implementation of policies. While being relatively well-defined, the tasks involve a number of uncertainties and limitations that challenge the functioning of the process at large. In particular, the lack of accurate, complete, frequent and timely data, challenges in moving from systemic risk measurement to policy implementations, and the high degree of dependence between and within the tasks in the process. SC management is a broad concept, encompassing all the activities involved in serving an end-customer. The co-ordination of activities, so that disperse processes performed by many different partners in the chain act as one seamless process, is an interesting aspect from our perspective. Typically, this is achieved by ensuring a high degree of transparency in the processes, with timely and accurate data frequently being exchanged. Just as any work activity, or process, within a company requires interaction on a continuous basis, efficient SC management requires parties from different companies working together with a mutual understanding of what the process entails, a shared goal, and a clear division of work. To start with, this paper first documents through event-driven process modeling the macroprudential oversight process, including activities and their inputs and outputs. This also involves defining the responsible entity for each activity. With this description at hand, we can not only better analyze the process, but also tap into established SC practices in industry to gain an understanding of how the process can potentially be improved. This is exemplified by a case study on Europe.
Consumers attitude to good (or bad) depending on the degree of its non-privacy

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ABSTRACT

Many economists believe that competition helps to achieve optimum balance, and maintaining the competition is not only a criterion for economic growth but also a matter of a sound social order. However, a deeper analysis of socioeconomic reality pushes to revise verities of neoclassical microeconomics and to recognize the failure of a perfect competition market paradigm. Authors believe that one of the factors causing the failure of a perfect competition market is failing to understand and to utilize the unique properties of public goods and public bads that are researched in this paper. Undoubtedly, the socioeconomic significance of social goods has not been studied enough, and the possibilities of putting them to use in order to increase the population’s welfare are not being fully utilized. In an extended interpretation, economic effect can be gained from goods that have only one of the qualities characterizing public goods – nonrivalry. Goods having such quality we are going to call nonprivate goods. Authors consider that use of methodology given in article is suitable for arrangement for production of nonprivate good or elimination of nonprivate bads. Also authors consider that consumer’s attitude changes depending on the extent of privacy of these goods. The article provides a definition of indicator for consumers of nonprivate goods, as well as the definition of fundamental value of the nonprivate goods. An example shows the calculation of fundamental value of public goods produced by Talsi region municipality. Studies of scholastic and scientific literature, method transferring and modifications, studies of municipality documents, inquiries, methods of financial mathematics and mathematical statistics were used in order to carry out the research.

Keywords: Municipality, Nonprivate good, Nonprivate bad, Indicator of consumer quantity, Fundamental value of asset

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Expert knowledge and decision support system to help a power distributor plan its call center

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ABSTRACT

Sizing the capacity of a call center is a well known problem. However, in some cases there are regulatory aspects that must be observed that combined with specificities of the service provided and how it operates affects the manner of the process for forecasting the inbound call rate and decisions on sizing capacity. This paper presents a real problem relating to several electric power distributors in Brazil regulated by ANEEL (the Brazilian regulatory agency for electric power companies). Amongst the available data, this kind of call center is affected by commercial actions, debt collection actions, billing activities, the health of the state of the distribution network and maintenance activities, which are not integrated and planned together. Considering the dynamics on the company cash flow these factors may change and adversely affect the demands on the call center. Thus in this article, a description is given of how experts’ knowledge has been integrated so as to improve the forecast of incoming calls and the decision process regarding a model to evaluate the sizing of this type of call center in order to comply with regulatory requirements for this service.

Keywords: Expert Knowledge, Electric Power Distribution, Call Center.
Decision Support System for Sanitary Teams Activities

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ABSTRACT

We describe the information system that has been built for the support sanitary teams. The system is aimed at supporting analytical work which must be carried out when there is a risk of epidemic outbreak. It is meant to provide tools for predicting the size of an epidemic on the basis of the actual data collected during its course. Since sanitary teams try to control the size of the epidemics such a tool must model also sanitary teams activities. As a result a model for the prediction can be quite complicated in terms of the number of equations it contains. Furthermore, since a model is based on several parameters there must be a tool for finding these parameters on the basis on the actual data corresponding to the epidemic evolution. The paper describes the proposition of such a system. It presents, in some details, the main components of the system. In particular, the environment for building complex models (containing not only the epidemic model but also activities of sanitary teams trying to inhibit the epidemic) is discussed. Then, the module for a model calibration is presented. The module is a part of server for solving optimal control problems and can be accessed via Internet. Finally, we show how optimal control problems can be constructed with the aim of the efficient epidemic management. Some optimal control problems related to that issue are discussed and numerical results of its solution are presented.

Keywords: Epidemic models, Forrester’s models of sanitary activities, Model calibration, Optimal management of sanitary activities.
An integrated approach to support decision makers in shaping problems and reducing uncertainties in complex projects

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ABSTRACT

The decisions that have to be made and the uncertainties associated with complex public projects are often unclear during the preliminary phases, as well as the responsibilities of the stakeholders to be involved in the decision process are frequently misunderstood. (per un non italiano dire che non si sa bene quali attori vanno coinvolti è incomprensibile, però non so se la modifica è coerente con ciò che volevi dire)

The most important and urgent strategic decisions need to be identified and shared by all the stakeholders at the early design stages, pointing out some alternative or complementary actions finalized to reduce the uncertainties that make the decision of the project difficult or impossible.

Frequently formal methods and procedures are applied to support and justify both technical solutions and political decisions, but without having a clear, complete and unambiguous framework of the project context, in terms of actual role and approach to the problem of the involved organizations, state and reliability of the available knowledge and information, nature of the required decisions and structure of the decision context.

For this reason, crucial elements could be left out or not appropriately taken in consideration and the results could be obvious or useless, even if tools, methods or systems have been correctly and accurately applied.

In case of complex projects specific tools should be applied, in order to better define and clarify specific aspects related to the project, and combined in an integrated way with other operational tools.

In the present paper, the Strategic Choice Approach (SCA) (1,2) is applied and integrated with methods from different disciplines and research fields, moving from a localization problem related to a complex public project in the Turin Province, in Italy.

SCA, that is proposed in (3) as a method for complex and unstructured decision problems, is a methodology that supports collaborative decision makers to shape decision problems, design and compare solutions and control uncertainties, with the support of the SW tool STRAD.

After a brief description of the main problem structure and the very tricky political context, the attention is focused on specific uncertainties and decision problems highlighted during the SCA application. In particular, the future end-users typology analysis is deepened, as well as all those aspects - and related choices - concerning the end-user/tourist profiles, such as, for example, the preferences regarding free-time activities, the willingness to pay, or to move in...
order to reach some tourist attractions, and so on.
A general overview of the methods that can be used to analyze the potential demand is proposed, in order to have a clear framework of how tools and methods can be applied in interaction with SCA, to support collaborative or not so collaborative decision makers.
A SCA simulative application, in relation to a real project but pointing out the positive synergy that an integrated use of different methods could offer to a group of decision makers, is presented in the paper, as a proposal of effective decision support system when the context is complicated or unclear and collaboration between actors is not obviously present but has to be constructed.

