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Opinion Makers Section

A note on integrating Geographic Information Systems and MCDA

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1. Introduction

A growing number of scientists are merging theories and methodologies from different disciplines to extract new meaning from data and to solve complex problems using new methods. The emerging area of research on integrating Geographic Information Systems (GIS) and MCDA is an example of how linking concepts and methods from ***two distinct*** fields can yield new ways of tackling decision problems. At the fundamental level, GIS-MCDA can be thought of as a collection of methods and tools for transforming and combining geographic data and preferences (value judgments) to obtain information for decision making. Over the last twenty years or so, there has been an exponential growth of theoretical and applied research on GIS-MCDA (Malczewski, 2010). There were only 26 refereed papers about GIS-MCDA published between 1990 and 1995. The volume of papers has increased to more than 350 over the last five years. The field of GIS-MCDA has strongly been adopted within the GIS community. The efforts to integrate MCDA into GIS have also been recognized as a considerable accomplishment in expanding MCDA into new application areas (Wallenius et al., 2008). The hybrid heritage of GIS-MCDA creates new opportunities and challenges for advancing both theoretical and applied research.

2. Opportunities

The opportunities for advancing research on integrating GIS and MCDA come from the synergy between the two distinctive sets of decision support tools. GIS is a system for collecting, storing, manipulating, analysing, and presenting geographic data to obtain information for decision making. The capabilities of handling and processing geographically referenced data distinguished GIS from other information systems. They also make GIS a valuable technology in a wide range of applications, because a wide variety of the public and private sector organizations use geographic data to support their activities. Prominent among the enduring uses of GIS is the task of producing maps. Data outputs in both hard copy and digital map form can be used as a basis for discussing and review of decision problems, which may culminate in the identification of decision alternatives and the choice of a preferred outcome. Here, the map is the basis for both the dialogue and decision outcome, where the discussion and review processes are facilitated not only by analysis of spatial data, but also by review of what the map content reveals to decision participants. GIS can help in coordinating situation analysis through its ability to integrate data from diverse sources. It can enhance the MCDA capabilities for exploring decision situation and supporting the process of learning and discovery. For example, GIS enables geographic data from one sector (such as safe water supply, education, employment) to be combined with data from other sectors (such as health care) to provide a comprehensive picture of the situation in any given community, region or country, and thereby facilitating the setting of priorities for control and surveillance activities, the rationalization of the use of scarce resources, and effective planning.

The capabilities of GIS for generating a set of alternative decisions are mainly based on the spatial relationship principles of connectivity, contiguity, proximity and the overlay methods. For instance, the overlay operations are often used for identifying suitable areas for new development, be it a new industrial facility, waste disposal site, school, hospital, etc. In this context, the functionality of GIS is essentially limited to overlaying deterministic digital map layers to define areas simultaneously satisfying a set of locational criteria. However, when the selection involves conflicting preferences with respect to evaluation criteria, the overlay functions do not provide enough analytical support, because of limited capabilities for incorporating the decision makers' preferences into the GIS-based decision making process. In addition, the complexity of relationships in some spatial decision problems cannot be represented cartographically. Consequently, GIS systems are not flexible enough to accommodate variations in either the context or the process of spatial decision making.

The limited capabilities of GIS to store and analyze data on the decision maker's preferences can be enhanced by integrating MCDA into GIS. MCDA

provides a methodology for guiding the decision maker(s) through the critical process of clarifying evaluation criteria (attributes and/or objectives), and of defining values that are relevant to the decision situation. The major advantage of incorporating MCDA into GIS is that a decision maker can introduce value judgments (i.e., preferences with respect to evaluation criteria and/or decision alternatives) into GIS-based decision making. MCDA can help decision makers to understand the results of GIS-based decision making procedures, including tradeoffs among policy objectives, and then use the results in a systematic and defensible way to develop policy recommendations.

3. Challenges

The hybrid heritage of GIS-MCDA brings about as a series of theoretical, methodological and operational contradictions and inconsistencies. For example, the problem of semantic heterogeneity caused by different meanings of data, terminologies, and models used in GIScience and MCDA has been recognized as one of the major challenges in advancing research on integrating GIS and MCDA. To this end, transparency issues are particularly troublesome to the GIS-based decision making. For instance, decision participants and GIS experts often mix-up fundamental concepts of MCDA such as the notion of value structure, goal, criterion, objective, and attribute without recognizing similarities and differences. It has been only recently that some considerations have been given to how the problem of semantic heterogeneity inherent in GIS-MCDA affects the quality of spatial decision making process. I suggest that an ontology-driven approach (a formal, explicit specification of a shared conceptualization) would reduce the problem of semantic heterogeneity. It could also provide a better organization and understanding of the GIS-MCDA tools through a set of descriptive properties classified by ontology concepts.

Research into GIS-MCDA has so far tended to concentrate on the technical questions of how to integrate GIS and MCDA. Our understanding of the benefits of such integration is limited by the lack of research on conceptual and operational validation of the use of GIS-MCDA in solving real-world spatial problems. More research about human-computer interaction is needed to understand the way users employ GIS-MCDA as a decision support tool. There are also other, more general, concerns surrounding the use of MCDA methods in GIS that require careful consideration. In the MCDA community there has been much discussion on the theoretical foundations and operational validation of the MCDA methods. It is argued that some MCDA methods are lacking a proper scientific foundation and some procedures involve strict assumptions, which are difficult to substantiate in real-world situations. To a large extent, these problems have been ignored by the GIS community. For example, the additive weighting methods are the most often-used GIS-MCDA models. However, the methods are frequently applied without full understanding of the underlying assumptions. In many GIS-based case studies, the models have been applied incorrectly and with dubious results because analysts (decision makers) have ignored or been unaware of the assumptions.

Over the last decade or so, considerable efforts have been made to develop the Web-based GIS to support spatial decision-making. These efforts have been centred on using GIS as a tool for enhancing public participation. However, the GIS technologies have been developed with strong assumptions about the instrumental/functional rationality (rather than the communicative/procedural rationality) as a base for decision-making procedures. Consequently, the GIS-based decision-making methods and practices have often been criticized for the failure to provide suitable tools for an active public participation. The GIS community has addressed this criticism by offering analytical and decision support tools that are accessible to non-experts. This is reflected in the increasing interest in the Web-based methods for public participation GIS (PPGIS). One of the main challenges in developing the Web-based PPGIS is the task of integrating the conventional Web-GIS techniques with the methods facilitating the participants to articulate their preferences, opinions, and values concerning decision-making problems. This challenge can be addressed by integrating the Web-PPGIS and MCDA methods. A related challenge of using GIS-MCDA as a tool for on-line participatory decision-making is to make sure that the GIS-MCDA methods are used properly. To this end, one should emphasize that the main function of MCDA in participatory decision-making is to help the decision participants in developing a constructive and creative approach to the problem at hand, rather than to support them in identifying the “best” solution. The use of argumentation maps (which combine Web-based mapping tools with a structured discussion forum to support geographically referenced discourse) in conjunction with MCDA in the WebGIS environment provides a platform for exchanging facts, knowledge, ideas, preferences, opinions, arguments, propositions, etc. in a dynamic process of human-computer-human interactions. From this perspective decision-making can be considered as a collective learning process supported by the PPGIS-MCDA on-line system.

