EWG-MCDA
EURO Working Group on Multicriteria Decision Aiding
Groupe de Travail Européen Aide Multicritère à la Décision
NEWSLETTER
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Bernard Roy (1934–2017)

Chers membres de l'EURO WG sur MCDA,

Nous souhaitons vous faire part de la très triste nouvelle de la disparition du fondateur de notre groupe de travail et de son président d'honneur, Bernard Roy, décédé subitement le samedi 28 octobre 2017.
Beaucoup d'entre nous ont eu la chance de rencontrer Bernard Roy lors de la 86e réunion de notre groupe qui s'est tenue à Paris (21-23 septembre). Bernard a assisté aux trois jours de la réunion. En le voyant si actif et si précis dans les discussions, nous ne nous attendions pas à ce que ce soit la dernière rencontre avec lui.
Son décès est une grande perte pour notre communauté.
Inspiré par lui, nous ferons de notre mieux pour maintenir l'esprit du groupe de travail initié par Bernard Roy.
Dans la pièce jointe, nous donnons une brève description des réalisations de Bernard Roy pour notre communauté scientifique.

Avec une grande tristesse,
Roman Słowiński, José Rui Figueira, et Salvatore Greco,
Coordinateurs de l'EURO WG

Dear Members of the EURO WG on MCDA,

We wish to share with you the very sad news about the loss of the founder of our Working Group and its Honorary President, Bernard Roy who, unexpectedly, passed away on Saturday, 28th October 2017.
Many of us had the chance of meeting with Bernard Roy during the 86th meeting of our group that took place in Paris (September 21-23). Bernard attended the three days of the meeting. Seeing him so active and precise in discussions, we did not expect that this will be the last meeting with him.
His passing away is a great loss for our community.
Inspired by him, we will do our best to maintain the spirit of the working group as initiated by Bernard Roy.
In the attachment we give a brief characteristic of Bernard Roy's achievements for our scientific community.

With great sadness,
Roman Słowiński, José Rui Figueira, and Salvatore Greco,
EWG Coordinators

Dear Members of the International Society on MCDM,

I am deeply saddened with the news of Bernard's passing away. He was indeed a great man, a great researcher, and a great inspiration to us.
I feel privileged to have known him.
In memory of Bernard, I would like to share with you an excerpt from our book (on the history of MCDM - with Jyrki and Stan) about Bernard.

Murat Koksalan
President, International Society on MCDM

Bernard Roy was born on March 15, 1934 in France. He started losing his sight at an early age, and his reading and writing deteriorated over the years. During secondary school, he started using a mechanical typewriter to take notes. Despite his vision problems he was an outstanding student. He received his *Licence* degree from Université de Paris in 1954. He graduated from the Institute of Statistics of the Université Paris (ISUP) in 1957 with a Masters degree. Bernard received his Ph.D. degree in Mathematics from Université Paris in 1961. His dissertation was on Graph Theory and its Applications (activity-on-node formulations to project scheduling in particularly); it was supervised by Claude Berge.

Bernard had a good friend, Patrice Bertier – a fellow student in mathematics – who contracted poliomyelitis during his youth and was confined to a wheel chair. Patrice persuaded Bernard to enroll in l'Institut d'Etudes Politiques (IEP - a special Grande École mainly oriented towards economics and political science) in October 1954, in addition to enrolling in ISUP. It was extremely uncommon for someone holding only a mathematics degree to enroll in IEP. Patrice and Bernard were, for this reason, viewed as a very strange couple. This strangeness was reinforced by the fact that Bernard, half blind, guided by Patrice, had to push his wheel chair from one institute to the other (one and one-half miles apart on Boulevard Saint Germain and Boulevard Saint Michel). After successfully completing the mid-term exams, they learned that the final exams were scheduled for the same day in both institutes and they had to make a choice. They both chose ISUP.

Roy was interested in applying mathematics to real-world problems. He started applying mathematics to problems while a student. In October 1957 he joined SMA (*Société de Mathématiques Appliquées*), a small consulting company. They were most successful in applying OR to different problems over a short period of time. The company grew quickly and became SEMA-Metra International, with multiple branches in Europe.

After working as a consultant applying operations research for many years, in 1972, Bernard became a professor at Université de Paris and he founded a new research center, LAMSADE, shortly thereafter. He was the director of LAMSADE until 1999. He founded the EURO Working Group on Multiple Criteria Decision Aiding in 1975. He became an Emeritus Professor in 2001, but continues his research and consulting activities.

Bernard has made important contributions to Graph Theory and Multiple Criteria Decision Making. He developed the concept of Outranking Relations to address multiple criteria problems, developed a series of ELECTRE methods, and applied them to many real life problems over the years. Bernard published extensively in these areas. Many researchers have followed and extended Bernard's pioneering ideas and have further developed and applied outranking methods.

Bernard Roy has received many awards. He was awarded honorary doctorates from seven universities. He received the EURO Gold Medal in 1992 from the Association of European Operational Research Societies and the MCDM Gold Medal in 1995 from the International Society on MCDM. In 2002, his colleagues (Bouyssou et al.) edited a volume in honor of Bernard Roy, with the contributions of many scholars in the area of MCDM. In addition to his research, Bernard is interested in history and oenology.



Opinion Makers Section

Spatial MCDA: trends and challenges

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It has been estimated that around 80% of data collected and managed across all sectors of society include geographic references (Williams, 1987, page 151). Consequently, a vast majority of decision problems are geographic in nature (McHenry and Rinner, 2016). This might be one of the reasons for the increasing interest towards the integration of Geographic Information Systems (GIS) and Decision Aiding tools.

One combination that seems particularly promising is the one based on GIS and Multi Criteria Decision Analysis, also known as Multi Criteria Spatial Decision Support Systems (MC-SDSS). The main rationale for integrating GIS and MCDA is that they have unique capabilities that complement each other, thus enhancing the effectiveness and the efficacy of the decision-making process. On the one hand, GIS has great abilities for storing, managing, analyzing and visualizing geospatial data required for the decision-making process. On the other hand, MCDA offers a rich collection of procedures, techniques and algorithms for structuring decision problems, and designing, evaluating and prioritizing decision alternatives (Malczewski, 1999) by combining physical information (e.g., soil type, slope, infrastructures) with values and judgements (e.g., expert's opinion, quality standards, participatory surveys).

As Figure 1 shows, the amount of papers on Multicriteria-Spatial Decision Support Systems was limited at the beginning, but in the past decade, presenting and solving spatial multicriteria problems have had a substantial growth, and have opened windows to research in different fields.

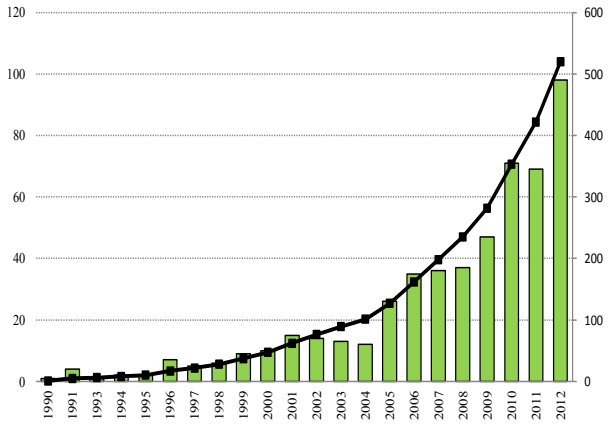


Fig. 1 Development of MC-SDSS in terms of the number of refereed articles published in the period 1990-2011 and the accumulation of those articles (source: Ferretti, 2013).

As Figure 1 shows, the development of MC-SDSS has seen a dramatic increase in recent years and several applications can be find in different domains (Malczewski, 2006; Ferretti, 2013). The type of decision making problems for which MC-SDSS are most frequently used is land suitability analysis (i.e. determining the suitability of a specific area to host a new project/infrastructure/land use etc.). Within this category, MC-SDSS are mainly used in the following application domains: urban and regional planning, hydrology and water management, and environment/ecology. It is worth mentioning that a growing trend towards the application of MC-SDSS for risk assessments has also recently emerged (see the special issue on Spatial Risk Analysis in the Risk Analysis Journal, e.g. Ferretti and Montibeller, under review).