**Keywords:** Strategic Choice Approach, Group Decision Support Systems, Problem structuring, Demand analysis, risks and uncertainties, Multicriteria analysis.

**References:**
A DSS User is a Happy Negotiator: The Impact of Decision Support on the Dynamics of Emotional Expressions in Text-Based Online Negotiations

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ABSTRACT

Decision support systems (DSSs) can have positive impacts on the entire negotiation process as well as its outcome. Research in this area, however, is predominantly focused on analytical or rational aspects, which leaves socio-emotional characteristics aside [1]. This lack of attention to the “soft” aspects of negotiations parallels the early days of research on computer-mediated communication, and is unfortunate since it disregards central driving forces of any negotiation encounter [2].

The present research addresses the gap of knowledge in this area by investigating the impacts of a DSS on the emotional behaviors of negotiators in dyadic text-based electronic negotiations. For this purpose, a multi-level model of emotional dynamics is introduced, in order to assess the impacts of the DSS on emotional expressions from an inter-personal, intra-personal, collective, and temporal level of analysis. Further, these emotional dynamics are analyzed with respect to negotiation success or failure. For the elicitation of emotions multidimensional scaling was employed. The resulting emotional dimensions can be interpreted in line with dimensional models of emotions [3].

One interesting result is that, in successful negotiations, negotiators express more high-activated positive emotions (e.g. enthusiastic or elated) over time when supplied with a DSS, but more low-activated positive emotions (e.g. calm or relaxed) over time when not having a DSS at their disposal. Not providing a DSS in failed negotiations leads to the decline of expressions of positive emotions over time, which is not observed for the DSS group. Thus, one conclusion is that having a DSS available makes negotiators happier, even if negotiations fail. This may further benefit repeated negotiation encounters with the same opponent.

Keywords: Emotion, Dynamic, Negotiation, Decision Support System, Text-Based

References:
On the use of a Multicriteria Decision Support Tool to Evaluate Green Economy in the State of Rio de Janeiro

by

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Abstract

In this paper we make a methodological discussion on the analysis of a case study referred to the Rio de Janeiro Green Economy Evaluation Level. The used methodology is based on a dashboard of economic, environmental and social dimensions. The aggregation is done using an interactive implementation of a non-compensatory procedure, avoiding the use of weights.

1. Introduction

Rio de Janeiro commissioned a methodology for measuring the State’s Green Economy level. Economic, social and environmental aspects were prioritized and potential performance partial indicators were identified concerning the most representative industrial sectors. The final set of partial indicators was based on the available databases, allowing to measure the multidimensional performance of each industrial sector. It was decided not to aggregate the set of partial indicators into a single Green Economy Index. For each partial indicator, thresholds were defined determining the tolerance range in the classification of industries performance. The aggregation among the dimensions, looking for a global classification of the industrial sectors, was done utilizing an interactive version of the conjunctive method. The SABILOC - MAT 1.0 package enables a clear communication among all the actors involved in the process. A dashboard was built enabling a simple and interactive sensitivity analysis. In this communication, we outline the interactive implementation of the conjunctive method (SABILOC - MAT 1.0 package), and we present and discuss its use in the above referred to case study.
Relevance of formal education for ensuring food safety – current situation and future perspectives

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ABSTRACT

Food safety is of crucial importance to the consumer, the food industry, and the economy. People are and will be responsible for the implementation of any food safety management practice/system, the effectiveness of which relies on employees having the appropriate knowledge, attitude and skills. Today we are faced with insufficient knowledge and awareness of food safety issues among food handlers, restricted only to certain work tasks within food business operators, without any general overview. On the other side, we have insufficiently informed consumers, lacking knowledge of food safety principles at home, as a consequence of incorrect food safety concepts being passed from generation to generation, and insufficient formal education. Although the responsibility of food business operators in the field of education and training of their employees is today higher than in the past, this has not led to improvements of food safety, especially in small and medium-sized food enterprises where, among other factors, high employee turnover is an issue. Additionally, contents related to food safety principles are reduced at the primary level of formal education, which is a necessary basis to acquire food safety principals. Furthermore, on the vocational and tertiary levels, there is no continuation of food safety contents if an individual is not enrolled in programmes oriented towards food handling. The purpose of this contribution is, therefore, to briefly emphasize public health and the economic burden of ineffective food safety management, to elucidate food safety risks originating from food handlers, to indicate critical trends of the current situation in the field of food handler education/ training, and to suggest directions for future strategies.

Keywords: Food safety, Food business operator, Food handler, Education, Training
A Conceptual Model of Senior Executives’ Information Behaviour

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ABSTRACT

This document addresses the information behaviours of a distinct group of managers – senior executives. Despite large research into decision support systems (DSS), business intelligence (BI), management decision making, and the information behaviours of various groups of managers, to say that the information behaviours of senior executives is significantly under-researched is an understatement. Effective DSS development is extremely difficult without a clear understanding of the needs of DSS users. A number of studies have shown low user acceptance rates for DSS and BI, which in turn is linked to a low perceived usefulness of the systems. Senior executives are very different to other types of managers and the decisions they make can have life or death consequences for an organization. They are the most important users of DSS. Unfortunately, the DSS/BI field does not possess clear and detailed understanding of what the information needs of senior executives are and how they process that information.

Keywords: Senior Executive, Information Behaviour, DSS

INTRODUCTION

Decision support systems (DSS) is the area of information systems (IS) field that investigates computer-based information systems that are designed to improve the process or the outcome of decision making [1].

Due to the fundamental differences of DSS from conventional information systems, the DSS area requires a clear understanding of the DSS users. It is important to explicitly articulate the difference between the average operational and management users of information systems and the very top level management users of DSS. The growing popularity of the current DSS trend – data warehousing and business intelligence (BI) [2] – triggered vendors target BI to senior management levels, disregarding the significant differences in their usage needs. This usage difference may make it impossible to support all management levels with the same approach. The IT industry has achieved a high level of success in information systems development, including new generation BI systems. However, the level of success in projects that support executives support is less impressive.
Knowledge Management and Business Intelligence relationship in the cloud

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ABSTRACT

In the age of information and knowledge, the Cloud Computing paradigm is becoming more and more popular within the business and research community. This concept certainly revolutionizes business, through its affects workforce, as well as the entire company’s business model, allowing them to invest their resources in a more financially responsible manner. Its objective is to provide agility, flexibility and adaptability of computing resources to different type of users who pay for those resources accordingly. By making use of Cloud Computing, companies are able to solve the issues that they are experiencing in managing information. It reduces technical challenges of knowledge management by eliminating many of systems requirements and offers more scalable and cost effective solution [1].