4. Concluding remarks

The process of merging traditionally distinct disciplines requires a tight collaboration among researchers and practitioners with different areas of expertise. Regrettably, the collaboration between the two disciplines involved in integrating GIS and MCDA has been rather limited. Most of the contributions to GIS-MCDA research have come from disciplines outside the MCDA community. Specifically, one-direction integration has dominated the approaches for interfacing GIS and MCDA. This approach provides a mechanism for importing/exporting data and information via a single flow that originates either in the GIS or MCDA software. GIS as the principle software has been used in majority of projects on integrating GIS and MCDA. Also, most of the GIS-MCDA applied research

has been done without any participation of the MCDA experts and practitioners. The issue of a tighter collaboration between the GIS and MCDA communities is of critical importance for advancing research and practices in the area of GIS-MCDA.

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Wallenius, J., J.S. Dyer, P.C. Fishburn, R.E. Steuer, S. Zionts, and K. Deb (2008) Multiple criteria decision making, multiattribute utility theory: Recent accomplishments and what lies ahead. *Management Science*, 54(7):1336–1349.

MCDA Research Groups

DSS Group - Romania

DSS Group Romania was set up in 2002 by Dr. Luminita Duta and Prof. F.G. Filip at the State University "Valahia" of Targoviste to continue and and extend te research works which started in early 80ies at the National Institute for informatics (ICI) Bucharest. It is a team of young members from different Romanian universities and research institutes, which has as main goal the research in the field of decision support systems. The group web-page is http://ssd.valahia.ro/indexuk.html. The groups' objective is to create a core of researchers from several Romanian universities whose works and publications are oriented towards the study and implementation of DSS in finance, industry, environment protection and transportation. The group is lead by Prof. Florin Gheorghe FILIP, the vice-president of the Romanian Academy. The members of this group are Associate Prof. Luminita DUTA, Assist. Prof. Ana SUDUC, Assist. Prof. Mihai BIZOI, Assist. Prof. Ion ISTUDOR, and Assist. Prof. Ciprian POPESCU from "Valahia" State University of Targoviste, ing. Ioana STANESCU from ATS Targoviste, Associate Prof. Constantin Bala ZAMFIRESCU,Associate Prof. Marius CIOCA,and Assist Prof Ciprian CANDEA from University Lucian Blaga of Sibiu, and mat. dr. Florin BOBOSATU from Technical University "Politechnica" University of Bucharest.

Prof. Filip has given DSS lectures at Polytehnica University from Bucharest, Valahia University of Targoviste, Lucian Blaga University from Sibiu and University of Economic Studies (ASE) Bucharest Romania since 1997. He has been supervising PhD studies in Computer-aided Decision-making at Dept. of Automation and Computers of TU "Politechnica" Bucharest since 1993 and at Romanian Academy since 2002. Dr. Luminita Duta has given courses on DSS at Dept. of Transportation Systems of Technical University" Politechnica" Bucharest (master graduate studies) since 2007) and at State University "Valahia" Targoviste since 2002. Some reference books of Prof. FILIP are: Filip, F.G. (2007). ***"Decision Suport Systems"***, 2nd Edition, Ed. TEHNICA, Bucharest; Filip F.G. (2005). ***Computer Aided Decision–making: Decision makers, and associated IT Tools***, Ed. TEHNICA , Bucharest; Filip, F.G. (2004). ***Decision Support Systems***, Ed. TEHNICA, Bucharest.Prof. FILIP's book *"**Computer Aided Decision–Making**"* 1st edition, (Expert Publishers & Technical Publishers, Bucharest, 2002 – in Romanian)was awarded in 2003 the**"COPY RO Prize"** as the best Romanian book in IT of the year.

Other recent relevant publications which review, among other contributions , the combination of algorithmic models with AI-based techniques proposed by Prof Filip in mid '80ies and the early applications to production control in the process industries and water systems are: Fillip F.G. (2008)*Decision support and control for large-scale complex systems* (**Annual Reviews in Control**, 32(1), p.61-70, 2008);, and Filip, F. G., Leiviska, K. (2009). Large-scale complex systems. In: Springer Handbook of Automation (S. Y. Nof, Ed.), Springer, Dordrecht, p. 619-.638.

Three main new research directions in integrating advanced DSS in real applications are envisaged by the members of the DSS Romanian group: **1) Decision Support Systems for Public Transportation, 2) Web-based Group Decision Support Systems (for partnership activities facilitation, banking, and medical applications), 3) Decision Support Systems used in Disaster and Environment Management.**

In The White Paper[1] of the European Commission the Intelligent Transportation Systems (ITS) have an important place since they have the potential to provide solutions for the 21st century European transportation. The modern solutions for transportation have to take into account the transportation efficiency and velocity as well as its security of passengers. Specific constituents of ITS' are Decision Support Systems in Transportation (DSST), which are utilized at the operational and organizational management levels. These are intelligent systems that support the decision unit – a human being or a group of persons - in approaching complex situations and decision - making processes. Some articles that treat this subject: *Computer-Based Decision Support for Railroad Transportation Systems: an Investment Case Study* (Duta L., Bituleanu I., Filip F. G., Istudor I) "Informatica Economica" Journal, 13 (. 2), 2009; Integrating DSS in Public Transportation Monitoring Systems (Duta L.,

[1] http://ec.europa.eu/transport/strategies/2001_white_paper_en.htm#

Zamfirescu Ctin., Cioca M.) **The 12th IFAC "Large-Scale Systems" LSS 2010 Symposium Lille , France.**

In group and organizational decisions-making processes, not always the participants can meet face to face. Internet changed the perspective on meetings and also on decision making processes. Virtualization of meetings has become a common way for collaboration among employees, customers, partners, trainees and trainers. Group decision support systems allow the collaboration between teams' members to achieve common goals and facilitate the decision-making processes. Without the need of traveling and meeting organization, the group decision support applications permit the participation of people from different locations (Zamfirescu C. B. , Filip, F.G. (2010). Swarming models for facillitating collaborative decisions. **International J. of Computers , Communication and Control-IJCCC , 4** (1), 125-137 and Zamfirescu C. B. and Luminita Duta (2009).*A stigmergic approach to deal with uncertainty in planning the e-meetings***,** Proceedings, **Uncertainty and Robustness in Planning and Decision Making URPDM 2010** (www.inescc.pt/urpdm2010

One of the most important element that can influence to great extent the success of a system used for decision-making, is the user interface. Users expect from developers to create advanced interactive interfaces which are easy to use and easy to learn, without the need of reading many pages. Some representative papers in this field are:

Interface Architecture for a Web-based Group Decision Support System (Suduc AM., Bizoi M, Duta L, Gorghiu G), **Studies in Informatics and Control,** Vol. 18, nr. 3, 2009; Using collaborative platforms for decision support (Bizoi, M.., Suduc, A.M., Filip, F.G.) **Proceedings of the 17th International Conference on Control Systems and Computer Science, CSCS 17**, Vol. 2, 2009.

