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Decision Support Systems VIII

Sustainable Data-Driven and Evidence-Based Decision Support

4th International Conference, ICDSST 2018
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Proceedings

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EURO Working Group on Decision Support Systems

The EWG-DSS is a Euro 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 the creation of professional, academic, and industrial opportunities for its members
- Favor the development of innovative models, methods, and tools in the field of decision support and related areas
- Actively promote the interest in decision systems in the scientific community by organizing dedicated workshops, seminars, mini-conferences, and conferences, as well as editing special and contributed issues in relevant scientific journals

The EWG-DSS was founded with 24 members, during the EURO Summer Institute on DSS that took place at Madeira, Portugal, in May 1989, organized by two well-known academics of the OR community: Jean-Pierre Brans and José Paixão. The EWG-DSS group has substantially grown along the years. Currently, we have over 300 registered members from around the world.

Through the years, much collaboration among the group members has generated valuable contributions to the DSS field, which resulted in many 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. Starting from 2015, the EWG-DSS established its own annual conferences, namely, the International Conference on Decision Support System Technology (ICDSST).

The current EWG-DSS Coordination Board comprises seven experienced scholars and practitioners in the DSS field: Pascale Zaraté (France), Fátima Dargam (Austria), Shaofeng Liu (UK), Boris Delibašic (Serbia), Isabelle Linden (Belgium), Jason Papathanasiou (Greece), and Pavlos Delias (Greece).

Preface

The proceedings of the eighth edition of the EWG-DSS Decision Support Systems published in the LNBIP series present a selection of reviewed and revised full papers from the 4th International Conference on Decision Support System Technology and PROMETHEE days (ICDSST – PROMETHEE DAYS 2018) held in Heraklion, Greece, during May 22–25, 2018, with the main theme: "Sustainable Data-Driven and Evidence-Based Decision Support with Applications to the Environment and Energy Sector." This event was jointly organized by the EURO Working Group on Decision Support Systems (EWG-DSS) and the PROMETHEE DAYS group and it was hosted by the Hellenic Centre for Marine Research.

The EWG-DSS series of the International Conference on Decision Support System Technology (ICDSST), starting with ICDSST 2015 in Belgrade, was planned to consolidate the tradition of annual events organized by the EWG-DSS in offering a platform for European and international DSS communities, comprising the academic and industrial sectors, to present state-of-the-art DSS research and developments, to discuss current challenges that surround decision-making processes, to exchange ideas about realistic and innovative solutions, and to co-develop potential business opportunities.

The scientific topic areas of ICDSST 2018 include:

- Decision support modeling
- Decision support and expert systems in the environment and energy sectors
- Data visualization and decision-making/support
- Environmental and energy data visualization
- Geographic information systems
- Data science, big data analytics, and business intelligence
- Technical and managerial dashboards for decision support
- Knowledge acquisition, management, extraction, and visualization
- Collaborative decision-making
- Intelligent, Web-based, spatial decision support systems
- Application models and systems: agricultural, environmental, farming, water resources, livestock, fisheries, warehouse, sustainable forest and rangeland management, food processing, and supply chain management
- Simulation models and systems, regional planning, logistics, and traceability
- Case studies involving any of the above issues

The aforementioned topics reflect some of the essential topics in the field of decision support systems, and they represent several topics of the research interests of the group members. This rich variety of themes, advertised not only to the (more than 300) members of the group, but to a broader audience as well, allowed us to gather several contributions regarding the implementation of decision support processes, methods, and technologies in a large variety of domains. Hence, this EWG-DSS LNBIP volume

published by Springer has considered contributions of a "full-paper" format, selected through a single-blind paper reviewing process. In particular, at least two reviewers – members of the Program Committee – reviewed each submission through a rigorous two-stage process. Finally, we selected 15 out of 71 submissions, corresponding to a 21.1% acceptance rate, to be included in this 8th EWG-DSS LNBIP volume.