The main aim is to extract, organize and present information of the current working of the business in a way that improves an employee’s comprehension in specific area, focusing on problem solving and decision making processes. Business Intelligence (BI) and Knowledge Management (KM) technologies play an important role in understanding hidden, inherent and decision-relevant contexts in large amounts of structured and unstructured information [2]. However, lack of organizational understanding of their relationships is limiting their value.

The paper explores the nature of relationship between BI and KM technologies, considering aspects where they overlap and differ from each other. We analyze the interaction effect between KM and BI activities through three scenarios: knowledge management as adding component to existing BI technology, the role of BI in knowledge improvement and considering them as integrated whole. Finally, the paper introduces how different cloud deployment models can be used for knowledge management in the cloud environment.

Keywords: knowledge management in cloud, business intelligence, decision making process.

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The Use of Modulo Risk Manager™ Integrated With Social Networks as a Collaborative Decision Support System for the World Youth Day – Rio2013

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ABSTRACT

The main objective of this paper is to discuss the utilization of Modulo Risk Manager™ along with social networks such as Twitter and Facebook on the operation of the Integrated Risk Management Center established in Rio de Janeiro from March to August 2013 for the WYD Rio2013. Modulo Risk Manager™ is a Risk Management tool software developed by Brazilian company Modulo Security Solutions S/A.

This paper also presents a short explanation about World Youth Day – Rio2013, the motivations behind the project, the needs to establish such technology infrastructure and the most relevant numbers, both projected and actual. Aside from that, it will explain briefly the methodology applied to the Integrated Risk Management Center.

Furthermore, this work presents the software Modulo Risk Manager™ in its application to the operation and the mobile application developed to help volunteers, allowing them to input information directly into the software’s workflow in order to help the decision making during the operation. This mobile app was downloaded by more than 13,000[1] volunteers.

The integration tool called Message Gateway is also presented and explained. The application of this tool was the key to turn Modulo Risk Manager™ into an actual collaborative platform since it was responsible for receiving inputs from various sources such as e-mail messages, text messages and Tweets and automatically inserting them into the software’s workflow stream of decision.

Lastly, in light of the views presented, this paper aims at assessing the description of the operation during the week of the event and explaining in full detail the manner in which this Integrated Risk Management scenario impacts the success of the project as a whole. The complete numbers of the operation are also shown in the conclusion.

Keywords: Risk Management, WYD Rio2013, Message Gateway, Operations Center, Social Networks, Collaborative Systems.

References:
1. Apple’s App Store and Google Play Store official numbers as they were on July 28th 2013.

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Negotiation Support System: An Approach to Making Use of Negotiators’ Personal Traits in the Negotiation Process

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ABSTRACT

The negotiation process supported by a Negotiation Support System (NSS) shows there is a lack of direct, face-to-face contact between the negotiators. This type of negotiation can be quite time consuming and can generate dissatisfaction at the end of the process involved. In order to make the negotiation more satisfying and faster, this paper proposes an approach that makes use of the concepts of personality traits, such that the model uses Myers-Briggs Type Indicators (MBTI), which will be incorporated into a NSS, so as to predict the personal characteristics of the negotiators. Thus, we expect the negotiations to be rapid and that the negotiation process will be satisfactory to the parties involved in the negotiation.

Keywords: Negotiation Support System, Negotiation Process, Myers-Briggs Type Indicators, Personality, Satisfaction with Negotiation
A framework for the measurement and reduction of user-perceivable complexity of group decision-making methods

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ABSTRACT

Many methods for group decision-making and negotiations exist [3]. Because they can be based on various preference and aggregation models, they exhibit different characteristics with regard to the complexity that is perceived by human decision-makers. Consequently, only a small subset of available methods is generally suitable for either specific problems or specific group settings in which group members may be subjected to knowledge and time constraints. It is hence essential to assess the complexity of candidate methods and to determine their appropriateness for the given situation.

In this paper, factors that influence the user-perceivable complexity of group decision-making methods are systematically specified. These factors are derived from the common universal framework for the assessment of decision-making methods and systems [2]. It is the purpose of the paper to focus solely and thoroughly on the aspect of complexity, so it omits other aspects of the existing general framework. On the other hand, it deals with complexity indicators in a broader sense than a previous study on the cognitive load [1].

The addressed factors include initial cognitive load, cognitive load during the process of decision-making, complexity of information types, ability of asynchronous interaction, conflict resolution and autonomous guidance, time taken to reach the decision, learning ability, problem structuring, problem solving focus, thoroughness and depth of analysis, efficiency of judgements, richness of information, level of imprecision, psychophysical applicability etc. Detailed definitions and decompositions of these factors are provided.

Factors that should be considered in order to reduce the user-perceivable complexity are specified as well. Correlations between both sets of factors are defined and justified. In addition, several mechanisms and techniques that limit complexity are systematized, such as the aggregation-disaggregation analysis, selective robustness analysis, autonomous and hybrid approaches, structuring techniques, fuzzy/holistic/imprecise judgements etc.

Keywords: Group decision-making, Evaluation and systematization models

References:
Abstracts of the EWG E-CUBE Stream on Experimental Economics
The Value of a Fallback Option

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ABSTRACT

When somebody tries to obtain the first-best solution, she may frequently choose different levels of effort to invest into its pursuit. This level of effort is generally influenced by the availability of a fallback option in case she fails to succeed in obtaining her first-best solution. Using a second price auction mechanism, we experimentally test whether subjects react to the existence and attractiveness of this fallback option by changing their bidding behavior. Our results show that subjects generally do not fully adjust to the existence of the fallback option according to the theoretical prediction.

Keywords: Fallback option, second price auction, bidding behavior
Collaborative experiments based on system dynamics models: concept and prototype of a web tool for project contracting experiments

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ABSTRACT

Contracting has a significant impact on the acquisition process efficiency, especially in the context of so-called public private partnership (PPP). Improper contracts may cause significant delay and additional costs in project execution due to opportunistic behavior of private-sector suppliers. We present a system dynamics model combined with a web based decision support and experimentation tool which can be used to train project purchasers showing that carefully designed contracts help to keep the project on schedule and bring benefits to both, to the governmental entities and the private-sector suppliers.

Keywords: system dynamics modeling, public private partnership (PPP), web tool for project contracting

Introduction

Delays in public-private partnership project cause a two-fold disadvantage for the contracting authority. Firstly, the planned features often are not available during the period of delay. Secondly, due to lack of time in many cases the features put in use are of less quality than they were originally planned. However, improvement of project contracting process may have a significant contribution to reduce project delay, additional costs and improve outcome of the project.