However, there are many different MCDA methods (see Belton and Stewart, 2002 and Figueira et al., 2005 for an overview) that could be integrated with GIS. Many of these methods can support spatial evaluations but none of them can be seen as the “super method” appropriate to all decision-making situations (Guitouni and Martel, 1998). Since the technical choices (typology of the measurement scales, different preference models, different aggregation operators) are not neutral (Tsoukiàs et al., 2013), the selection of the method should be driven by the specific characteristics of the decision-making context under analysis. To support decision analysts in the selection of the appropriate method to solve a complex decision-making problem, a checklist of guiding questions has recently been proposed by Roy and Slowinski (2013).

To extend this support to the spatial domain, we adapted this checklist of guiding questions to account for the specific characteristics of spatial decision-making processes (Ferretti and Montibeller, 2016). Table 1 thus provides solutions for each of the questions, which have been defined to guide the selection of the MCDA method in spatial decision-making processes.

Table 1. Guiding questions for the selection of an MCA method in MC-SDSS design (source: Ferretti and Montibeller, 2016).

Guiding questions	Specific questions	Solutions
1. What kind of results are needed?	a) Is it conducting a suitability analysis (i.e. choice problem, as for instance the generation of possible alternatives, as for instance suitable areas where to locate a new landfill)? b) Is it comparing different existing alternatives (e.g. ranking problems, as for instance comparing two different road layouts)? c) Is it assigning each action to one or several categories which have been defined a priori (i.e. sorting problems, as for instancerisk categories or vulnerability categories)?	a) Use value based methods (e.g. Keeney and Raiffa, 1976) b) Employ outranking/ alternative based methods (e.g. Roy, 1995) c) Adopt category based methods (Zopounidis and Doumpos, 2002)
2. How to gather inputs from stakeholders?	How are preferences elicited?	a) Use qualitative elicitation protocols (Montibeller and Belton, 2009) b) Employ quantitative elicitation protocols (von Winterfeldt and Edwards, 1986)
3. How to share the outputs of the analysis?	How to aggregate the data and display results?	a) Avoid black box methods, use intuitive methods with an easy to explain logic (Edwards et al., 1988) b) Display results in a user friendly way (e.g. graphical representations, visual use of colours, easy to see changes in the models, Belton and Elder, 1994) c) Use methods that support conversation and negotiation of

		different views (Franco and Montibeller, 2010)
4. What are the relevant characteristics of the problem in terms of compensability, uncertainty and interaction?	a) Is the compensation of bad performances on some criteria by good ones on other criteria acceptable or not (e.g. compensation is not acceptable for emissions of pollutants over regulatory levels or for the number of lives lost; compensation is acceptable between the distance from the subway station and the quality of the landscape)? b) Are there uncertainties (about priorities and the factors) that must be taken into account? c) Is it necessary to take into account some forms of preferential interaction among criteria?	a) If compensation is allowed, one can use compensatory aggregation rules (e.g. Keeney and Raiffa, 1976; Saaty, 2013). If compensation is not allowed, you can use non-compensatory aggregation rules (e.g. Roy, 1995). b) Use methods that allow the modelling of non-deterministic impacts (e.g. Keeney and Raiffa, 1976) and enable an easy sensitivity analysis on criteria weights. c) The DSS designer should try to design a criteria set without preferential dependences. If that is impossible, methods that allow more sophisticated aggregation procedures than a weighted sum are required (Roy and Slowinsky, 2013).

As the field of MC-SDSS continues to grow, new interesting avenues of research and opportunities for cross-disciplinary collaborations are emerging, especially for the development of collaborative online MC-SDSS able to address the growing demand for participatory and distributed spatial decision and policy making processes.

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MCDA Research Groups

Multicriteria Decision Aid in University of Economics in Katowice

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The origins of the MCDA research group at the University of Economics in Katowice go back to 1989, when Professor Tadeusz Trzaskalik entered this field at the *International Conference in MCDM: Applications in Industry and Service*, held in Bangkok, presenting his paper "Multiobjective, Multi-period Planning for Manufacturing Plant". During those 29 years, he has built a strong team working on the development of methodology and applications of MCDA and MCDM methods. The composition of the team changed over time and currently it consists of one full professor (Tadeusz Trzaskalik), four associate professors (Jerzy Michnik, Maciej Nowak, Krzysztof Targiel, Tomasz Wachowicz), and one assistant professor (Slawomir Jarek) – all being employed at the Department of Operational Research led by Professor Tadeusz Trzaskalik. In the past, Dr Bogdan Ciupek, Dr Cezary Dominiak and Dr Iwona Gruszka were also members of the group.

Originally, **Professor Trzaskalik's** research interests concentrated on multiobjective dynamic programming. He wrote two books in this field, published by the University of Economics in Katowice: *Multiobjective Discrete Dynamic Programming. Theory and Economic Applications* (1990) and *Multiobjective Analysis in Dynamic Environment* (1998).
In 2000, in Ustroń (Poland), Professor Trzaskalik together with his research group organised the Fourth International Conference on Multiple-objective Programming and Goal Programming. The conference was attended by 66 people from 15 countries. Selected papers have been published in a monograph edited by T. Trzaskalik and J. Michnik (in the Springer in Advances in Soft Computing series).
The project *Preference modelling versus risk* became a milestone in the development of MCDA research at the University of Economics in Katowice. It involved researchers from three Polish universities as well as Kazimierz Zaraś from Canada. The project resulted in numerous publications and a new series of nation-wide conferences on mathematical modelling and optimisation, which took place for the first time in 1998 and every two years since 1999. Since 2005, it has been accompanied by the *International Workshop on Multiple Criteria Decision Making* which gathers researchers from many countries (such as Brazil, Czech Republic, Finland, France, Iran, Romania, Spain, Slovenia, Taiwan, USA).
Applications of MCDA and MCDM methods in portfolio selection, management in commercial banking and insurance have been a focus of the group's interest for a long time. In 2002-2005, the group had worked on the project *Multiple Criteria Methods on the Polish Financial Market* led by Professor Trzaskalik. Its results have been published in a monograph under the same title and in numerous scientific papers.
The next project, led by Professor Trzaskalik in 2009-2013, was entitled *Multicriteria Decision Aid. Methods and Applications* and again involved researchers from three universities. The monograph, published as a result of the project, consists of two parts. The first part describes the most important MCDA methods, as well as methods developed by the members of the group; the second part discusses the following applications of these methods: evaluation of proposals to be financed by European Funds, interactive project selection in a firm, selection of ERP systems, portfolio selection, trade centres ranking, negotiation analysis, bonus distribution system for employees of a telephone customer service department, and restoration of historical objects. It is the first monograph on MCDM in Polish, dealing with a wide spectrum of MCDA methods. For educational purposes, the book is accompanied by a CD with many numerical problems illustrating the methods and applications presented.
The most recent project conducted by Professor Trzaskalik and prepared together with Professors Nowak and Targiel is entitled *Interactive approach to multiobjective dynamic programming*. An essential component of the results was the design of methods which allowed to apply a quasi-hierarchical interactive approach, as well as an interactive approach based on trade-offs, to selected problems of management, such as: project portfolio selection, allocation of resources in a project portfolio, selection of the start time of a single project, scheduling of non-critical activities in a project, management of production capacity.

Professor Jerzy Michnik's recent interests comprise: systems thinking (cognitive mapping, soft system dynamics, participatory modelling, mixed methods, etc.), soft OR, decision analysis and applications to solving complex problems, strategic management, innovation management, etc.
In 2009-2014, Professor Michnik led the research project *Multiple Criteria Decisions in Managing New Product Portfolio*. He developed a number of MCDA methods and models to support important decisions in new product development and innovation management. Among them were: SPR-2T – a synthetic preference relation with two thresholds which has been applied to support the choice of the strategic position in innovation management; a procedure for selecting innovation projects which consists of a two-step model with Hurwicz's rule and VIKOR-S method (modified VIKOR); the Weighted Influence Non-

linear Gauge System (WINGS) method – a general systemic approach that can be applied as an MCDA method for evaluating alternatives when interrelations between criteria cannot be neglected.
In his next project, *Structural approach to modelling the dependence between criteria in multiple criteria decision aiding* (2013-2017), Professor Michnik focused on expanding the utility and broadening the applicability of WINGS as a decision support method. Together with other researchers, he presented a wide range of applications of WINGS to decision problems in innovation management, health management and public relations. Using multiple networks (for positive and negative, as well as certain and uncertain consequences) allowed to apply the WINGS method to more realistic modelling of real decision situations. With the introduction of negative influences, the WINGS method becomes even more universal and can be used as a soft system modelling tool.