Another research direction of our group is the knowledge-based DSS. The aim is to create Decision Support Systems that combine different types of data and information from various sources in a seamlessly manner and without much user intervention. These properties are related to knowledge processing and decision making activities such as knowledge representation, knowledge management and reuse, reasoning and inference techniques, as well as risk analysis. Two of the papers that treat this aspect: *Web-Based Knowledge-Driven Decision Support Systems* (Stanescu I., Stefan A.), accepted to be presented at **The 12th IFAC LSS 2010 Symposium Lille , France**; *The cognitive complexity in modeling the group decision process* (Zamfirescu Ctin, Duta L, Barna I), **Understanding Intelligent and Complex Systems Conference, UICS 2009, (**http://uics.upm.ro/)

Web Based Decision Support Systems (WB-DSS) are referring to computerized systems that deliver decision support tools using a Web browser and large Data Bases. Developing the user interface and data managing for Web-based DSS remain the major tasks in building such complex systems. Some works are dedicated to the implementation of WB-DSS that assist the ecology decisions makers to choose the best solution in the decision process to minimize the risk in environmental and disaster management systems. Through the Web interface the DSS system can present graphical information of different environmental parameters evolution and can be easily integrated with an expert system or an intelligent system. Marius Cioca wrote a book chapter: *Decision Support Systems used in Disaster Management*, in **Decision Support Systems**, (Chiang S. Jao Ed.), INTECH Publishing, 2010
Other relevant publications are :

Environment web-based decision support system (Bobosatu F., Duta L), Proceedings of **The 1st International Workshop on Energy, Transport and Environment Control Applications, ETECA 2009**, (http://www.eteca.valahia.ro/); *An Experimental Web-Based Decision Support System In Ecology* (Bobosatu F. Duta L), **The Scientific Bulletin of Electrical Engineering Faculty,** 2009

Industrial and banking applications are developed on demand of our economic partners. These DSS systems are the results of some national projects and are described in publications as: *Control and Decision Making Process in Disassembling of Used Electronic Products*, (Duta L., Filip F. G.) **Studies in Informatics and Control,** 17 (1), 2008; *Evolutionary Programming in Disassembly Decision Making* (Duta L., Filip F. G., Popescu C.) , Proc., **International Conference on Computers, Communications and Control, ICCC08**, (http://www.iccc.univagora.ro/iccc-2008/); *WEB-Based Decision Support System*, (Istudor I., Duta L., Filip F. G.), **Proc. of the 9th International Conference on Informatics in Economy**, (http://www.conferenceie.ase.ro/).

The members of the DSS Group Romania are attending and organizing invited sessions and thematic conferences such as ETECA 2009 International Workshop on Energy, Transportation and Environment, (http://www.eteca.valahia.ro); or the Invited Session organized by Dr. Duta and Dr Cioca entitled ***Advanced DSS in complex industrial and management systems***, at The 12th IFAC LSS 2010 Symposium Lille , France (http://lss2010.ulbsibiu.ro);

By attending the **ICT Action IC0602 „Algorithmic Decision Theory",** The Romanian DSS Group intends to align and integrate its work in an European network of specialists and researchers from the field of Decision Theory, Theoretical Computer Science and Artificial Intelligence.

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Forum

Obstacles and Avenues to Promoting the Use of Multi Criteria Decision Aiding

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Introduction

In a 2009 address at Université Paris-Dauphine, Philippe Vincke said that preference aggregation is part of any human activity involving decision making [5]. This stresses how important is Multi Criteria Decision Aiding (MCDA), as human activities are now widely acknowledged to have a significant impact one the Earth climate [8]. The Kyoto Protocol, signed and ratified by 187 states aims at achieving the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would minimize dangerous anthropogenic interference with the climate system" [10]. This common objective turns out to be formulated in a way that sounds familiar to decision aiding and operational researchers, as the problem is to make appropriate decisions at different stages and in different places so as to meet economical performances while satisfying constraints due to climate protection. In a more modest scale yet, companies face challenges of the same decisional nature as bad decisions can make the difference between success and bankruptcy. In such a context, it is very surprising to observe that multiple criteria decision making aiding specialists still have relatively few interactions with industrialists and international institutions. This paper hypothesizes some of the reasons for such a situation based on industrial project collaborations in France, and suggests some ideas for promoting MCDA beyond research centers and universities.

Knowing about MCDA

At first sight, it could be thought that the main reason for which MCDA experts are not more involved in industrial projects is probably because industrialists are simply not aware of the existence of scientific approaches to decision aid. This is undeniably true, but is far from being the only reason. As a matter of fact, even when industrial practitioners are informed that advanced approaches are available for addressing some of the problem they face daily, they generally do not use them. This is not only true for decision aiding: many researcher working in the field of scheduling can see while visiting companies that planning and scheduling are most of the time managed by employees relying on their experience, using Microsoft Excel or Microsoft Project, with no particular knowledge of theoretical approaches. When asked about not using more advanced techniques, managers often reply that they view scientific scheduling techniques as a matter of experts, or something that would require a long training and a costly investment. Even when qualified personnel is available, these techniques are generally not being used whereas a worthy benefit could be taken from them.

Decision making as a personal prerogative

Unlike scheduling, which is a well-circumscribed activity sometimes regarded as mostly technical-focused, decision making is more often connected to long term strategic aspect of the company management. Not only executive decision makers rarely express the need for any assistance, but they are also reluctant to share sensitive information on the strategy of their company with researchers, who are willing to publish their work internationally. Moreover, in projects led by scientists, like ANR research projects in France [1], decision makers often have little experience of decision-making in such a context, and they tend to make decisions alone, as they view their decision making role as a personal prerogative endowed by their acknowledged expertise in the project's field.
Consequently, providing decision aiding for managing an industrial activity or a scientific project is not easy first because the need for assistance is rarely expressed, and second because most decision makers whether rightly or wrongly, are not willing to share information or decision making power.

Trust is the key

Provided that the decision maker is willing to be assisted in the decision making process, another, and not least obstacle should be overcome: the nature and meaningfulness of result provided by MCDA techniques. At this point, the analogy with scheduling is no longer straightforward. Indeed, production managers are quite often bound to accept and to use a complex scheduling approach that they do not understand, provided that they can interpret the results and check that the new approach outperforms the one they used to rely on. However, whereas advanced MCDA techniques provide a deep insight in the risks and consequences of a series of decisions, they return results which requires good mathematics background they usually lack for interpreting them. As the decisions and their consequences deeply commit the decision maker, he will not be likely to give up his common sense or the decision making procedures he is familiar with for an advanced approach that yields results that he does not fully understand. In such a case the process intended to provide assistance is very likely to be perceived as intrusive, and may be regarded with defiance.

The need for a progressive introduction to MCDA

For this reason, coming up with the latest MCDA approaches may be counter-productive, and it might be preferable to focus on what is really intelligible and hence

helpful to the decision maker. For instance, robustness approaches based on the min max regret criterion [6] have long been considered to be "over conservative" measures by the scientific community because the numerical value of such a criterion exclusively depends on the worst case scenario, leading to draw the decision maker attention to this single scenario, that may hopefully be very unlikely. However, such results on a robustness problem have the significant advantage of being easy to understand, and to provide a valuable piece of information to the decision maker. Indeed, one should not forget that decision makers that do not use advanced tools or softwares have just no quantitative measurements to the robustness of a solution. Consequently, a first approach that provides global information on the behavior of a solution in the worst case is already something new that the decision maker must get used to integrate in his usual decision making processes. Moreover, providing light and easy-to-use information on robustness also introduces the decision maker to MCDA in a progressive way, letting him understand that decision aiding is a tool that is not intended to replace his skills and expertises nor to remove or hamper his decision making power. As a consequence, when a MCDA expert designs a decision aiding tool or software, he should maybe be paying a particular attention to the decision aiding acceptability aspect of his proposal, as a rather modest assistance is probably the best trade-off between unintelligible results to the decision maker and no decision aiding at all.