In our research we want to analyze how project contracts that include incentives and carefully designed timely penalties help to keep a project on track and within the planned timeline. The proposed system dynamics model in combination with the web tool for project contracting experiments is developed at the Universität der Bundeswehr München and shall be used for teaching project contracting in the future.

In this paper we start with a literature review examines three related research issues: public-private partnership, opportunistic behavior and contracting, as well as project contracting from the view of system dynamics. Following that we describe our concept development using system dynamics modeling and a web-based simulation and experiment tool to achieve a better understanding of the problem and the relation between the contracting authority on the one side and the private-sector project supplier on the other.
Offer vs. Veto in Negotiations

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ABSTRACT

This paper presents negotiation by veto as a novel negotiation approach, an alternative to the exchange of offers and a potential solution to the problems related to offer exchange in negotiations. An experiment with student participants was conducted to compare the performance of offer and veto negotiation procedures. For simple negotiation problems no differences between the outcomes of the two negotiation procedures was found. In complex negotiation problems, however, negotiation by veto achieves fewer but better agreements.

Keywords: negotiation, offer exchange, veto
Pay Inequity and Job Performance: A View From Inside the Firm

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ABSTRACT

In this paper we use regular personnel data to “mine” for the relationship between individual job performance and wage inequity. We calculate three measures of pay inequity: the Bolton and Ockenfels (2000) measure of “inequality” and two measures which, following Fehr and Schmidt (1999), are associated with an individual’s motivation to show “altruism” or “envy.” The latter two measures reflect the extent to which an individual is relatively over- or underpaid. All measures are calculated using total pay as well as salary income, commission pay, and one-time bonuses separately. To account for the selection of individuals into performance clusters, we use a two-step procedure to assess the relationship between job performance and pay inequity. In a first step, employing the random effects regression model, we estimate the impact of income components and individual and workplace characteristics on job performance. The residuals – i.e. the random error component plus the overall error - obtained from of this regression indicate unexplained, or excess, performance. In a second step, we employ panel quartile regressions of the inequity measures on excess performance. Stronger “inequality” and “envy” regarding salary income and commission pay is significantly positively correlated with excess performance, while “altruism” shows a negative effect. The latter effect weakens when simultaneously including “envy” and “altruism” in the regression equation. There are no such clear-cut effects of inequity regarding one-time bonuses and total income. Thus, our analysis reveals how the company uses different pay components to reduce inequity while, at the same time, providing performance incentives.

Keywords: job performance, wage inequity, social preference, envy, altruism

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Simulation of Bribes and Consequences of Leniency Policy. Results from an experimental study

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ABSTRACT

Within the context of the present work an experimental study is conducted which executes negotiations between the agent and bidders. In these contract awards the opportunity for bribes is simulated. The following issues are analyzed: on the one hand the willingness to be dishonest respectively to accept bribes and on the other hand the effect of different detection probabilities and the possibility of leniency policy. The new idea is the simulation of bribes and as a further step the consequences of leniency policy. Our motivation was created by recent developments of increasing cases of corruption worldwide. Quite a number of corruption cases are in the field of huge projects mainly in construction industry, building sector in general and energy sector and of course in all sorts of supplies of services. We ran an experiment and report some interesting results.

Keywords: Bribery, Honesty, Leniency Policy, Whistle-blowing
Empirical study on bullying

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ABSTRACT

In recent years, the word bullying has become a household term, which is taken up by the media again and again. But workplace bullying does not only have negative effects on the person / persons concerned but inevitably affects adversely to the Company or the Employer. It was therefore the objective of our empirical study to assess the cost-relevant dimensions of the phenomenon of bullying at the workplace. The empirical study was based on a qualitative research approach. To clearly define the concept of bullying and to differentiate between conflicts of a general nature and bullying at the workplace, it is essential to start with a clear definition. Therefore the following definition of bullying was the basis for our study: Bullying at the workplace comprises activities of a group or an individual which are interpreted from a person (several people) as directed against him/her (them). These activities are experienced as hostile, humiliating or intimidating. The activities must occur frequently and last for a longer period. Over time an asymmetric balance of power between the parties develop. The coping resources of the defeated person (s) exhaust more and more. Therefore negative social, economic, physical, psychological and / or psychosocial consequences arise.

In our empirical study we conducted 10 qualitative interviews based on an interview guide to determine the cost of bullying. As a basis for our calculations we used payroll accounting. As cost-related factors of bullying we used absenteeism and reduction of work performance of people affected by bullying as well as a loss of working hours because of conversation and discussion about bullying at the workplace. It is important to notice that there are a lot of cost factors that cannot be quantified and therefore cannot be included in our cost calculations. That is why this empirical study represents minimum values of the costs of bullying. The empirical study shows that the loss of working time due to a bullying situation at work is quite considerably. The average absences per year of a person affected by bullying vary widely, but may be up to 80 days per year. The average reduction of work performance is up to 69 days per person per year. The average loss of working time due to conversation and discussion about bullying at the workplace is up to 78 days per person and year. This results in an annual loss of working time up to 119 days per year and subject! Moreover the empirical study shows that the annual costs of bullying vary greatly from case to case but go up to € 40,792 per person. If considering the duration of the bullying situations of the subjects in our study, total costs of up to € 320,314 incurc. As shown by our empirical study on bullying, costs caused by systematic hostilities at the workplace are quite high. In this sense, the empirical data from this study suggest that an investment in workplace health promotion, conflict and bullying prevention and the strengthening and promotion of leadership skills within the company are profitable from a business perspective.

Keywords: bullying, costing, business, survey
Residual income measurement & the emergence of cooperation: Results of an agent-based simulation of budget coordination

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ABSTRACT

A well-established corporate budget allocation mechanism is Baldenius et al.’s [1] competitive hurdle rate (CHR) mechanism (the only strongly incentive compatible mechanism of allocating financial resources to self-interested department managers, who seek to maximize their residual incomes by putting investment opportunities into action, while being supplied with full decision-making authority with respect to whether or not to operate a project but not capable of funding these projects independently from the corporation’s headquarters; the latter paves the way for budget coordination). [1]’s CHR mechanism is based on the homogenous agent assumption, while we seek to understand, among others, the effect of implementing heterogeneous agents on the likely emergence of “collusion” and “side-payments” (both outcomes of collaborative/cooperative decision-making processes usually unwanted from the viewpoint of an organization’s headquarters). We, thus, investigate whether incentives for heterogeneous agents to set up cooperations emerge, when the CHR mechanism [1] is repeatedly used. To do so, we conceptually transfer the idea behind the first-best solution presented in [1], augmented by heterogeneous agents (and heterogeneous investment opportunities), into an agent-based model following the agentization approach suggested by Guerrero and Axtell [2]. We find that in the medium and long run, our agent-based implementation of the CHR mechanism works efficiently as long as the use of an intra-organizational communication network can be ruled out. We show that, if, over the observation period, only a single investment venture is put into practice, the heterogeneity of investment opportunities positively affects the departments’ payoffs, while the number of proposed investment projects negatively impacts departmental utilities derived from residual income. The latter is why an emergence of cooperation is to be expected as soon as agents start to communicate.