Professor Nowak's research interests focus on multiple criteria decision making under risk, computer simulation applications in decision making, multiple criteria decision trees and dynamic programming. In 2005-2008, he led the research project *Interactive approach in multiple criteria decision making under risk and its applications in management*. He developed a number of techniques for discrete decision making problems under risk, including INSDECM, based on multiple goal programming approach, and ATO-DPR, which uses trade-offs to identify proposals for the decision maker. The next project (2010-2014) led by Professor Nowak concentrated on decision aiding in project management. The main deliverables were methods and tools to support project planning and project portfolio management. In recent years, Professor Nowak has been working (together with T. Trzaskalik and K. Targiel) on dynamic multiple criteria decision making problems under risk. He proposed new interactive techniques based on decision trees and dynamic programming.

Professor Krzysztof S. Targiel's main research interests are applications of MCDM and MCDA methods in project management. In his recent project entitled *Applications of real options in project management* (2011-2015), he developed new method based on multiobjective dynamic programming as applied to real options valuation in project environment.

Professor T. Wachowicz's major research focus is decision support in negotiation processes, electronic negotiation and negotiation support systems (NSS). A significant part of his research consists in designing negotiation protocols applying decision support methods and techniques that can be efficiently used in the bilateral and multilateral negotiation context, allowing for the cognitive limitations of the negotiators, their lack of experience, knowledge and decision making skills.
Cooperating with Concordia University (Montreal) and using their web-based negotiation support systems Inspire and Imbins, Professor Wachowicz has been involved in organising international negotiation experiments in which universities from Canada, USA, Brazil, China, Taiwan, the Netherlands, Austria, Poland and Ukraine participate regularly.
Currently, Professor Wachowicz takes part in a research project conducted in cooperation with domestic and foreign universities. This project consists in analysing the applicability of holistic preference elicitation approaches (i.e., ones that derive from the preference disaggregation paradigm) to build efficacious negotiation support tools. Other participants in this project are the research teams of Gregory Kersten (Concordia University, Montreal, Canada) and Ewa Roszkowska (University of Bialystok, Poland). One of the project's current deliverables is a new negotiation template scoring approach, which hybridizes some notions derived from the ZAPROS and MACBETH multicriteria methods. The MARS method predefines a set of negotiation offers close to the ideal solutions that are subject to evaluation by the supported negotiator.

In his research **Dr Sławomir Jarek** tackles the issues related to discrete multiple criteria programming and analysis of pair-wise comparisons matrices. He has worked on problems of consistency of preferences in the AHP method and is also interested in quantitative methods in marketing. For many years he has intensively used the GNU R environment.
Worth mentioning are also bilateral international projects undertaken by the group. The first project was carried out together with colleagues from the University of Malaga: Rafael Caballero, and Francisco Ruiz. The next two projects were carried out together with researchers from Czech universities: Josef Jablonsky, Petr Fiala and Jaroslav Ramik. The group also cooperates, on a regular basis, with Kazimierz Zaras and Gregory Kersten from Canada. In 2011-2013, Professors Michnik (the Polish coordinator), Trzaskalik and Nowak took part in the joint Polish-Taiwanese research project *A frontier multiple-criteria decision-making model for innovation management*. The Taiwanese team was led by Gwo-Hsiung Tzeng from Kainan University.
The journal *Multiple Criteria Decision Making* (MCDM) was founded at the University of Economics in Katowice in 2011. It is a continuation of the book series *Multiple Criteria Decision Making* edited by Tadeusz Trzaskalik and Tomasz Wachowicz and published by the University's publishing division since 2005 (when the group first organised the *International Workshop on Multiple Criteria Decision Making*). Currently, the journal's scientific board consists of: Tadeusz Trzaskalik (editor-in-chief), Luiz F. Autran M. Gomes (IBMEC, Brazil), Gregory Kersten (Concordia University, Montreal, Canada), Carlos Romero (Technical University of Madrid, Spain), Roman Słowiński (Poznan University of Technology, Poland), Ralph Steuer (University of Georgia, USA), Tomasz Szapiro (Warsaw School of Economics, Poland). All volumes and issues can be found on the web page: www.mcdm.ue.katowice.pl.

Multicriteria and decision aiding at Laval University

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The Research Group

The CERMID group at Laval University, Québec, Canada (Centre d'Études et de Recherche en Modélisation, Information et Décision) consists of members specializing in Analytics, Big Data and Multicriteria Decision Analysis with applications in Urban planning, Supply Chain, Search and Rescue Planning, Finance, Sport Marketing, Manufacturing, Hydroelectric Reservoir Management, Health, and Social and Environmental related issues.
The CERMID group is currently composed of five professors from the Operations and Decision Systems department, in the Business Faculty at Laval University and a post-doc researcher at the University of Toronto. Five Ph.D. Students and four Master students are currently supervised or co-supervised by CERMID members who have varying research interests as follows:

- Irène Abi-Zeid (Professor): Multicriteria Decision Analysis, Machine Learning for Optimization, and Argumentation for Decision-Making.
- David Beaudoin (Associate professor): Statistics applied to sports, Simulation.
- Adnène Hajji (Associate professor): Dynamic Programming, Stochastic Optimal Control, Meta-Heuristics
- Bernard Lamond (Professor): Stochastic Dynamic Programming, Stochastic control.
- Pascal Lang (Adjunct Professor): Stochastic optimization, Classification and Machine Learning
- Michael Morin (Post-doctoral fellow at Toronto University): Combinatorial and multiobjective optimization, machine learning, and big data analytics.

Available MCDA Software Developed at CERMID

CERMID has developed MCDA-ULaval implementing Electre II, III, Tri-B, Tri-C, Tri-rC and Tri-nC was developed at the CERMID. The software is free and may be downloaded in English at the following address: http://cersvr1.fsa.ulaval.ca/mcda/?q=en/node/4

Research Activities

The CERMID research projects are funded by various provincial and federal research bodies (FQRNT, CRSNG, MITACS, and Natural Resources Ministry). Recent collaborations led by CERMID members include projects with the City of Québec, the Canadian Coast Guard, Centre de santé et de services sociaux de la vieille capitale, NSim Technologies, and Tetratech. The CERMID members welcome every year many international students and researchers for research visits and internship and have established research collaborations with other universities and research centers in Canada and abroad, including France and Tunisia. Supported by the Canadian Operational Research Society, seminars and conferences are organized regularly by CERMID members, including the recent IFORS 2017 that gathered over 1800 participants in Quebec City. Below is a list of selected recent publications presenting the outcomes of some CERMID research projects.

Selected Recent Publications:

Berthaut F., Pellerin R., Hajji A., & Perrier N. (2017). A Path Relinking-based Scatter Search for the Resource-Constrained Project Scheduling Problem. *International Journal of Project Organisation and Management* (in Press).

Hlioui R., Gharbi A. & Hajji A. (2017). Joint supplier selection, production and replenishment of an unreliable manufacturing-oriented supply chain. *International Journal of production Economics* (IJPE). 187: 53-67.

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Morin M., Abi-Zeid I., Quimper C.G. & Nilo O. (2017, June). Decision Support for Search and Rescue Response Planning, *Proceedings of the 10th International Conference on Information Systems for Crisis Response and Management*, Albi, France.

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Zéphyr L., Lang P., Lamond B. & Côté P. (2017). Approximate stochastic dynamic programming for hydroelectric production planning, *European Journal of Operational Research*, 262:2, 586–601.

Abi-Zeid I., Léger M., Morin M., Grondin F., Pleau M. & Thomopoulos R. (2016, June). Explaining the Results of

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Feki Y., Hajji A. & Rekik, M. (2016). A hedging policy for carriers' selection under availability and demand uncertainty. *Transportation Research Part E: Logistics and Transportation Review*. 85: 149-165.