Flexibility as a technological-only concern

Robustness is a notion close to flexibility, as evidenced in this book [3]. In the field of decision making, flexibility may sound as an even more appealing feature as it allows for on-line adjustments to fit the context, while robustness has a more static connotation. However there is a quite common misunderstanding about flexibility when this feature is intended to provide opportunities to adjust the solution (which can be a schedule, or more generally any decision to be applied in the future) to the actual context of its execution. Indeed, if flexibility is undeniably useful for facing uncertainty, it remains an unexplored potential if it does not come along with a reflection on how to use it appropriately for facing context changes and disturbances. As an example of misunderstanding, some people think about flexibility as a technological asset only, and neglect or underestimate the on-line decisional aspects attached to this feature, as well as the actual management of this flexibility. Whenever technology allows for fast and cheap reconfiguration (this is typically the case for embedded electronic systems), the available options for overcoming the effects of unexpected events and disturbances appear to be numerous. This often leads to think that the more potential solutions to a problem, the easier it can be addressed, which is unfortunately not true in general as any operational researcher knows. However, most of the efforts devoted to flexibility as a mean to overcome context changes remain chiefly focused on technical aspects, and this trend is drastically accentuated by the fact that in the concurrent engineering method (also known as integrated product development) [7], which is very popular in industry and also in scientific project management, hardware and software are not developed by the same team of designers. Consequently, once flexibility capabilities have been successfully designed and implemented at the hardware level, the problem of facing disturbances is considered to be nearly closed, as it is just a matter of using it appropriately in the control software, while this "appropriate use" is exactly the point of MCDA, and is of course far from being as easy as it looks from the technological experts' point of view. Another drawback originating in the use of concurrent engineering is that technical choices are likely to be put in question all along the design process. This has not only an impact on flexibility, but also on the whole decisional organization of the system. As a slight modification in the constraints of a combinatorial optimization problem is known to have a potentially drastic impact on the solution process for addressing it, the formulation of MCDA problem is also subject to the same "sensitivity" to technological changes or adjustments. This is likely to turn the problem modeling and the implementation of solutions into a very time- and energy-consuming process.

Flexibility as a tool for robustness

There exists another way to developing flexibility for facing unexpected events or fitting to the context on-line. The authors in [2] propose to maximize flexibility for ensuring robustness, by using the ordered group assignment representation. They show that by minimizing the number of groups of permutable operations, the number of different solutions is maximized, providing the decision maker with a large choice of options for overcoming unexpected events. The number of different schedules that can be represented may be huge (up to 4.7×10^{21} in one of the computational experiments they performed), but the actual usefulness of the offered flexibility is not assessed. Flexibility appears to be developed as an end to itself, without connecting it to its practical usefulness for facing disturbances. Indeed, it may happen that the huge number of alternative solutions offered by flexibility is useful for a restricted class of scenarios, and useless in all other situations. The point is that the decision maker has no precise idea of which perturbations or events the flexibility he is provided with protects him from.

Getting into projects

If the need for decision aiding is not explicitly expressed, MCDA researchers may rely on their skills in operations research for getting involved in industrial and scientific projects. Indeed, algorithmics and combinatorial optimization are undoubtedly more popular than MCDA, and skills in operations research can constitute an access point to collaborations as well as an opportunity to

convince project members that mathematical-based methods can outperform the algorithms or common sense-based approaches that are considered as references in some technical fields (this has been shown to be particularly true in electronics [4], [9]). Moreover, this indirect approach has also the significant advantage of managing time for introducing decision makers to MCDA, as well as to provide the MCDA specialist with a deeper knowledge of the decisional structure of the system to be designed by the project team. The MCDA researcher is then able to identify interesting decision-aiding issues in the project, and to submit specific and convincing proposals for using his decision-aiding skills, which is preferable to having to respond to a request with no preliminary knowledge on the context.

Managing concurrent engineering

Concurrent engineering may be perceived as a source of nuisance to a MCDA expert working on a project, as it is likely to bring his work back to square one several times. However, a reflection on flexibility and robustness with the project team may mitigate the side-effects of this project leading methodology. Indeed, once the objectives in terms of robustness and flexibility are clearly stated, some technological platform changes or updates may be avoided. Whenever they occur, the two following situations may occur. First, the new platform prevents to meet the flexibility and robustness objectives. This is not very likely to happen, but the argument may be sufficient to reject the platform change, or to negotiate down flexibility and robustness features. Second, the new platform has higher flexibility and robustness capabilities. In that case, the system requirement should stick with its features, and the project team should refrain from investing time and energy for taking advantage of the system update as it would just lead to "over"-quality. If technology (and hence flexibility) is agreed not to be an end to itself, then it becomes clear that the pursuit of the optimal exploitation of the system technological characteristics may generate additional development costs and delays when technical updates are as frequent as in concurrent engineering.

Conclusion

The obstacles to the use of MCDA in the industry and even in scientific projects are numerous, and should not be underestimated. They mostly originate in the ignorance of MCDA in most of those who would take benefit from it, as well as in the fear of losing decision making power, especially when the results of MCDA are not intelligible to their potential users. All these reasons stress the need for an introduction to MCDA, that requires time and efforts for adapting the decision aiding to what the decision maker is willing to accept. Thus, it should be useful to refrain from using the most advanced MCDA techniques, at least in the first place. The misuse of flexibility, that may be the result of an excessively technological-oriented vision may also be avoided as it is likely to lead MCDA researchers to the pursuit of the unnecessary exploitation of all technical features at the expense of deadline meeting. But finally, the fact that the use of MCDA requires time can also be seen as an advantage, as it provides the opportunity to gather information on the decisional aspects of the project, and to submit relevant proposals to project leaders, which can only increase the probability of MCDA acceptance.

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Consultancy Companies

WHO WE ARE

Founded in 2008, Cogentus is a small, boutique consultancy which concentrates on data analytics. We are currently engaged on a range of assignments where Multi Criteria Decision Analysis (MCDA) techniques are applied to business problems in the strategy arena. We help organisations to organize and analyze data, creating real added value.

Our name comes from the adjective co - gent (kojent). Our data analytics are designed to be powerfully persuasive and work on a practical level for senior managers.

OUR VALUES

We believe in:

Delivering value to our Clients.
Personal and Professional integrity.
Continuous learning.
Practical solutions.
Working as a team.

OUR VISION

We want to be recognized as the thought leaders in the field of data analytics.

WHAT WE DO

We collect, store, aggregate and analyze data. Most importantly we convert that analysis into value-creating action.

We help to improve an organisation's ability to do more work with less money at all levels:

Strategy - develop revised strategies to plan for coming out of the recession.

Program Management - optimise capital expenditure programmes with reduced budgets.

Project Management - select between competing projects or technologies to create a compelling investment appraisal.

- Monitoring – create auditing systems to evaluate implemented activities, comparing with prospective projects and improving added value.
- Information Management – build modern data capture tools and online data warehouses to help organization dealing with the increasing information flow of the new knowledge economy.

WHAT'S DIFFERENT

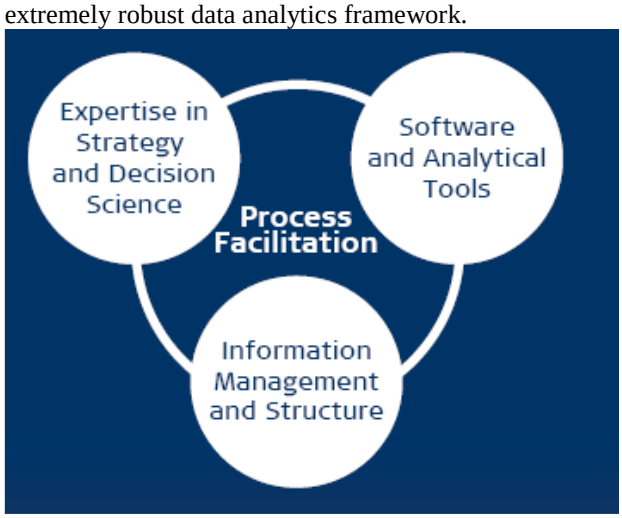
Stakeholder Perspectives - our data analytics is unique in that we can take into account stakeholder viewpoints. It is clear that different stakeholders value things differently and that trying to create a single data source that suits all is not going to work. In fact, it papers over a multitude of cracks. Far better to accept those differences and see what effect it has and then **manage those differences.**

Strategic Alignment – our data analytics are carried out such that it aligns with you organisation's mission and vision. This means you can always be sure of a good strategic fit whatever.