Keywords: Investment Budget Allocation, Distributed Decision-Making, Competitive Hurdle Rate, Coordination, Residual Income Measurement, Agent-Based Simulation

References:
Vehicle Routing Problems with Time Windows and Multiple Service Workers - A Systematic Comparison between two Metaheuristics

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ABSTRACT

Real life distribution of goods, particularly in very large cities, imposes difficulties on classical vehicle routing algorithms. In these ever growing urban areas, space becomes increasingly valuable. Hence, even smaller stores servicing local customers may not be able to provide dedicated parking spaces. This lack of space to park, albeit encouraging alternative means of transport, constitutes a problem for the stores' suppliers.

Given these circumstances, distribution planning requires clustering nearby customers around known parking locations. Deliveries from each parking location to its assigned customers occur by foot. This causes long service times at each of the clusters. In conjunction with time windows, these service times can lead to inefficient routes as nearby customer clusters with overlapping service times may not be connected. As a consequence, assigning additional service workers to each vehicle is a strategy to reduce service times and hence permit more efficient routes. The trade-off between paying additional workers to reduce costs for vehicles and driving creates a new decision problem called the vehicle routing problem with time windows and multiple service workers (VRPTWMS).

Building on prior work of Pureza et al. [1], the goal of this study is the creation and analysis of two high-quality algorithms for the VRPTWMS. It systematically compares an ant colony optimization (ACO) and a greedy randomized adaptive search procedure (GRASP) metaheuristic. Both are used to efficiently generate solutions to the VRPTWMS. In order to keep the results comparable, the same route construction heuristic and local search procedures are used. It is shown that ACO clearly outperforms GRASP in the problem under study. Additionally, new globally best results for the used benchmark problems are presented.

Keywords: vehicle routing · time windows · local search · ant colony optimization · GRASP · metaheuristics

References:


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It’s about how the task is set – The inclusion and exclusion effect in preprocessing management information

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ABSTRACT

Managerial decision-making often rests on preprocessed and, as a result, considerably reduced information. In our study we investigate to what extent the frame in information processing (inclusion or exclusion) affects the managerial information basis in quantitative and qualitative terms. In an experimental setting, graduate and undergraduate students are asked to prepare a proper foundation for the management’s subsequent decisions by selecting figures they consider to be of particular importance. In two treatments subjects are instructed to (1) actively select relevant figures or (2) exclude figures they do not find relevant. Depending on the particular treatment and on the profit/loss-situation, the subjects’ selection of information and, thus, the managers’ decision-making basis differs significantly.

Keywords: inclusion, exclusion, management reporting, information selection, experimental study
Merit norms in the ultimatum game. An experimental study of the effect of merit on individual behavior and aggregate outcomes.

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ABSTRACT

The paper reports the results of an ultimatum game experiment designed to test the effects of meritocratic norms on individual behavior and aggregate outcomes. In one treatment the roles of proposer and responder were assigned randomly. In the other treatment the roles were earned in a general knowledge quiz. The results show that proposers offer significantly less when they have earned their roles and responders have a significantly lower acceptance threshold. As a result efficiency is increased because of lower rejection rates for offers lower than the equal split when positions are allocated based on merit: Proposers earn significantly more in this setting. Responders suffer some loss in this treatment. This leads to an increase in overall inequality of payoffs measured by the Gini index when positions are allocated based on merit.

Keywords: ultimatum game, merit, inequity aversion, social preferences, social norms, experimental game theory, social value orientation
The effects of honesty and social preferences on reporting behavior

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ABSTRACT

In this experimental study we analyze the propensity for misreporting under information asymmetry within a company. The experiment reproduces the relationship between a shareholder (principal P) and a better informed manager (agent A). The shareholder knows only that the actual project-production lies within certain ranges. The better informed manager, however, knows the project-production for sure. His task is to make a report regarding the production to the principal. The payoffs of both parties depend on the actual project-production and the manager's report. The payoff structure is manipulated in different treatments: for one thing the manager has or has no financial incentives to misrepresent his private information to the shareholder and for another thing, the shareholder can be either harmed or benefited, or her payoff remains unaffected by the agent’s deceptive reports. We manipulate the (positive/negative/no) consequences from misreporting for both the shareholder and for the manager, since we are interested in patterns in reporting behavior resulting from different motivations for potential misrepresentation. This allows for examining the stability of the (mis)reporting behavior in different treatments. Furthermore, we are interested in the relationship between the social value orientation and the reporting behavior in our study. The results of the second experiment show that participants have some preference for truthful reporting, however, we find only little evidence for a strong preference for honesty, since only 8% of agents report truthfully in each treatment, regardless of the consequences. Agents are primarily driven by the consequences for themselves rather than by the consequences for the principal, while deciding on misreporting. Agents are, however, also willing to forgo small potential gains for themselves to prevent a relatively greater loss for the principal, since very selfish black reports (in T5) are less frequent than selfish black reports (in T1). Some participants’ costs of lying are not high enough to prevent them from underestimating the production in treatment T1, but they are high enough to prevent them from doing so in T5. If agents misreport, they do it in order to generate positive rather than negative consequences for themselves. Reports in favor of the principal, but fruitless or even costly for the agent are very rare. The experiment indicates also that pro-social agents report more truthfully than pro-self agents.

Keywords: Reporting, Honesty, Social Preferences, Experimental Study
Reciprocity as an Individual Difference

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ABSTRACT

There is accumulating evidence that decision makers are sensitive to the distribution of resources among themselves and others, beyond what is expected from the predictions of narrow self-interest. These social preferences are typically conceptualized as being static and existing independently of information about the other people influenced by a DM’s allocation choices. In this paper we consider the reactivity of a decision maker’s social preferences in response to information about the intentions or past behavior of the person to be affected by the decision maker’s allocation choices (i.e., how do social preferences change in relation to the other’s type). This paper offers a conceptual framework for characterizing the link between distributive preferences and reciprocity, and reports on experiments in which these two constructs are disentangled and the relation between the two is characterized.

Keywords: Social Value Orientation (SVO), Social preferences, Reciprocity, Individual differences, Preference dynamics

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Applications of the Inverse Infection Problem on banking data

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ABSTRACT

The Domingos-Richardson model, along with several other infection models, has a wide range of applications. In most of these, a fundamental problem arises: the edge infection probabilities are not known. To provide a systematic method for the estimation of these probabilities, the authors have developed the Generalized Cascade Model as a general infection framework, and a learning-based method for the solution of the Inverse Infection Problem.