Hajji A., Pellerin R., Gharbi A., & Legers, P.-M. (2016). Toward valuable prediction of ERP diffusion in North American automotive industry: a simulation based approach. *International Journal of Production Economics*. 175: 61-70.

Pornsing C., Sodhi M. S. & Lamond B. F. (2016). Novel self-adaptive particle swarm optimization methods. *Soft Computing*, 20(9): 3579-3593.

Tebini H., M'Zali B., Lang P. & Pérez-Gladish B. (2016): "The Economic Impact of Environmentally Responsible Practices". *Corporate Social Responsibility and Environmental Management*. 23 (5): 333-344.

Zéphyr L., Lang P., Lamond B. F. & Côté P. (2016): Controlled approximation of the SDP value function for multi-reservoir systems, In R.J. Fonseca, G.-W. Weber and J. Telhada (Eds.), *Computational Management Science: State of the Art 2014,* Lecture Notes in Economics and Mathematical Systems 682, Springer. 31-37.

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Forum Section

Colors and Brand Personality: Shades of Blue for Competent Cosmetic Brands

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Abstract

This study attempts to gain a deeper understanding of the complex relationship between the brand color and brand personality perception by the customers. Combining data from a survey with accurate measurement of brand colors, a disaggregation analysis has been employed to identify how each component of brand color (hue, saturation, and brightness) can form customers' perception of a brand personality, also to discover the relative contribution of each component in such perception.

Introduction

Colors play an important role in many marketing and branding practices, ranging from product design, packaging, advertising, brand differentiation and positioning. This section gives a brief introduction to the impact of color in personality perception of a brand by customers.

Motivation

Among the three drinks in Fig. 1, which one do you expect to be sweeter? Now think of the perfumes in Fig. 2. Which one do you expect to have a more intense, fresh, or fuity smell?



Fig. 1: Which drink is sweeter?



Fig. 2: Which perfume has a fresher smell?

No matter what the answer is, most people have an answer to these questions, which means the color can raise expectations and impact judgments about the other qualities of the product, in this case taste and smell. In a similar way, color can affect our perception of a brand personality. We might perceive some brands to be more natural, upper class, sincere, or reliable due to their color. The aim of this article is to investigate the contribution of brand color to the brand personality perception by the customers.

Background

Color, as one of the most important elements of a brand, plays an important role in customers' judgments of a brand and influences purchase decisions. Brand managers use color as a strategic tool to communicate meaningful messages, to signal the product attributes, to differentiate their products, to grab customer attention, and to form customer perception and feelings about their brands (Lohse & Rosen, 2001; Chebat & Morrin, 2007; Schindler, 1986; Schindler, 1986).

Color operates via two mechanisms: sensory and cognitive. In the sensory mechanism, color helps to retrieve information in blurry conditions, by distinguishing, for example, an object from its background. In the cognitive mechanism, color impacts perception by playing a diagnostic role and characterizing the object that is being represented (an orange sunset and the blue of the sea have specific meaning). Since brand personality is formed in customer's mind by judgments and attaching meanings to the brand, the contribution of color to this process is through the cognitive mechanism.

Several studies have explored such cognitive process in different contexts and from different perspectives, see (Labrecque & Milne, 2012; Ghaderi, 2017; Ghaderi, et al., 2015) amongst all. This study aims to analytically examine the relation between color and brand personality. This article does not attempt to provide a comprehensive analysis of the colors for all the brand personality dimensions and in all the industries. Instead, we demonstrate how a recently introduced preference disaggregation framework can be employed to explore the impact of color on brand personality. To this aim, we narrow our focus on the cosmetic brands with a single representative color, and we examine one dimension of brand personality, namely *competence*. The recently introduced methodology can be used to infer possibly non-monotonic value functions from indirect pairwise comparisons (Ghaderi, et al., 2017).

Data and Settings

The dataset consists of two parts. The first part comes from the opinion of nearly five thousand respondents on different cosmetic brands. For each brand, the respondent is asked to express her opinion about the brand with respect to each of the nine competence items by selecting one of the five values with a "1" for "not at all descriptive" and a "5" for "extremely descriptive". The nine items are *reliable, hardworking, secure, intelligent, technical, corporate, successful, leader, confident*, and are presented

in randomized order. The competence score of a brand is the average of the nine competence items on the 5-point scale. The greater the average, the more *competent* the brand is perceived to be by the respondent. The competence score of a brand is the average of the values across all the respondents This part of the data comes from a survey on the top U.S. national brands (Lovett, et al., 2014).

The second part of the dataset consists of information regarding the color that is the most representative of the brand (blue of Nivea, red of Colgate). We selected only those brands for which such representative color does exist. For instance, if you ask someone what color Nivea is, the answer would be blue and would be immediate. We scanned the selected brands to measure and quantify their representative color.

There are several color spaces used to uniquely define a color. The most known of these is RGB, proposed by the Commission International de l’Eclairage(CIE) in 1931. RGB uses additive color mixing and describes what type of light (red, green, or blue) needs to be emitted to produce a given color. The RGB color model is implemented in different ways, depending on the capabilities of the system used. The most common implementation is the 24-bit, limited to a range of 256×256×256≈16.7 million colors. It is a convenient color model for computer graphics, but distant from human color description.

Among many different ways of representing a color, we choose the HSB color space because it is close to human color perception. For human vision, it is more natural to think about a color in terms of hue and brightness than additive or subtractive color components. In HSB color space, each color is uniquely defined by three components. The first component, varying from 0 to 360, represents hue of the color by specifying its position on the color wheel. The other two numbers, each varying from 0 to 100, represents the degree of color saturation (washed out versus pure and vivid) and brightness (dark versus bright). This is shown in Fig. 3.

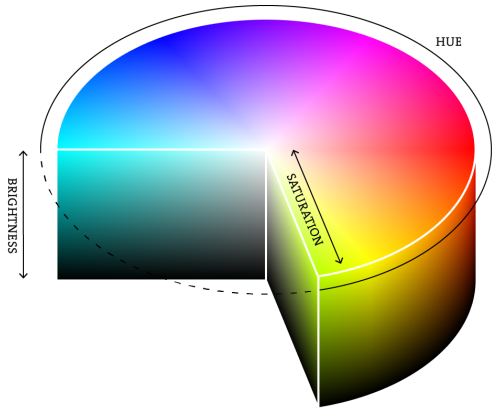


Fig. 3: In HSB color space, each color is represented by its position on the color wheel, saturation, and brightness percentage.

Settings

In order to clearly observe the impact of the color on the brand personality perceived by the customers, several conditions have been imposed to our analysis framework. This section delineates the boundaries of our experimental analysis. In this analysis, we limited our focus to the cosmetic brands in order to detach the industry effect. Similar analysis can be performed across industries. In addition, the scope of the analysis is limited to the brands that are clearly associated with a single color. Therefore, interaction among the colors as well as the impact of color combination is not going to be addressed here. Moreover, we narrowed our attention to the brands with less familiarity among the respondents (familiarity defined as whether the respondent has used products of this brand more than a certain number of times, or if she personally knows many people using products of this brand). The reason is that when the customer is adequately familiar with a brand, her perception of the brand personality is mainly affected by her actual experience with the brand and/or her image of the personality of the typical users of the brand. Hence the impact of color on her perception is expected to be rather marginal. Finally, we consider brands with a minimum level of saturation and brightness in their color (more than 20). The reason is that when the color is too washed out (low saturation) or too dark (low brightness), the color hue is difficult to be detected by human eye. In the end, we are left with 15 different, less familiar, cosmetic brands with a single dominant, sufficiently bright and saturated, color. These brands are compared according to their competence score. In order to dismiss noisy comparisons, brand X is said to be more *competent* than brand Y if its competence score is at least one standard deviation bigger than that of brand Y, i.e. $\text{Brand}_i \succ \text{Brand}_j$ if $\text{Component Score (i)} \geq \text{ComponentScore(i)} + \sigma$, in which σ is the standard deviation of the component scores. This leads to 45 pairwise comparisons among the 15 brands, shown in Fig. 4. We also account for the brand age, defined as the time length since the brand launched a product in the market for the first time till the time that data for this experiment is collected.