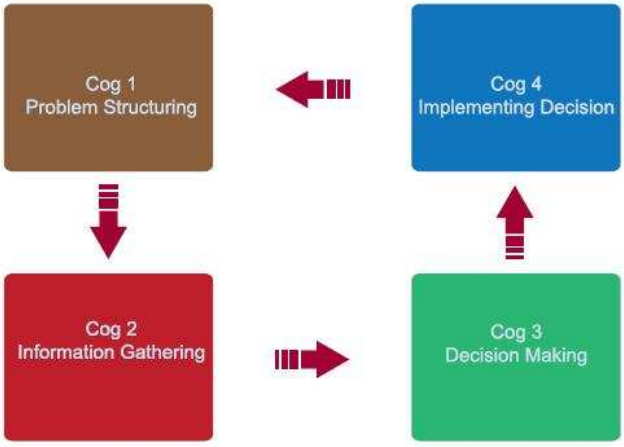
Value For Money – our data analytics are all about demonstrating value for money arguments even where value is hard to measure.

OUR APPROACH

We have a unique mix of academic expertise in strategy and decision science, robust reusable processes and our own analytical tools. These combine together, using facilitated process where necessary, to provide an extremely robust data analytics framework.



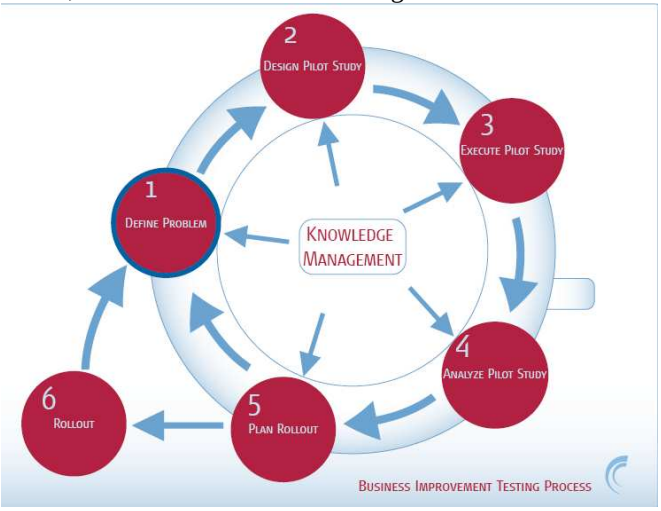
Our four stage process is a proven methodology for a systematic approach which is essential when dealing with decisions involving numerous stakeholders with alternative perspectives.



Our decision support software include Promax Ranking and Promax Efficiency which are leading edge analytical tools based on MCDA techniques. They enable companies of all sizes better understand complex problems to improve their decision making results in a cost effective manner. Their extensive simulation and scenario capabilities provide a less risky approach to test hypothesis, anticipate and adapt to change, optimize decided actions and return on investment for customers.
Global organisations across a range of industry sectors use our solutions to maximize project performance, optimize resource allocation, and improve their decision making processes.

HOW WE WORK

We understand that most of our data analytics will fall under the banner of "Business Improvement". You may already be doing something that seems similar or you may have identified a gap. We therefore always carry out a pilot study which is a very focussed and measurable project aimed at demonstrating that the improvement will, in fact, add economic value to the organisation.



WHAT WE'VE DONE

Program Management – project prioritization (Department of Energy, US)

We have been working with the US DOE Environmental Management group to help prioritize their nuclear research cleanup projects. Since each project has a cost to deliver and some benefits (mostly non financial) we can create a prioritized list based on benefit-cost ratio. However, the department has a limited budget so we created a portfolio of projects that gave the best overall benefit for the given budget.

Program Management – project selection (Foster Wheeler and Santos, UK and Aus)

We helped to determine the best technology for a major ($8bn) project to process coal seam gas into liquefied natural gas, as a cleaner energy source. Our work looking at the non financial benefits supported the detailed financial models.

Strategy Development – negotiation (Riopaila, Col)

We helped to develop the strategy for negotiation between the Company and the Unions by considering the alternative values of the key actors. In this case, the Government was also a key actor.

Strategy Development – blue ocean strategy (Raytheon, US)

We helped to develop a competitive strategy based on the blue ocean strategy concept. This unique approach focuses on facilitating creative thinking and strategic innovation. The concept has proven to increase profits when existing industry boundaries are expanded. Instead of always trying to offer more to do better our approach focus on the key market factors that allows being more efficient while finding differentiation.

Strategy Development – measures of effectiveness (Department of Defense, US)

We are currently engaged on a number of projects to determine Measures of Effectiveness for the US DOD. This includes their programs in the Middle East, Afghanistan and Mexico and they are all related to looking at issues from the perspective of those in the relevant countries. Once their value systems have been established and understood then there's a better chance that the programs can be adapted to satisfy them.

Strategy Development – partnering selection (Christian Aid, UK)

We helped this Charity developing a process for working with prospective business partners – ones who may bring expertise, political leverage or money to them. Nowadays, NGOs must learn to work more efficiently and be smarter about their decision making processes. By helping the organization to function more strategically, we can do our part to 'give something back'.

WHAT WE'RE PLANNING

UK University Guide

We are launching a guide to UK Universities in May 2010. This takes official data and aggregates it into a personalised league table for each student. Choosing a university is a decision which has multiple factors to consider, most of which are not purely financial. The

Cogentus University Guide leads students through the decision in a structured way, allowing them to evaluate at every level.

Promax 2010

We are launching our new multi criteria analysis software in April 2010. This updates our Promax Ranking software with a new and improved look as well as extra functionality.

Survey Wizard

We are launching our new market research tool in September 2010. This tool is used to collect and aggregate major market research data online prior to exporting to Promax for subsequent analysis. It can also be used for the data gathering stage for any decision, again prior to subsequent analysis in Promax.

For More information, please visit our website: www.cogentus.co.uk

Software

Please see the attached file.

Persons and Facts

Milosz Kadzinski (Milosz.Kadzinski@cs.put.poznan.pl) is the current Web Site Editor of our EWG.

The web page is at the URL:
http://www.cs.put.poznan.pl/ewgmcda/

About the 71th Meeting

71th MEETING OF THE EURO WORKING GROUP
MULTIPLE CRITERIA DECISION AIDING
Torino, Italy, March, 2010.

The 71st meeting of the European Working Group "Multiple Criteria Decision Aiding (MCDA)" was held in Turin, Italy, the 25-27 of March 2010, at the Regional Museum of Natural Sciences (a historical building - XVII century - in the centre of Turin). Maria Franca Norese was the organiser, with the help of Ersilia Liguigli and Chiara Novello. The organisation was supported by the Regione Piemonte and the Politecnico di Torino. EURO supported the participation of some PhD students and young researchers.

Scientific Programme

The main theme of the meeting was "Decision aid applications in private and public organizations: today and in the future" and several studies, involving real-world applications of MCDA over a wide spectrum of fields, have been submitted, together with methodological studies that might facilitate future applications.

Overall, 35 abstracts had been submitted, out of which 14 were presented in five sessions, 11 were included for discussion and the remaining 10 were proposed in a pre-meeting (the 24th of March), where the organization of an Italian section of the EURO WG MCDA had been discussed.