The process requires several infection patterns, the results of previous infections, as a test dataset. Using these, it becomes possible to learn the infection probabilities by minimizing an error function. The probabilities themselves are represented as functions of multiple edge attributes.

In this paper, we will present an application of the Inverse Infection Problem. Bankruptcy forecasting, more precisely the prediction of company defaults is an important aspect of banking. We will use our model to predict bankruptcies. These can occur within a 3 months’ timeframe. The network itself is built from the bank’s existing clientele for credit monitoring issues. We have found that by using inverse infection algorithms we can make better predictions for the near future Basel II default events.

Keywords: Network science, Infection model, Inverse infection model.
Multi-criteria analysis of local economic development issues: evidence from Serbia

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ABSTRACT

This paper demonstrate application possibilities of multi-criteria analysis (MCA) in the specific local economic development problem in Serbia that refers to capability assessment of local self-government (LSG) units to act independent from state institutions in order to create business friendly environment and increase entrepreneurial activities. The aim of the paper is to formulate an adequate multi-criteria model trough determination of relevant criteria for evaluation of business climate in observed LSG units. As well, appropriate methodologies for weights derivation are used. Data base is primary collected data from the questionnaire directed to two mayor stakeholders - business community and Local Economic Development Offices. Data analysis is conducted using relevant statistical methods such as factor analysis and regression analysis, as well as weights determination methodology for analysis of stakeholder’s subjective preferences such as Analytic Hierarchy Process (AHP). Entrepreneurial activities are very important for inclusion of developing local self-government units into national economy. Therefore, increase of entrepreneurial activities are seen as an opportunity for providing growth of developing LSG. A country representative bodies and institutions have a great role in creating business environment. However, they are not the only ones that should be taking actions and making positive environment for business activities. Local governments can also take part in encouraging entrepreneurship and business prosperity. They can create micro climate, which should make their communities recognizable and favorable for entrepreneurs. One of the first steps includes development of local economic strategies and plans with purpose of reducing risks for developing business and create stable business environment. The paper summarizes the problems and efforts concerning business environment improvements that local communities in Serbia were facing during the last two decades and the factors that influenced on reduction of business activities. Local government in some cities have already realized the importance of local actions and discovering of local comparative advantages for increasing business activities and making better position inside regionally unbalanced Serbian economy. The
paper points out what are the main tools of LSG units and what were the affects, measured through numbers of open and closed businesses. To the respondents from both of these groups of stakeholders has offered a number of criteria where they express an opinion on their significance for the improvement of the business environment and the level of compliance in the respective local self-government unit. Since this is a heterogeneous criteria, which include a variety of responsibilities of local governments, it is possible to form an adequate multi-criteria model. Expected result of this paper is to provide trough statistical analysis data for determination of relevant criteria for evaluation of different tools used at local level for business climate improvement. As well, by using AHP methodology it is possible to quantify subjective preferences of stakeholders about importance of certain criterion for business friendly environment. In that context, AHP is used as methodology for weights derivation when the decision maker is group. The paper has practical value because it provides information about different tools' importance and it can become valuable guideline for future actions of local self-government authorities in order to increase business friendly environment.

Keywords: Multi-Criteria Analysis, Local Economic Development, (De)Centralization, Analytic Hierarchy Process
Abstracts

of the

EWG-MCSP Stream on Complex Societal Problems
Decision support of complex societal problems

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ABSTRACT

Decision support of complex societal problems needs more than just applying decision support tools. Lawyers and doctors follow protocols to support their decisions. However for complex societal problems such protocols do not exist. Policy making on complex societal problems and thus making decisions on what kind of policy and what kind of interventions are needed for complex societal problems needs a different approach. In the problem handling process for complex societal problems one can distinguish twelve problem handling phases. Although there are decisions made in every phase of the problem handling process, the actual decision support moments refer mainly to phase 2.4 of the problem handling phases. This means that before fruitful decisions can be made with decision support tools the former problem handling phases have to be fruitfully processed. An example of the use of a group decision support tool is given in relation with the complex societal problem of global safety, the problem handling phases and the use of knowledge institutes.

Keywords: Decision Support, Complex Societal Problems.
Analyzing environmental hazard on air pollution using input-output analysis

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ABSTRACT

The environmental hazard involving air pollution has become a crucial problem facing both the advanced as well as developing countries. In Malaysia, for instance, the major cause of air pollution is through industrial and vehicular emissions. Malaysia is ranked 42nd in the world in terms of vehicle ownership per capita (273 per 1000). Public transportation has been introduced in the form of bus networks as well as railway and metro systems, but the utilization rates are low [1].

This study attempts to analyze the environmental hazard caused by air pollution in Malaysia. The methodological approach is through the utilization of the input-output approach of analysis. Such analysis could determine the prevalent economic sectors which contribute to the proportion of air pollution in the country. The impact of pollution is measured through the “coefficients of pollution” in the generation of output in the production processes. Similar method was used by Miller and Blair (2009) [2] in planning. However, our approach is only confined to the pollution caused by greenhouse gas emissions such as methane (CH₄), carbon dioxide (CO₂), carbon monoxide (CO), nitrous oxide (N₂O) and sulfur hexafluoride (SF₆).

Using the input-output tables of Malaysia for the years 1991 and 2005 and the relevant values of gas emissions from the Department of Environment Malaysia, the pollution coefficients of related economic sectors could be calculated. From our estimates on the pollution coefficients, it is revealed that in general, petroleum and gas, chemical industries, rubber production and processing, food manufacturing as well as transportation and logistics sectors showed increase in their respective coefficients in 2005 as compared to the year 1991. In retrospect, the air pollution level had increased. Hence, it makes sense for the policy makers to have careful planning to ensure reduction of the greenhouse emissions from the related industries in order to have sustainable development as well as healthy quality of air for the entire citizens.

Keywords: environmental hazard, air pollution, input-output analysis, greenhouse emissions, pollution coefficients.