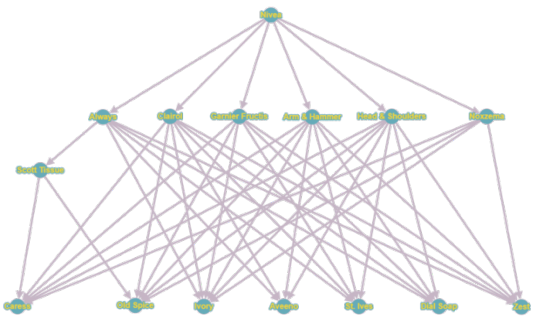


Fig. 4: The pairwise comparison structure among the brands according to their competence score.

Methodology

We follow a preference disaggregation approach to understand how different components of a brand color are related with the perception of a brand personality. To this aim, we take as input the pairwise comparisons of the brands according to their competence score, as explained above, and we try to decompose this preference information on a set of additive value functions. Particularly, we are interested to know i) how the likelihood of a brand to be perceived as *competent* is changing by varying the hue, saturation and brightness of its color, as well as ii) the relative contribution of each of these three components into the perception of the brand personality. It is clear that such relations are not necessarily monotonic. There is no evidence supporting the idea that the brand is necessarily perceived more *competent* by increasing the value of its hue (i.e. changing its position on the color wheel from 0 to 360). For this reason, we need to employ a disaggregation met5hodology that is able to elicit non-monotonic preferences from a set of indirect holistic comparisons. For this purpose, we use the recently introduced methodology that estimates additive non-monotonic value functions from a set of pairwise comparisons, by making a balance between the discriminative power1 of the estimated preference model versus its complexity (Ghaderi, et al., 2017). The methodology requires solving only a single Linear Programming (LP) optimization problem, hence computationally efficient. In addition, it allows to, if needed, further simplify the estimated value function at the cost of its discriminatory power by manually adjusting the value of an exogenous parameter.

Results

As input, we take the holistic comparisons of the brands according to their competence score, and we try to find a possibly non-monotonic value function, defined over the three components of the brand color as well as brand age, that can reproduce the same preference relations. The result from the disaggregation method, described above, is presented in Fig. 5.

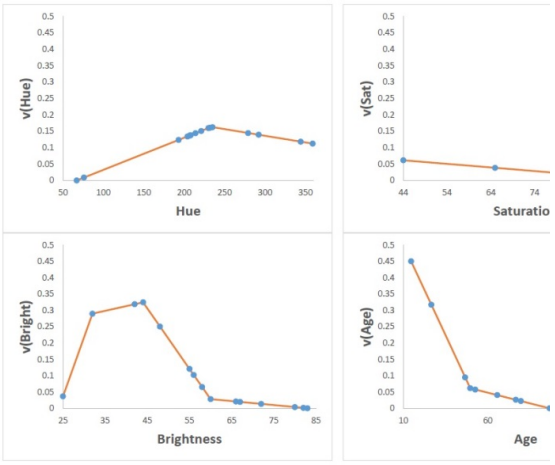


Fig. 5: Estimated non-monotonic value function from the pairwise comparison of the brands (discriminative power=0.13)

Fig. 6: Color hue values

The above estimated value function demonstrates that brand age contributes to brand personality perception more than any of the brand color components separately, but not more than the brand color as a whole, that is the coalition of the three components. Among the three components of the brand color, brightness has the largest contribution to the perception of brand personality to be *competent*, followed by hue, and finally saturation has the least contribution to the comprehensive perception. This is surprising because when we talk about colors, intuitively we expect color hue to be the most important factor. However, the results show that how much a brand color is dark or bright has greater importance than the color hue on the perception of a brand to be *competent*. The results also show that in order to position a brand as *competent*, the value of the color hue should be adjusted around 240 which corresponds to blue (see Fig. 6). Moreover, to position the brand as *competent* in the customer’s mind, the brand color should not be too dark neither too bright, also it should not be too saturated.

As mentioned in the methodology section, the disaggregation method allows to further simplify the estimated value function at the cost of its discriminative power by manually adjusting the value of an exogenous parameter. For the current results, it makes sense to further simplify the value function as the discriminative power is sufficiently large (=0.13). These results are presented in Fig. 6. As it can be seen, the estimated value function is smoother; however the discriminative power is much smaller, though still large enough.

[1] By discriminative power, we mean the minimum difference in the comprehensive value of the two alternatives belonging to the preference relation.

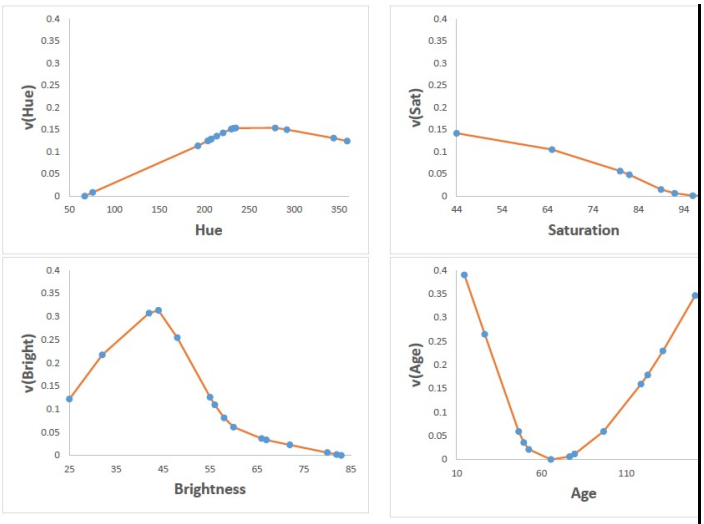


Fig. 7: Simplified estimated non-monotonic value function from the pairwise comparison of the brands (discriminative power=0.05).

Conclusion

This study examines the influence of the brand color on the customer perception of brand personality following a preference disaggregation approach. Combining data from a survey on the opinion of customers on several brands with the accurate measurement of brand colors, the results of preference disaggregation analysis demonstrate that mildly bright and slightly saturated blue can position a cosmetic brand as *competent* in customer's mind better than any other color. By accounting for the brand familiarity level, product category, and brand age, the results demonstrate that color brightness has the greatest impact on the customers' perception of brand personality, at least for the *competence* dimension.

The findings of this analysis need to be extended in several ways. First of all, we need to explore other dimensions of brand personality, as well as across other product categories in order to figure out how general or context-dependent the current findings are. It is also interesting to see how the results change across different cultures. The current data is collected from American users. Finally, the analytical framework needs to be extended in two directions: first, to account for the interaction among the color components, second to consider combination of colors. Regarding the first part, it could be the case that brightness has different relative importance levels depending on the color wavelength (hue). As per the second part, it is important to find which colors go better together to communicate a particular meaning and to form perceptions in a certain way.

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About the 86th Meeting

The 86th meeting of the European Working Group on Multicriteria Decision Aiding (EWG-MCDA) took place in Paris from September 21st to September 23rd. It was a special event for several reasons. First, it was jointly organized by LAMSADE at Paris Dauphine University and the Scientific Center of the Polish Academy of Sciences in Paris. Second, LAMSADE is the birth place of the working group, which was founded 43 years ago by Bernard Roy. Bernard attended the three days of the meeting.

The event was particularly successful. We welcomed 90 participants from 21 different countries. We received about 50 submissions. 17 papers were selected for presentation.

The main theme of the meeting was "Multiobjective combinatorial optimization" attracting both theoretical and applied papers. A scientific highlight of the meeting was the keynote lecture on Friday morning given by Kathrin Klamroth.

The first day of the meeting concluded by a reception at the Polish embassy in Paris at the magnificent Hotel de Monaco. Beside a wonderful banquet offered by his excellency, ambassador of the Republic of Poland to France, we attended a concert by Tadeusz Trzaskalik. At this occasion, Bernard Roy received the Medal of the Polish Academy of Sciences corresponding to the highest scientific distinction conferred on personalities exterior to the Academy. The laudation for Bernard was delivered by

Roman Słowiński (the complete text is reported at the end of this section).
The last day of the meeting, on Saturday morning, the participants enjoyed a boat cruise on the canal Saint Martin.
Our gratitude goes to all participants who actively contributed to the meeting through their papers, presentations and discussions. We also wish to thank all institutions that supported this event: LAMSADE at Paris Dauphine, the Polish Academy of Science in Paris that were the two main organizers, the Polish embassy in Paris, EURO the association of European Operational Societies, and ROADEF the French Operational Research Society. A special thank goes to the members of the Organizing Committee for their active involvement.