The 71st Meeting was attended by 60 participants, from 14 different countries. A "poster" session was dedicated to young MCDA researchers and introduced the meeting with eight active participants (Elisabetta Capobianco, Claudia Ceppi, Lioba Markl-Hummel, Chiara Novello, Luisa Paolotti, Mario Regneri, Diana Rolando, Aida Valls Mateu).

A debate was proposed in the 4th session on "How to assign numerical values to different parameters that aim at differentiating the role that the criteria have to play in a comprehensive preference model?" Bernard Roy, Marc Pirlot, Roman Slowinski and Thierry Marchant introduced their points of view, in order to stimulate the debate that resulted interesting and characterized by a really large and active participation.

Both full papers and abstracts were printed in the proceedings. Submitted papers will undergo a two-fold blind review to be selected for publication in a special issue of the International Journal of Multicriteria Decision Making **(**IJMCDM**),** a new journal published by Inderscience.

Social Programme

Anna Ostanello organised the traditional excursion on Saturday. The social programme included a visit to the Roero hills, between Turin and the Langhe hills, where the participants had the opportunity of visiting two fine wine producers and of admiring the beautiful countryside and its traditional cuisine, while the banquet on Thursday evening gave the opportunity of knowing a fresh reading of the Piedmont cuisine.

PROGRAMME

Jeudi 25 mars	**Thursday, March 25**

11.00 - 13.00 **Matinée des jeunes chercheurs: posters**
Young MCDA Meeting: posters
11.00 - 13.00 **Inscriptions/Registration**

13.15 - 14.00 **Déjeuner/Lunch**

14.00 - 14.30 **Session d'ouverture/Opening session**

Session 1

Président/Chairman : Jacques Pictet

14.30-15.30 **F. Macary, J. Almeida-Dias, J.R. Figueira, B. Roy**: Une application de traitement multicritère en gestion agroenvironnementale pour un Syndicat d'Aménagement et de Gestion des Eaux
15.30-16.00 **P.-H. Bombenger, J.-Ph. Waaub**: The Integrated Rural Planning System, an evaluative and participative method of decision-making support to build a sustainable urban development in the Ballons des Vosges Natural Regional Park

Papiers soumis à discussion/Papers submitted for discussion

- **W.K.M. Brauers, E. Zavadskas**: From the previously Centrally Planned Economy of China to Project Management by MULTIMOORA
- **G. Fernandez Barberis, M.C. Escribano Ròdenas**: A real life multicriteria decision making problem: Choosing the site for a University Kindergarten in Madrid

16.00-16.30 **Pause café/Coffee break**

Session 2

Président/Chairman : Jean-Philippe Waaub

16.30-17.00 **F. Taillandier, I. Abi-Zaid**: Vers une évaluation multicritère d'un parc immobilier en vue de construire un plan d'actions environnementales
17.00-17.30 **M.R. Trovato**: A decision model to support the architectural-urban regeneration actions for the old town of Mazara del Vallo
17.30-18.00 **S. Giove, P. Rosato**: The valuation of the attitude of historical building to sustainable economic reuse: a "non additive measure" approach
18.00-18.30 **A.-M. Poli, P. Oberti, J.-M. Culioli, M.-C. Santoni**: Outranking and temporal evaluation of public management effectiveness: an application to the natural reserve of Bonifacio strait

Papiers soumis à discussion/Papes submitted for discussion

- **L. Krus**: On decision support in the case of multicriteria cooperative games
- **N. Cremonesi, S. Griffa, M. F. Norese, C. Novello:** Cognitive mapping and multicriteria models to identify and structure user needs and requirements for an innovative system

- 20.30 **Dîner /Dinner**

Vendredi 26 mars Friday, March 26

Session 3

Président/Chairman: José Rui Figuieira

09.00-09.30 **C. Verly, Y. De Smet**: Some considerations about rank reversal occurrences in the PROMETHEE II method
09.30-10.00 **S. Greco, M. Kadziński, R. Slowinski**: The most representative parameter set for robust outranking approach
10.00-10.30 **S. Greco, V. Mousseau, R. Slowinski**: UTAGMS–INT: Robust Ordinal Regression of Value Functions Handling Interacting Criteria

Papiers soumis à discussion/Papers submitted for discussion

- **A. Leikab, O. Vaarmann**: On decomposition-coordination methods for multi-objective optimization
- **E. Fernandez, E. Lopez, F. Lopez**: Increasing Selective Pressure toward the best compromise in evolutionary multiobjective optimization: the NOSGA-II method

10.30-11.00 **Pause café/Coffee break**

Session 4

Débat/ Debate

Président/Chairman : Maria Franca Norese

11.00-13.30 Débat autour de la question: "**Comment attribuer une valeur aux différents paramètres qui ont pour objet de différencier le rôle que**

doivent jouer les critères dans un modèle de préférences globales?"
Après un rappel par la présidente de la raison d'être et de l'objet du débat (voir annexe jointe au programme), **Bernard Roy, Thierry Marchant, Roman Slowinski et Marc Pirlot** présenteront leurs points de vue en 10 minutes chacun afin de lancer le débat.

Debate on: "**How to assign numerical values to different parameters that aim at differentiating the role that the criteria have to play in a comprehensive preference model?**" After a reminder of raison d'être and aims of the debate (see the document that is forwarded with the programme), **Bernard Roy, Thierry Marchant, Roman Slowinski and Marc Pirlot** will introduce their points of view (10 minutes each) in order to stimulate the debate.

13.30-14.30 **Déjeuner/Lunch**

Session 5

Président/Chairman: Salvatore Greco

14.30 - 15.00 **Roy**: Vie du groupe et prochaines reunions/Working group matters and next meetings

15.00 – 16.00 **Lienert, N. Schuwirth, P. Reichert**: MCDA Elicitation Challenges in a Complex Real-World Decision to Reduce Pharmaceuticals in Wastewater from Communal Hospitals

Papiers soumis à discussion/Papers submitted for discussion

- **S. Vlah, J. R. Figueira**: An Interactive Approach for Multiple Criteria Scheduling in a Croatian Hospital
- **L. Marín, D. Isern, A. Moreno, A. Valls**: Web-based recommender using linguistic preferences

16.00-16.30 **Pause café/Coffee break**

Session 6

Président/Chairman: Marc Pirlot

16.30-17.00 **A. Ishizaka, Ph. Nemery**: A multi-step model for player grouping when sharing facilities

17.00-17.30 **S. Wegener and D. Kirschke**: Priority setting for the agri-environmental programme of Saxony-Anhalt – application of an interactive programming approach

17.30-18.00 **E. Liguigli**: Integrated use of Linear Programming and Multicriteria methods: an application to design a land monitoring system in the SMAT project

Papiers soumis à discussion/Papers submitted for discussion

- **T. Subrt, H. Brozova**: Knowledge Mapping in Group Decision-Making with the support of AHP and ANP
- **D. Loukas, S. Anastasiadou**: Evaluation of post-graduate studies: A multivariate –approach to a stochastic group decision-making problem
- **H. Yamnahakki , M Meslouhi**: Couplage de l'Analyse Multicritère d'Aide à la Décision et l'Analyse Coût-Bénéfice

18.00 Clotûre/ closing

Forthcoming Meetings

(This section is prepared by Carlos Henggeler Antunes)

Forthcoming EWG Meettings/
Prochaines réunions du Groupe

Note:

- It should be remarked again that this is a bilingual group; all the papers should be presented in both official languages of the group (i.e. French with English slides, and *vice-versa*).
- Ceci en un groupe bilingue ; tous les papiers doivent être présentés dans les deux langues officielles du groupe (i.e. en français avec les transparents en anglais et *vice-versa*).