We proudly present the selected contributions, organized in four sections:

1. Decision Support Systems for a Sustainable Society: Suggestions and empirical proofs about how DSS can improve the world we live in and exploit evidence to advance the quality of the decisions made. First, Tong Wang, Qi Han, and Bauke De Vries present "SIRPSS-Sustainable Industrial Site Redevelopment Planning Support System." Then, "An Intelligent Multi-Agent System Using Fuzzy Analytic Hierarchy Process and Axiomatic Design as a Decision Support Method for Refugee Settlement Siting" by Maria Drakaki, Hacer Guner Goren, and Panagiotis Tzionas deals with a crucial topic of our era, followed by the work of Khelifa Boudjemaa, Ridda Laouar, and Sean Eom about an "Intelligent Integrated System for Urban Planning Using GIS and Cloud Computing." This section closes with "An Ontology-Based Decision Support Framework for Personalized Quality of Life Recommendations" by Marina Riga, Efstratios Kontopoulos, Kostas Karatzas, Stefanos Vrochidis, and Ioannis Kompatsiaris.
2. Decision Support Systems Serving the Public: Methods and case studies on DSS in the service of the public, with topics ranging from physical disaster protection to policy design. Stefano Armenia, Georgios Tsaples, and Camillo Carlini present "Critical Events and Critical Infrastructures: A System Dynamics Approach" and Marta Dell'Ovo, Francesca Torrieri, and Alessandra Oppio present "How to Model Stakeholder Participation for Flood Management." This section continues with a case study from Brazil on how "Big Data Analytics Improve the Decision-Making Process in Public Safety," a work by Jean Turet and Ana Paula Cabral Seixas Costa, and finishes with the work of Glykeria Myrovali, Georgios Tsaples, Maria Morfoulaki, Georgia Aifadopoulou, and Jason Papathanasiou about "An Interactive Learning Environment Based on System Dynamics Methodology for Sustainable Mobility Challenges Communication and Citizens' Engagement."
3. Decision Support Systems in Management and Organizations: A section that highlights how DSS can be involved in management practices of modern organizations to give a boost to their effectiveness and efficiency. Yusuf-Ali Karbelkar and Mike Hart present "Skills and Mindsets for an Analytically Innovative Organization," while Georgios Stavrou, Panagiotis Adamidis, and Jason Papathanasiou deal with "Computer Supported Team Formation." Then, the important as well as frequent problem of supplier selection is presented through a description of the case of a "Colombian Agricultural Research Company," a work by Jenny Milena Moreno Rodriguez, Takanni Hannaka Abreu Kang, Eduarda Asfora Frej, and Adiel Teixeira de Almeida.
4. Advances in Decision Support Systems Technologies and Methods: Abstracting from the thematic focus of the conference, this section focuses on methods, techniques, approaches, and technologies that advance the research of the DSS field. Dario Torregrossa and Joachim Hansen present "SK-DSSy: How to Integrate the

YouTube Platform in a Cooperative Decision Support," while a valuable family of methods in DSS, multiple-criteria decision aid, is exemplified through the work of Gjorgji Nusev, Pavle Boškoski, Marko Bohanec, and Biljana Mileva Boshkoska: "A DSS Model for Selection of Computer-on-Module Based on PROMETHEE and DEX Methods." Then, Kathrin Kirchner and Petar Markovic present how process mining can be related to the field of decision support with their work on "Unveiling Hidden Patterns in Flexible Medical Treatment Processes – A Process Mining Case Study." Finally, "A New Function for Ensemble Pruning" is suggested by Souad Taleb Zouggar and Abdelkader Adla.

We would like to thank many people who contributed greatly to the success of this LNBIP book. First of all, we would like to thank Springer for providing us with the opportunity to guest edit the DSS book, and we wish to express our sincere gratitude to Ralf Gerstner and Christine Reiss, who dedicated their time to guide and advise us during the volume editing process. Secondly, we need to thank all the authors for submitting their state-of-the-art work for consideration for this volume. From our point of view, this is yet another confirmation that the DSS community is vivid, active, and has a great potential for contributions. It really gives us courage and stimulates us to continue the International Conference on DSS Technology series. Finally, we express our deep gratitude to the reviewers and members of the Program Committee who volunteered to assist in the improvement and the selection of the papers, under a tight schedule. We believe that this EWG-DSS Springer LNBIP volume presents a rigorous selection of high-quality papers addressing the conference theme. We hope that readers will enjoy the publication!

March 2018

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