Roman Słowiński and Daniel Vanderpooten

Programme

Thursday, September 21, 2017
The sessions took place at the Scientific Center of the Polish Academy of Sciences in Paris.

12h00-13h15: Registration/Light lunch
13h15-13h30: Opening and welcome address
Roman Słowinski, Maciej Forycki, and *Daniel Vanderpooten*.

Session 1. THEORY AND METHODOLOGY 1
Chair: *José Rui Figueira*

- 13h30-14h00: Vers une PAMC fondée sur les limites des classes de performances (PAMCIAMARA) - *Amin Affes, Abdelwaheb Rebai*
- 14h00-14h30: ENUCUT-V, a hybrid approach to integer linear vector optimization problems - *Walter Habenicht*
- 14h30-15h00: Preference Elicitation for Robust Optimization with Ordered Weighted Averages: application to assignment and shortest path problems - *Nadjet Bourdache, Patrice Perny*
- 15h00-15h30 A bicriteria perspective on an L-penalty approach for solving MPECs - *Kerstin Daechert, Sauleh Siddiqui, Javier Saez-Gallego, Steven Gabriel, Juan Miguel Morales*

Papers submitted to discussion

- Multicriteria clustering: an overview of the main contributions - *Mohamed A. Boujelben*
- A formal framework for deliberated judgments - *Olivier Cailloux, Yves Meinard*
- Practical and theoretical aspects of the CAT-SD method for nominal classification - *Ana Sara Costa, José Rui Figueira, José Borbinha*
- An MCDA interval based outranking approach for ordinal classification problems - *Eduardo Fernández, José Rui Figueira, Jorge Navarro*
- Robust Ordinal Regression and Stochastic Multicriteria Acceptability Analysis for the level dependent Choquet integral - *Giuseppe Arcidiacono, Salvatore Corrente, Salvatore Greco*
- Towards a Multi-Criteria Collective Aggregation-Disaggregation Methodology - *Nikolaos Matsatsinis*

15h30-16h00 Coffee break

Session 2. EVOLUTIONARY APPROACHES
Chair: *Benedetto Matarazzo*

- 16h00-16h30: Interactive Evolutionary Multiobjective Optimization driven by Dominance-based Rough Set Approach - *Salvatore Corrente, Salvatore Greco, Benedetto Matarazzo, Roman Słowiński*
- 16h30-17h00: Interactive many-objective evolutionary optimization guided by preferences modeled with an augmented Chebyshev function - *Tomasz Sternal, Roman Słowińsk*i
- 17h00-17h30: Abstract Hybrid Algorithm for Multi Objective Optimization based on Game Theory - *Paweł Jarosz, Tadeusz Burczyński*

Papers submitted to discussion

- Prioritization of Public Buildings Energy Retro_t Strategies: an AHP model - *Chiara D’Alpaos, Paolo Bragolusi*
- Assessing the quality of life of French municipalities: a multicriteria approach - *Alexis Guyot, Emilios Galariotis, Michalis Doumpos, Constantin Zopounidis*
- Sustainable Supplier Selection Based On Sustainable Procurement Practices- *Devika Kannan*
- Use of Risk Based Inspection and Maintenance Techniques in rafineries. Can MCDA be of use in these cases? - *Zoe Nivolianitou, Nicolas Defteraios*
- A multi-criteria approach for the construction of Land-use Change Spatial Composite Indicators in CS@Monitor Project - *Valentina Sannicandro, Raffaele Attardi, Maria Cerreta, Carmelo M. Torre*
- Solving procedure for multiobjective dynamic problem with changeable group hierachy of stage criteria dependent on the stage of the process - *Tadeusz Trzaskalik*

- Interactive Evolutionary Multiobjective Optimization with NEMOII-Ch for facility location problems - *Maria Barbati, Salvatore Corrente, Salvatore Greco*

19h00 Banquet at the Polish Embassy in France

Friday, September 22, 2017
The sessions took place at Paris Dauphine University.

Session 3. THEORY AND METHODOLOGY 2
Chair: *Roman Słowiński*

- 9h00-9h30: An efficient SAT formulation for learning multicriteria non-compensatory sorting models - *Khaled Belahcène, Christophe Labreuche, Nicolas Maudet, Vincent Mousseau, Wassila Ouerdane*
- 9h30-10h00: Introducing Pareto Minimal Correction Subsets - *Miguel Neves, Inès Lynce, Vasco Manquinho*
- 10h00-10h30: Forced Choice - *Simone Cerreia-Vioglio, Fabio Maccheroni, Massimo Marinacci, Aldo Rustichini*

Papers submitted to discussion

- Multidimensional Attitudes in Intertemporal Choice - *Veronica R. Cappelli*
- A note on the detection of outliers in a binary outranking relation - *Yves De Smet, Jean-Philippe Hubinont, Jean Rosenfeld*
- Selection of a suitable MCDA method based on robustness of results and sensitivity analysis - *Malik Haddad, David Sanders, Giles Twekesbury, Nils Bausch*
- Expressiveness and robustness measures for the evaluation of an additive value function in multiplecriteria preference disaggregation methods: An experimental analysis - *Miłosz Kadzinski, Mohammad Ghaderi, JakubWasikowski, Nùria Agell*
- Incorporating Strength of Preference Information in UTA methods for the robustness improvement incases with limited alternative actions - *Athanasios Spyridakos, Nikolaos Tsotsolas, Isaak Vryzidis*
- Conception d’un MOOC sur l’Aide MultiCritère à la Décision - *Maria de Vicente y Oliva, Jaime Manera Bassa, Vincent Clivillé*

10h30-11h00 Coffee break

Keynote lecture. Chair: *Daniel Vanderpooten*

- 11h00-12h00: Multiobjective Combinatorial Optimization – Beyond the Biobjective Case - *Kathrin Klamroth*

12h00-13h30 Lunch break

13h30-14h00 Preparation of next meetings/Vie du groupe

Session 4. APPLICATIONS 1
Chair: *Marc Pirlot*

- 14h00-14h30: Dynamic programming for multi-objective process design - *Eric Fraga*
- 14h30-15h00: Designing an argumentative decision-aiding method for urban planning - *Franck Taillandier, Benjamin Delhomme, Irène Abi-Zeid, Rallou Thomopoulos*, *Cédric Baudrit*
- 15h00-15h30: Computer-aided Drafting of Urban Designs for Walkability - *Ivan Blecic, Giuseppe A. Trunfio*
- 15h30-16h00: Développement d’une approche combinatoire de conception systématique d’instruments d’action collective - *Adam Baïz, Michel Nakhla*

Papers submitted to discussion

- Optimization of Multiple Satisfaction Levels in Portfolio Decision Analysis - *Maria Barbati, Salvatore Greco, Miłosz Kadzinski, Roman Słowiński*
- Méthodologie multicritère d’aide au choix d’un système énergétique standard autonome en territoire isolé - *K. Bouyachou, B. Urli*
- Simulation of a Ranking of Military Defense Systems for the BENELUX countries - *Willem K. M. Brauers, Thomas Baelus*
- Patients’ satisfaction: The medical appointments valence in Portuguese public hospitals - *Diogo Cunha Ferreira, Rui Cunha Marques, Alexandre Morais Nunes, José Rui Figueira*
- Integrating human preferences in automated decisions of unmanned aerial vehicles - *Arwa Khannoussi, Catherine Dezan, Jean-Philippe Diguet, Patrick Meyer*
- Comparison between two multicriteria methods for assessing land suitability for agriculture - *A. Mendas, A. Mebrek, Z. Mekranfar*
- Démarche d’Aide Multicritère à la Décision pour l’Evaluation Préventive des Risques de Gestion Aéroportaire - *Hassane Yamnahakki, Abdellah Menou*

16h00-16h30 Coffee break

Session 5. APPLICATIONS 2
Chair: *Salvatore Greco*

- 16h30-17h00: Incorporation of risk and management criteria in positive mathematical programming: the case of marginal agricultural lands in Poland - *Athanasios Petsakos, Rafal Pudelko, Stelios Rozakis*
- 17h00-17h30: Data generator for multicriteria satisfaction analysis: *Alkaios Sakellaris, Konstantina G. Miteloudi, Evangelos Grigoroudis, Nikolaos Matsatsinis*
- 17h30-18h00: Multi-criteria e_ectiveness map for evaluation of project success - *Isaak Vryzidis, Athanasios Spyridakos*