References:

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The System Dynamics of Social Return in a municipal Labour Market in The Netherlands

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ABSTRACT

This research focuses on the dynamics of persons with low Social-Economic Status (SES) on the labour market in Apeldoorn, a medium sized (ca. 156,000 inhabitants) municipality in The Netherlands. In labour market terms low SES means these people have relative low economic productivity because of low Human Capital (HC), i.e. low levels of knowledge, skills and health, which gives them a larger distance to the labour market. Because a large proportion of households receiving social assistance have a low SES and municipalities are responsible for funding social assistance, they have an incentive to decrease these persons’ distance to the labour market. This is done by providing education, subsidized work and help with job applications. Another, more recently implemented policy, is to force companies winning public tenders to spend 5% of the contract to hire low SES personnel during the project, i.e. Social Return (SR) in procurement. Some expected negative effects of Social Return are a substitution effect of low-SES workers for regular workers and the “site office”-effect – superfluous employees are not working nor increasing their HC, but sitting in the site office all day. An alternative for this policy is the Social Responsibility Certificate (SRC), which can be provided to companies deliberately hiring low-SES workers from a social responsible point of view, apart from specific contracts with the municipality. These SRC companies are given an advantage over regular companies in public tenders. To research the pros and cons of these policies, a System Dynamics (SD) simulation model is built. SD is a method for modelling continuous systems to test the effects of policies on these systems and the model consists of several aspects of the labour market, including groups of (potential) workers and economic influences. The model focuses on output for certain stakeholders of the problem, the so-called measures of effectiveness, e.g. for the municipality, employers and employees. The model input data is taken from information from the municipality, local employers and the Statistics Bureau of the Netherlands. The model shows the economic situation having a large influence on the development of the Human Capital of low-SES groups. Implementing SRC policies will lead to advantages for low SES groups during economic decline compared to doing nothing (basecase) and the regular 5% SR policy. During periods of economic growth, the policy outcomes are equal in size and behaviour. Second, both policies do not have a large effect on costs for municipalities, compared to the basecase situation. Thirdly, the “site office”-effect is noticed in the SR policy by a relatively large return to unemployment after the contract term has ended in comparison to the basecase and SRC policy.

Keywords: Labour Market Dynamics, Social Return, Corporate Social Responsibility, Human Capital
ABSTRACT

When new products are introduced to the market, more often than not, consumers have to choose between a well-known version of the product and a newer (mostly more innovative) one. For each alternative multiple and sometimes even different attributes might be considered and evaluated in the consumers decision process. Some of these characteristics might be known more, some less to the consumer, which results in different uncertainty levels for each attribute respectively each product. For new vehicle technologies – like fuel cell vehicles – there is uncertainty concerning the vehicles range, the fuel consumption, or the current and future refueling availability, as a new refueling-infrastructure is needed. This was shown in a focus group on the topic. Generally, the uncertainty rises with a higher technological difference between a known and an unknown alternative.

Agent-based simulation is a powerful tool to model complex emergent phenomena, and is therefore often used in the innovation diffusion literature [1]. Existing agent-based models on the diffusion of alternative vehicle technologies focus either solely on the distribution of fueling stations and its (initial) critical mass [2], various interacting market players such as consumers, infrastructure providers, vehicle manufacturers, or policy makers [3,4,5,6,7,8], imitation effects in the consumers’ decision process [9], cost-benefit calculations [10], or social interactions among consumers, network effects and/or marketing activities [11,12,13]. Although in most of these models the consumers’ decision process is modeled using a utility or value function considering different attributes of a product, the underlying uncertainties of these attributes and their influence on the diffusion process are hardly represented. We therefore introduce an agent-based model that pictures (re)purchasing behavior under uncertainty in order to investigate the diffusion of fuel cell vehicles opposed other technologies. The inherent uncertainty about each (novel) technology can be reduced through marketing activities, word of mouth, and/or first-hand experience. Notice that not every channel might be appropriate to reduce the uncertainty of each attribute in the same way. Additionally we consider the influence of technological progress over time on the consumers’ uncertainties and information demands, as multiple generations of a product have a high influence on the uncertainty on several attributes of the technology and therefore impact its diffusion.
Keywords: Agent-Based Modeling, Fuel Cell Vehicle, Uncertainty, Multiple Technological Generations

References:

Walking the Land: Building an understanding of an Ecosystem Approach in the Highlands & Islands through mobile methods & qualitative GIS

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ABSTRACT

The Highlands and Islands of Scotland has a mixture of land uses that dominate the landscape but woodlands are lacking clear economic and cultural drivers to motivate uptake by land owners. The Government woodland expansion strategy is pushing widespread planting and regeneration but a combination of past practices and conflict with traditional Highland Estate Sporting management is preventing woodlands from finding their niche beyond recreation and amenity. Scotland is investing widely in renewable energy and the Highlands have been earmarked as a Bioenergy region. Forest energy has been receiving less attention than wind or hydro schemes but could play a significant role in developing domestic energy markets. Sporting Estates cover the majority of the Highlands, so the potential for a forest energy resource base is strongly influenced by landowner decision-making. Landowner motivation to adopt short rotation forestry is hindered by underdeveloped markets and cultural factors that drive management. The interactive field interview explores economic, cultural and spatial planning issues simultaneously as the researcher and landowner walk the Estate. Primarily the tool is designed to engage landowners by providing them with figures, comparisons and simple options for new woodlands. A computer tablet with a mapping App is used to plan potential areas of woodland and run through a ‘Forest Energy Tool’, specifically developed to address woodland expansion issues in the Highlands. The tool generates net economic revenues, timber volume, carbon sequestration and calorific values. The interview component tracked by GPS and recorded on dictaphones aims to identify main cultural drivers that influence current and potential management decisions-this information forms a Cultural Transect of the Estate. Linking the various components of the interactive field interview produces a deeper insight into the potential woodfuel resource base within diverse regions in the Highlands. The individual field interviews will be followed by a Clustered Land Use Collaboration workshop with the participating Estates within each case study area. This process will compare the maps (Potential forest energy & Site compatibility) produced from the interviews to look at opportunities and obstacles to management within a micro-regional context. Connecting land use across borders from the perspective of traditional highland management systems may inform possible strategies for an Ecosystem Approach through the lens of forest energy.

Keywords: Forest Energy, Ecosystem Approach, Mobile methods, Walking Interview, Woodfuel, Cultural drivers, Scotland, Qualitative GIS
Demand dynamics of construction materials in Europe - Lessons learned: Combination of resource and knowledge management as a contribution to successful decision making and investment plans

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ABSTRACT

Crushed stone, sand and gravel are crucial for Europe’s society and economy. Supply of construction market is very important for it makes possible to build infrastructure, residential and non-residential buildings, commercial skyscrapers or large shopping malls, airports, railways, highways sewage systems, dams and bridges. Aggregates are also used to repair and maintain the existing infrastructure. In an attempt to analyse and understand the demand trends for construction materials, the identification, evaluation and analysis of the identified demand drivers and developed forecasting models, are discussed in this paper.

Further research about construction sector and its primary resources (aggregates) combined with the lessons learned tools and experiential knowledge is needed, for decision-makers, and businesses are facing the challenge of being competitive and successful in the 21st century knowledge-based type of economy.