The 72th of the European Working Group "Multiple Criteria Decision Aiding" will be held in Paris, France. October 7-9, 2010. Topic: MCDA put into practice / Preference Elicitation. Organizer: Vincent Mousseau (vincent.mousseau@ecp.fr).

The 73th of the European Working Group "Multiple Criteria Decision Aiding" will be held in Corsega, France. April 14-16 or March 24-26, 2011. Organizer: Pascal Oberti.

Other Meetings

Multi-Objective Programming and Goal Programming (MOPGP10)
Dates: May 24 - May 26, 2010
Location: Sousse, Tunisia
URL: http://mopgp10.logiq-isgis.org/

CIAC 2010 - 7th International Conference on Algorithms and Complexity
Dates: May 26 - May 28, 2010
Location: Rome, Italy
URL: http://ciac.di.uniroma1.it/

EWG ECCO XXIII - CO2010 Joint conference of European Chapter on Combinatorial Optimization and the British Combinatorial Optimization group
Dates: May 27 - May 29, 2010
Location: Malaga, Spain
URL: http://www.eccoxxiii.com/

International Workshop on Computational Stochastics
Dates: May 31 - June 2, 2010
Location: Amsterdam, The Netherlands
URL: http://www.math.tu-clausthal.de/~ws09/computational_stochastics-2010.html

Seventh International Symposium on Neural Networks
Dates: June 6 - June 9, 2010
Location: Shanghai, China
URL: http://isnn2010.sjtu.edu.cn

ALIO-INFORMS Joint International 2010 Buenos Aires
Dates: June 6 - June 9, 2010
Location: Buenos Aires, Argentina
URL: http://meetings2.informs.org/BuenosAires2010/

StochMod10: 3rd Meeting of the EURO Working Group on Stochastic Modeling
Dates: June 7 - June 9, 2010
Location: Nafplio, Greece
URL: http://users.uoa.gr/~aburnetas/stochmod10/

12th International Conference on Enterprise Information Systems (ICEIS)
Dates: June 8 - June 12, 2010
Location: Funchal, Madeira, Portugal
URL: http://www.iceis.org/

8th International Conference on DEA
Dates: June 10 - June 12, 2010
Location: Beirut, Lebanon
URL: http://www.deazone.com/dea2010/

32nd INFORMS Marketing Science Conference
Dates: June 16 - June 19, 2010
Location: Cologne, Germany
URL: http://www.marketingscience2010.uni-koeln.de/01/index.asp

10th Annual Informs Revenue Management and Pricing Conference
Dates: June 16 - June 18, 2010
Location: Cornell University, Ithaca, New York, USA
URL: http://www.informs.org

ECEG 2010 - 10th European Conference on eGovernment
Dates: June 17 - June 18, 2010
Location: Limerick, Ireland
URL: http://academic-conferences.org/eceg/eceg2010/eceg10-home.htm

Seventh Triennial Symposium on Transportation Analysis - TRISTAN VII
Dates: June 20 - June 25, 2010
Location: Tromso, Norway
URL: http://www.tristan7.org

24th Mini EURO Conference on Continuous Optimization and Information-Based Technologies in The Financial Sector
Dates: June 23 - June 26, 2010
Location: Izmir, Turkey
URL: http://cs.ieu.edu.tr/europt-2010/

2010 INFORMS MSOM Society Annual Conference
Dates: June 27 - June 29, 2010
Location: Haifa, Israel (ISR)
URL: http://msom.technion.ac.il/

2010 INFORMS Service Science Conference
Dates: July 7 - July 10, 2010
Location: Taipei, Taiwan
URL: http://icss.ie.nthu.edu.tw/icss/

DSS 2010 - 15th IFIP WG8.3 International Conference on Decision Support Systems
Dates: July 7 - July 10, 2010
Location: Lisbon, Portugal
URL: http://dss2010.di.fc.ul.pt/

EWG 8th EUROPT Workshop on Advances in Continuous Optimization
Dates: July 9 - July 10, 2010
Location: Aveiro, Portugal
URL: http://www.europt2010.com

24th European Conference on Operational Research (EURO XXIV)
Dates: July 11 - July 14, 2010
Location: Lisbon, Portugal
URL: http://www.euro2010lisbon.org

International Conference on Modeling and Simulation
Dates: July 15 - July 17, 2010
Location: Barcelona, Spain
URL: http://www.amse-modeling.com/ms10

Mixed Integer Programming 2010
Dates: July 26 - July 29, 2010
Location: Atlanta, Georgia, USA
URL: http://www2.isye.gatech.edu/mip2010/

Computational Management Science 2010
Dates: July 28 - July 30, 2010
Location: Vienna, Austria
URL: http://www.univie.ac.at/cms2010/

2nd International Conference on Applied Operational Research (ICAOR'10)
Dates: August 5 - August 27, 2010
Location: Turku, Finland
URL: http://www.tadbirstm.org.ir

Practice and Theory of Automated Timetabling Belfast 2010
Dates: August 10 - August 13, 2010
Location: Belfast, UK
URL:
http://www.cs.qub.ac.uk/~B.McCollum/patat10/index.html

12th International Conference on Stochastic Programming
Dates: August 16 - August 20, 2010
Location: Halifax, Nova Scotia, Canada
URL: http://ispc12.dal.ca

OR 2010, International Conference on Operations Research
Dates: September 1 - September 9, 2010
Location: Munich, Germany
URL: http://www.or2010.de

OR52 Annual Conference
Dates: September 7 - September 9, 2010
Location: London, UK
URL: http://www.orsoc.org.uk

MCPL 2010 - Management and Control in Production and Logistics
Dates: September 8 - September 10, 2010
Location: Coimbra, Portugal
URL: http://mcpl2010.uc.pt/
http://www.icfc.ijcci.org

INFORMS Annual Meeting 2010 Austin
Dates: November 7 - November 10, 2010
Location: Austin, Texas, USA
URL: www.informs.org

2010 IEEE International Conference on Industrial Engineering and Engineering Management
Dates: December 7 - December 10, 2010
Location: Macau, China
Sponsor: www.IEEM.org

INFORMS 2011 Practice Conference
Dates: April 10 - April 12, 2011
Location: Chicago, USA
URL: www.informs.org

INFORMS Applied Probability Society Conference
Dates: July 6 - July 8, 2011
Location: Stockholm, Sweden
URL: www.informs.org

2011 IFORS Conference on World OR : Global Economy and Sustainable Environment
Dates: July 10 - July 15, 2011
Location: Melbourne, Australia
URL: http://www.ifors2011.org/

OR 2011 - International Conference on Operations Research
Dates: August 30 - September 2, 2011
Location: Switzerland Zurich, Switzerland
Sponsor: http://www.ifor.math.ethz.ch/

WCO 2010 - 3rd Workshop on Computational Optimization,
Dates: October 18 - October 20, 2010
Location: Wisla, Poland
URL: http://www.imcsit.org/pg/305/247

INFORMS Annual Meeting 2011 Charlotte
Dates: November 13 - November 16, 2011
Location: Charlotte, North Carolina, USA
URL: www.informs.org

21st International Conference on Multiple Criteria Decision Making
Dates: June 13 - June 17, 2011
Loction: Jyväskylä, Finland
URL: https://www.jyu.fi/en/congress/mcdm2011

Announcements and Call for Papers

Web site for Annpoucements and Call for Papers:
www.cs.put.poznan.pl/ewgmcda

Books

Constumer Satisfaction Evaluation
By
Yannis Siskos and Vangelis Grigoroudis
Springer 2010