Papers submitted to discussion

- Landscape Services Evaluation: A Multi-Criteria Spatial Decision Support System - *Maria Cerreta, Simona Panaro, Giuliano Poli*
- Any bias in Spatial Multicriteria Decision Aiding? - *Valentina Ferretti*
- Measuring resilience in communities involved in flooding Osumi river, Berat, Albania, using MCDAmethods of evaluations - *Robert Kosova, Antonino Scarelli, Valentina Sinaj, Evgjeni Xhafaj, Irakli Prifti*
- An extendable web-based multicriteria group decision support system - *Konstantina G. Miteloudi, Alkaios Sakellaris, Nikolaos Matsatsinis*
- EGov-Evaluator: A web-based decision support system for the global evaluation of e-government in Europe - *Eleftherios Siskos, Dimitris Kalogeros, John Psarras, Yannis Siskos*
- The European Innovation Scoreboard Revisited: A Multicriteria Evaluation Perspective - *M. de Vicente y Oliva, J. Manera Bassa, S. BenAmor*

18h00 Conclusions

Laudation for Bernard Roy by Roman Słowiński

Son Excellence, Monsieur l'Ambassadeur de la République de Pologne en France, Monsieur le Professeur Bernard Roy, Monsieur le Directeur du Centre Scientifique de l'Académie Polonaise des Sciences à Paris, Monsieur le Directeur du Laboratoire LAMSADE, Mesdames et Messieurs, Chères et Chers Collègues

Au tout début de mon allocution, au nom de participants de la réunion du groupe de travail européen sur «L'Aide Multicritère à la Décision», je voudrais m'adresser à votre Excellence Monsieur l'Ambassadeur, avec nos remerciements pour l'honneur que vous nous rendez en nous accueillant dans cet endroit prestigieux de grande beauté, dit l'Hôtel de Monaco, qui est votre résidence à Paris. Nous vous sommes aussi particulièrement reconnaissants à votre généreuse invitation au diner qui va suivre.

Cette réunion, qui fait la suite de 85 réunions précédentes, est extraordinaire sur plusieurs plans. D'abord, car son organisation est partagée entre deux institutions le Centre Scientifique de l'Académie Polonaise des Sciences à Paris, et le laboratoire LAMSADE de l'Université Paris Dauphine. Ensuite, car après avoir expérimenté un accueil toujours fervent en diverses villes européennes (y compris 3 fois à Poznań), canadiennes et du nord d'Afrique, le groupe se réunit de nouveau à Paris d'où vient l'initiative de son création en 1975. Finalement, car nous avons l'énorme plaisir de nous retrouver en présence de son fondateur qui est le Professeur **Bernard Roy.**

Je tiens à remercier les co-organisateurs de cette réunion exceptionnelle: le Professeur Daniel Vanderpooten et son équipe du laboratoire LAMSADE, le Directeur du Centre Scientifique de L'Académie Polonaise des Sciences à Paris, Maciej Forycki et son équipe, mes associés en tant que coordinateurs de ce groupe du travail, les Professeurs José Figueira et Salvatore Greco, ainsi que mon collaborateur proche Miłosz Kadziński.

Grace à nos efforts communs, nous arrivons à se réunir pour la 86^{e} fois et travailler ensemble sur le développement de la méthodologie multicritère d'aide à la décision qui est à la fois d'une grand utilité pratique, et d'un grand intérêt scientifique pour plusieurs disciplines, avec recherche opérationnelle, mathématiques, informatique, gestion et autres.

On pourrait se demander pourquoi une coopération franco-polonaise pour organiser une réunion du groupe de travail européen à ce sujet ? A cette question, je me permet de répondre immodestement que la composante franco-polonaise au développement de ce groupe a été non négligeable grâce aux attaches du laboratoire LAMSADE avec l'Institut d'Informatique de l'Université de Technologie de Poznań depuis 40 ans déjà.

Le laboratoire LAMSADE a été dirigé depuis son origine en 1976 par le Professeur Bernard Roy. En 1977, quand Bernard Roy, en tant que Président de l'Association Française pour la Cybernétique, Economique et Technique (AFCET), avait organisé un Congrès de l'AFCET à Versailles, j'avais la chance de participer à ce congrès à mes frais. Au fait, j'avais une chance double, car j'étais écouté par Bernard Roy qui a trouvé que ma présentation valait une discussion à laquelle il m'avait invité par la suite. Trois ans plus tard je me suis trouvé comme chercheur associé au LAMSADE, et en 1981 Bernard Roy est venu en Pologne pour participer au jury de mon habilitation à l'Université de Technologie de Poznań. Dans ce temps fort pour notre pays, Bernard Roy montrait de manière ostentatoire son soutien à l'ambition des Polonais, en portant devant des officiels un pin de « Solidarność » qui les piquait aux yeux, surtout le 1er secrétaire du parti de notre université.

Dans les années suivantes, moi-même et mes multiples doctorants et étudiants polonais ont trouvé un bon accueil scientifique au LAMSADE en renforçant la collaboration dans la recherche et, surtout, en approfondissant la compréhension de l'approche européenne d'aide à la décision dont Bernard Roy était le fondateur et le plus conséquent promoteur. Cet approche mettait en cause certains axiomes de la théorie d'utilité de provenance américaine, et proposait une démarche plus réaliste et conviviale au raisonnement humain dans le processus de décision.

En 1985 Bernard Roy avait publié en français un livre intitulé « Méthodologie Multicritère d'Aide à la Décision », qui résumait cette démarche – j'avais entreprit son traduction en polonais et 5 ans après elle a été publié en 10 milles exemplaires par Wydawnictwo Naukowo-Techniczne à Varsovie. Ce livre permettait aux étudiants et chercheurs polonais de bâtir des nouveaux algorithmes d'aide à la décision sur les fondements autres que la théorie d'utilité, déjà bien connu à cette époque dans notre pays.

Le groupe du travail qui se réunit ces jours-ci à Paris continue le développement de l'école européenne vers d'autres paradigmes d'aide à la décision. Cela ne serait pas possible sans l'exemple de Bernard Roy et de son extraordinaire capacité d'assembler des chercheurs à une discussion critique mais constructive. Bernard Roy était président de ce groupe depuis son origine jusqu'à 2010. Pendant les 35 ans, plusieurs centaines de membres contribuaient aux travaux du groupe. Le groupe fonctionnait selon quelques principes simples et efficaces qui sont toujours en application. Ces principes sont :

- le groupe se réunit 2 fois par an, en printemps et à la fin d'été, pour un jour et demiedu travail plénier, et une demi-journée de renforcement de liens sociales, chacun peut s'inscrire au groupe, mais 2 non-réponses successives à l'invitation à la réunion (pas forcement positives) entraînent une suppression de la liste des membres,
- pendant une réunion de travail le temps de la présentation est stricte mais le temps de la discussion qui suit, tant qu'elle est intéressante, n'est pas limité.

J'ai le plaisir de mentionner que pendant toutes ces années quand Bernard Roy présidait le groupe, son secrétariat était assuré de façon très précis et sympathique par **M^{me} Dominique François** qui est avec nous ce soir.

L'ambiance du constructivisme et d'amitié qui catalysait au sein du groupe des collaborations fructueuses était certainement dû à la personnalité de Bernard Roy et de son épouse **Françoise Roy** qui accompagnait souvent Bernard aux réunions. Nous gardons un excellent souvenir d'elle, et regrettons beaucoup son décès d'il y a deux ans.

Bernard Roy jouissait toujours un grand estime dans le milieu scientifique. Il a été élu président de l'Association Européenne des Sociétés de Recherche Opérationnelle (EURO) qui sponsorise une vingtaine de groupes du travail, comme la nôtre. Sept universités du monde lui ont conféré le titre du docteur *honoris causa* (parmi eux, l'Université de Technologie de Poznań). Bernard Roy est aussi lauréat de la médaille d'or d'EURO, de la médaille d'or de la société internationale « Multiple Criteria Decision Making », du prix « Hermès de la recherche » par l'Université Laval, et « Distinguished Service Award » par l'EURO.