Keywords: Knowledge management, lessons learned, mineral economics, construction materials, sustainable management, demand drivers
Abstracts
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OR in Agriculture & Forest Management
On decomposition-coordination methods for the generation of Pareto points for complex systems

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ABSTRACT

For solving large and multi-objective optimization problems a multi-level approach to the generation of Pareto points is discussed. Frequently, multi-objective optimization problems are solved by the scalarization or weighting method where multiple criteria are replaced by a single function based on the weighted sum. According to the idea of hierarchical approach the overall complex problem is reduced through the introduction of coordination parameters into smaller and simpler sub-problems which thereafter will be solved independently as the coordinated (harmonized) ones to generate the Pareto optimal points for the primary global problem. For finding proper values of coordination parameters some iterative methods based on the Gauss-Newton method are studied.
Selecting an efficient wood chips supply chain strategy in organized small-scale forestry with a simulation-based AHP-TOPSIS approach

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ABSTRACT

In 2010 the 681 Bavarian biomass heating and combined heating and power (CHP) plants used in total 1.82 million bone-dry tons of wood fuels (WF) representing an increase of 38% compared to 2005 [1]. With an overall share of 26% wood chips (WC) were the second most important WF and registered an increase in consumption between 2005 and 2010 of more than 50% [1]. With regard to small and medium-sized biomass heating and CHP plants WC are already the most important WF [1]. In the long-term perspective, it is planned that biomass will cover 9% of the primary energy consumption in Bavaria until 2021 [2]. The resulting growth in demand for WF and especially WC is expected to pose a considerable challenge to the future security of supply. Hence, the exploitation of additional and substantial WF potentials e.g. in small-scale forests is required [2]. In Bavaria for instance, privately owned forests with less than 20 hectares account for 58% of the total WF potential [3]. Consequently, organizations in small-scale forestry, such as forest owner associations (FOA) and forest management cooperatives (FMC), will play more and more a crucial role in the management of the WC supply chain (WCSC) and thus, need to address analytical strategic decision making.

This work presents a simulation-based AHP-TOPSIS approach to support FOA/FMC in selecting an efficient supply chain strategy (SCS) for the WCSC. The approach uses empirical productivity models to simulate the WCSC steps and expert-based scenarios until 2025 to configure relevant but uncertain WCSC parameters. Next, the performance of the WCSC is measured by the criteria staging quantity, costs and regional value-added. Subsequently, the weights of the criteria are determined by a survey-based AHP. Finally, the efficiency of a SCS, i.e. specific configuration of the WCSC, is assessed through the relative closeness degree to the best alternative as proposed by the TOPSIS.

Keywords: Small-scale forestry, Supply Chain Management, Simulation, AHP, TOPSIS

References:
Landowner decisions and public access rights to privately owned land

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ABSTRACT

Public access rights to private land vary considerably across different countries. In general, many European countries allow some sort of access or everyman’s rights on privately owned land, while in the U.S., for example, access rights are much more strictly controlled. But how do the land accessibility rights affect the decision making of private landowners in terms of voluntary conservation of land? Here, an analytic basis is developed for the fundamental land allocation problem of how to divide land between productive land and conserved land. The question is put into a dynamic framework and investigated analytically and numerically. Private decision-maker’s voluntary conservation is described in two cases: first, in a case where access to conserved land is closed, and second, in a case where there is an open access to the recreational amenities of conserved land. It is demonstrated that open access leads to a collusive equilibrium that implies a smaller size of conserved land as compared to the closed access. Open access also leads to lower utility level of the landowners compared to closed access. Collaborative decision making would be needed in the open access case to bring the utility level up to the level implied by the closed-access case. It is shown that a wealthier society prefers more extensive land conservation than a poorer society. Furthermore, access regimes are shown to have profound implications on how land fragmentation (parcelization) affects allocation of land. Optimal taxes and subsidies are derived which ensure a socially optimal extent of land conservation. Analysis is extended to a landowner-nonlandowner case. When conservation policies are imposed in a closed-access regime, optimal policies become dependent on income distribution and wealth differentials between land-owning and non-landowning members of society. Utility of both groups can be increased if willingness-to-pay for conservation is utilized.

Keywords: Access Rights, Collusive Equilibrium, Landowner Decision-making
The box assignment problem in log yards

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ABSTRACT

We present an optimization approach to minimizing log yard round wood transportation time for a medium sized hardwood sawmill. The log yard, which has to ensure a smooth raw material supply to the entire production process, is the first processing step in a sawmill. The log yard also serves as an internal round wood sorting and storing capacity. Thus, an optimal assignment of ejection boxes, storage boxes and feeding carriages is required to minimize transportation time at a log yard.

Research for improving sawmill’s productivity mainly focuses on cutting pattern generation (see [1]). However, in order to improve operating efficiency additional material flow considerations are required. Simulation has some tradition to optimize processes in the forest products industry. [2] present one of the earliest papers dealing with the topic of hardwood sawmill optimization and [3] show the topic of object orientation for sawmill simulation. Anyhow, no direct applicable solution for planning and optimization the log yard could be found in literature.

The main contribution of this paper is to present an integrated approach which simultaneously takes into account log transportation time, storage capacity and yard crane deployment. The approach is based on two steps: a) defining storage spaces per batch and calculating distances and b) determining optimum box assignments in the log yard in order to minimize overall transportation distance. Furthermore, the box assignment to one box and the fragmentation of the assortment into several storage boxes were investigated. The solution in step b) is compared with the results obtained by random box assignment as well as heuristic planning models. We have been able to show that our approach is much more flexible and results are more than 16 percent better than the corresponding real life solution.

Keywords: Log yard planning, Sawmill, Linear Optimization

References:

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DEA models for the analysis of efficiency of agricultural farms

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ABSTRACT

In this talk we generalise recent developments in the methodology of Data Envelopment Analysis (DEA) aimed at the analysis of efficiency of agricultural farms. We also discuss our practical experience with the application of new DEA models.

The focus of this presentation is on the use of additional information in the form of production trade-offs that reflect the relative difficulty (in terms of resources) of different agricultural crops. We discuss the meaning of production trade-offs in the agricultural context, give examples of their assessment and demonstrate the difference their use has on the results of efficiency analysis.

The results on the Empirical Application of the DEA Models to assess the efficiency of the farms for most of EU countries are presented.

Keywords: Production Trade-offs, Data Envelopment Analysis, efficiency analysis, OR in Agriculture

References:


Quantifying Urban Sprawl using Land Use Data

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ABSTRACT

The main characteristics of urban sprawl are low density, low continuity of land use type, and low compactness of the shape of the city. Here we present ways of measuring these urban sprawl characteristics using digital land use data. The type of data influences which indices can be used effectively. Some classical indices cannot be meaningfully (usefully) applied when data is presented in digital form at cell level. We will present some indices in this paper that are ideally suited to digital land use data. Some of these indicators have been used in the literature before, others we developed ourselves. We use the structure provided by the Corine Land Cover (CLC) Project (2006) to define usage categories as well as grid size (100m x 100m). To illustrate the working of these measurements, we calculate all indices for the city of Graz in Austria as well as the surrounding area of Graz.