Abstract
The customer orientation philosophy of modern business organizations and the implementation of the main principles of continuous improvement, justifies the importance of evaluating and analyzing customer satisfaction. In fact, customer satisfaction is considered today as a baseline standard of performance and a possible standard of excellence for any business organization. Extensive research has defined several alternative approaches, which examine the customer satisfaction evaluation problem from very different perspectives. These approaches include simple quantitative tools, statistical and data analysis techniques, consumer behavioral models, etc. Many of these approaches do not consider the qualitative form of customers’ judgments, although this information constitutes the main satisfaction input data. Furthermore, in several cases, the measurements are not sufficient enough to analyze in detail customer satisfaction because models’ results are mainly focused on a simple descriptive analysis. Taking into account all the above, the aim of this book is to provide a comprehensive discussion of the customer satisfaction evaluation problem, by presenting an overview of the existing methodologies, as well as the development and implementation of an original multicriteria method in the context of this particular problem. The main objective of the presented multicriteria method (MUSA method) is the development of a model able to evaluate the level of customer satisfaction both globally and partially for each of the characteristics/attributes of the offered product/service. Moreover, the method aims at providing an integrated set of results capable to analyze customer needs and expectations and to justify their satisfaction level. Finally, the development of a decision support tool emphasizing the understanding and applicability of the results is also examined.

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Multiple Criteria Decision Making for Sustainable Energy and Transportation Systems
Proceedings of the 19th International Conference on Multiple Criteria Decision Making, Auckland, New Zealand, 7th - 12th January 2008

M. Ehrgott, The University of Auckland, New Zealand; B. Naujoks, Login GmbH, Schwelm, Germany; T.J. Stewart, University of Cape Town, South Africa; J. Wallenius, Helsinki School of Economics, Finland (Eds.)

In the twenty-first century the sustainability of energy and transportation systems is on the top of the political agenda in many countries around the world. Environmental impacts of human economic activity necessitate the consideration of conflicting goals in decision making processes to develop sustainable systems. Any sustainable development has to reconcile conflicting economic and environmental objectives and criteria. The science of multiple criteria decision making has a lot to offer in addressing this need. Decision making with multiple (conflicting) criteria is the topic of research that is at the heart of the International Society of Multiple Criteria Decision Making. This book is based on selected papers presented at the societies 19th International Conference, held at The University of Auckland, New Zealand, from 7th to 12th January 2008 under the theme "MCDM for Sustainable Energy and Transportation Systems"

2010, XVIII, 389 p., Softcover
ISBN: 978-3-642-04044-3
http://springer.com/978-3-642-04044-3

*** *** ***

Handbook of Multicriteria Decision Analysis

Zopounidis, Constantin; Pardalos, Panos M. (Eds.)
Springer, 1st Edition., 2009, XXV, 455 p.,
Hardcover
ISBN: 978-3-540-92827-0
Due: April 28, 2010

Multicriteria analysis is a rapidly growing aspect of operations research and management science, with numerous practical applications in a wide range of fields.

This book presents all the recent advances in multicriteria analysis, including multicriteria optimization, goal programming, outranking methods, and disaggregation techniques. The latest developments on robustness analysis, preference elicitation, and decision making when faced with incomplete information, are also discussed, together with applications in business performance evaluation, finance, and marketing. Finally, the interactions of multicriteria analysis with other disciplines are also explored, including among others data mining, artificial intelligence, and evolutionary methods.

*** *** ***

Advances in Multi-Objective Nature Inspired Computing

Edited by:
Carlos A. Coello Coello
Clarisse Dhaenens
Laetitia Jourdan

Studies in Computational Intelligence, Vol. 272 1st Edition., 2010, 200 p.

ISBN: 978-3-642-11217-1

http://www.springer.com/engineering/book/978-3-642-11217-1

The purpose of this book is to collect contributions that deal with the use of nature inspired metaheuristics for solving multi-objective combinatorial optimization problems. Such a collection intends to provide an overview of the state-of-the-art developments in this field, with the aim of motivating more researchers in operations research, engineering, and computer science, to do research in this area.
As such, this book is expected to become a valuable reference for those wishing to do research on the use of nature inspired metaheuristics for solving multi-objective combinatorial optimization problems.

This volume consists of eight chapters, including an introduction that provides the basic concepts of multi-objective combinatorial optimization.

*** *** ***

Trends in Multicriteria Decision Analysis

M. Ehrgott, J.R. Figueira, and S. Greco (Editors)

Forthcoming, 2010 (for more details see the next issue of the Newsletter)

Other Works

(Communicated by the authors)

Collections du LAMSADE

(Université Paris-Dauphine)

Available at: www.lamsade.dauphine.fr/cahdoc.html

Preprints du CoDE

(Université Libre de BRuxelles)

Available at: www.ulb.ac.be/polytech/smg/

Research Reports of INESC Coimbra

Available at: www.inescc.fe.uc.pt/ingles/pubinter.php

Working Papers of CEG-IST Lisbon

Available at: www.deg.ist.utl.pt/cegist/artigosinternos_en.shtml

Seminars

SÉMINAIRE «MODÉLISATION DES PRÉFÉRENCES
ET AIDE MULTICRITÈRE À LA DÉCISION»

Responsables : Bernard ROY,
Daniel VANDERPOOTEN

(le mardi, à 14.00)

16 mars 2010 — Conférence de **Stéphane Deparis** (Doctorant à l'Ecole Centrale de Paris, **Vincent Mousseau** (Professeur à l'Ecole Centrale de

	Paris) et **Meltem Oztürk** (Maître de Conférences à l’Université Paris-Dauphine : *Investigations expérimentales du concept d’incomparabilité.* (salle à préciser)
6 avril 2010	Conférence de **Lucie Galand** (LAMSADE) : *Algorithmes exacts pour l’optimisation d’opérateurs OWA dans des problèmes d’arbres couvrants multi-objectifs*. (salle à préciser)
11 mai 2010	Conférence de **David Rios Insua** (Universidad Juan Carlos, Royal Academy of Sciences, Madrid) : *Adversarial risk analysis*. (salle à préciser)
8 juin 2010	Conférence de **Mohamed Haouari** (Ecole Polytechnique de Tunisie) et **Mohamed Ali Aloulou** (LAMSADE) : *Un modèle basé sur la redistribution des marges pour la génération d’un planning robuste pour une flotte aérienne*.
	(salle à préciser)
22 juin 2010	Conférence de **Vivien Kana** et **Alexis Tsoukiàs** (LAMSADE) : *Contribution de l’aide multicritère à la décision en mesure de la pauvreté*. (salle à préciser)

Announcement:

The "Useful links" section of the group's homepage

(www.cs.put.poznan.pl/ewgmcda)

is being enlarged. Contributions of URL links to societies, research groups and other links of interest are welcome.

A membership directory of the European Working Group on "Multiple Criteria Decision Aiding" is available at the same site. If you would like to be listed in this directory please send us your data (see examples already in the directory).

Contact: José Rui Figueira (figueira@ist.utl.pt)

Web site for the EURO Working Group "Multicriteria Aid for Decisions"

A World Wide Web site for the EURO Working Group on "Multicriteria Aid for Decisions" is already available at the URL:

http://www.cs.put.poznan.pl/ewgmcda/

Web site Editor: Milosz Kadzinski
(Milosz.Kadzinski@cs.put.poznan.pl)

This WWW site is aimed not just at making available the most relevant information contained in the Newsletter sections, but it also intends to become an online discussion forum, where other information and opinion articles could appear in order to create a more lively atmosphere within the group.

Groupe de Travail Européen "Aide Multicritère à la Décision" /
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