Mesdames et Messieurs, j'ai un immense plaisir d'annoncer **que le Président de l'Académie Polonaise des Sciences, Monsieur Jerzy Duszyński, avait conféré La Médaille de L'Académie Polonaise des Sciences à Monsieur Bernard Roy.**

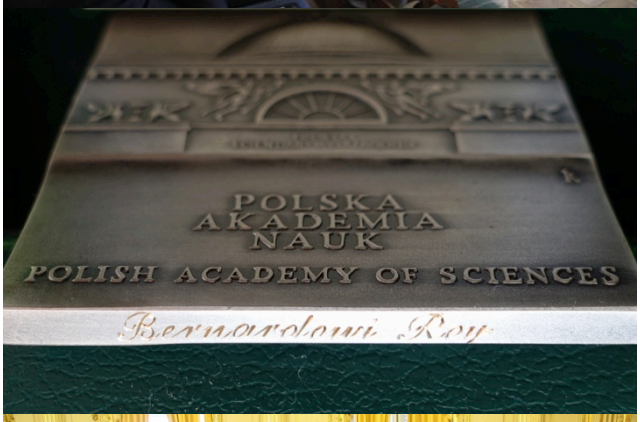
Dans la description de cette médaille nous lisons, qu'elle est la plus haute décoration de l'Académie Polonaise des Sciences conférée à une personnalité extérieure à l'Académie «**pour des mérites exceptionnelles au développement de la recherche scientifique en Pologne et dans le monde - des mérites particulièrement liés au rôle social de la science** ».

La médaille a une forme carrée; au recto, elle porte l'image du siège de l'Académie au Palais Staszic à Varsovie, et au verso, l'image du système solaire de Copernic. Elle est personnalisé par la gravure du nom du lauréat sur la circonférence de la pièce.

Le président de l'Académie m'avait autorisé de remettre la médaille à Bernard Roy ce soiren tant que son représentant. Monsieur l'Ambassadeur, voudriez-vous me joindre pour la décoration, s'il vous plait ?

Roman Słowiński, Paris, le 21 septembre 2017




POLSKA
AKADEMIA
NAUK
POLISH ACADEMY OF SCIENCES
Bernardowi Roy













Forthcoming meetings

- 22-25/10/2017

2017 INFORMS Annual Meeting
Houston, Texas, USA
http://meetings2.informs.org/wordpress/houston2017/

- 27-29/9/2017

SOR '17 - The 14th International Symposium on Operations Research in Slovenia
Bled, Slovenia
http://http://sor17.fov.uni-mb.si/

- 25-27/10/2017

ADT 2017 - 5th International Conference on Algorithmic Decision Theory
Luxembourg
http://sma.uni.lu/adt2017

- 1-3/11/2017

IJCCI - 9th International Joint Conference on Computational Intelligence
Funchal, Madeira, Portugal
http://www.ijcci.org/

- 15-17/11/2017

IES 2017 - 21st Asia Pacific Symposium on Intelligent and Evolutionary Systems
Hanoi, Vietnam
http://fit.lqdtu.edu.vn/ies2017

- 10-13/12/2017

IEEM2017 - IEEE International Conference on Industrial Engineering and Engineering Management
Singapore
http://www.IEEM.org

- 25-27/1/2018

WGSCO2018 - Workshop on Graph Spectra, Combinatorics and Optimization
Aveiro, Portugal
http://wgsco2018.web.ua.pt

- **5-7 April 2018**

87th Meeting of EURO Working Group on MCDA
Delft, The Netherlands
https://www.tudelft.nl/tbm/over-de-faculteit/afdelingen/engineering-systems-and-services/research/ewg-mcda/

- 8-11/7/2018

EURO 2018
Valencia, Spain
http://euro2018valencia.com/

- 23-26/6/2019

EURO 2019
Dublin, Ireland

Seminars

SEMINAIRE «MODELISATION DES PREFERENCES ET AIDE MULTICRITERE A LA DECISION »

Responsables : Bernard ROY, Daniel VANDERPOOTEN
(le mardi à 14h00 – salles à préciser)

Prochaines réunions

17 octobre 2017 Conférence de **Yann Chevaleyre**
LAMSADE – Université Paris Dauphine
Apprentissage de modèles interprétables pour la décision

14 novembre 2017 Conférence de **Olivier Cailloux et Yves Meinard**
LAMSADE – Université Paris Dauphine
A formal framework for deliberated judgment

5 décembre 2017 Conférence de **Brice Mayag**
LAMSADE – Université Paris Dauphine
Negative interactions between criteria are not necessary in MCDA

23 janvier 2018 Conférence de **Khaled Belahcene**
Laboratoire Génie Industriel, CentraleSupélec, Université Paris-Saclay)
Explications de décisions multicritères

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

Awards

A member of our Working Group, Professor **José Rui Figueira** from the Universidade de Lisboa, was awarded the MCDM Gold Medal.

"This is the highest honor that the International Society on Multiple Criteria Decision Making (http://www.mcdmsociety.org/) bestows upon a scholar who, over a distinguished career, has markedly contributed to the theory, methodology, practice and professional development of MCDM."



And also the Georg Cantor medal has been granted to Professor **Kaisa Miettinen** and Edgeworth-Pareto medal has been given to Professor **Wojtek Michalowski**.



Announcements and Call for Papers

By Prof Doumpos

The 7th International Conference on Multidimensional Finance, Insurance and Investment (ICMFII'18)

May 10-12, 2018 Chania (Crete, Greece)

CALL FOR PAPERS

The International Conference on Multidimensional Finance, Insurance and Investment is devoted to the recent developments and applications of the Multi-Criteria Decision Aid tools in the field of finance and insurance. This scientific event disseminates recent methods and procedures designed to solve problems related to **finance**, **insurance** and **investments** formulated through **analytical operational research models** in a multidimensional framework that takes into consideration multiple conflicting and incommensurable decision objectives. The aim of this conference is to bring together **researchers** and **practitioners** from all over the world to discuss recent theoretical and methodological developments as well as new empirical results. Given the popularity of financial portfolio optimization within the fields of finance and operational research, and the large number of active researchers, the idea of organizing an international workshop on multi-attribute portfolio selection (MAPS) was initiated in **Helsinki** in 2005 and chaired by Pekka Korhonen. The second edition of this scientific event took place in **Montreal** and was organized by Belaid Aouni in 2007. The third edition was organized by Alejandro Balbas in **Madrid** in 2009. The international committee has decided to replace the MAPS workshops by an International Conference on Multidimensional Finance, Insurance and Investment (ICMFII). The 2011 edition of the ICMFII held on April 14-16, in **Hammamet** (Tunisia) and chaired by Fouad Ben Abdelaziz. The fifth edition of the ICMFII was organized on November 25-27, 2013 in **Bahrain** and chaired by Minwir Al-Shammari. The sixth edition of this conference took place on June 26-29, in **Alcoy** (Spain). The 7th edition will be organized by the Technical University of Crete (Financial Engineering Laboratory, conference chairs: Michael Doumpos and Constantin Zopounidis) on May 10-12, 2018 in Chania, Greece.

A broad range of topics will be covered during the conference. Papers related to the following topics are suitable for submission to the conference:

- Multi-Attribute portfolio selection
- Multi-Criteria Decision Aid in Finance
- Multiple Objective Programming in Finance
- Stochastic Programming in Finance
- Fuzziness and uncertainty in Finance
- Financial Planning and Financial Engineering
- Option pricing
- Portfolio Analysis
- Asset and liability management
- Financial Economics
- Interest rate models
- Bank Management
- Capital Budgeting
- Finance applications
- Corporate Governance
- Insurance applications
- Auditing, Accounting, Insurance, and Pension Fund Management
- All other topics in relation to Financial Decision Sciences

Plenary talks have been arranged by Prof. Panos Pardalos (University of Florida, USA) and Prof. Salvatore Greco (University of Catania, Italy and University of Portsmouth, UK).

The ICMFII International committee invites all interested researchers and professionals to submit **extended abstracts** (at most 2 pages) should be written in English. They should clearly include: title, brief abstract, list of key-words, author(s) full name(s), affiliation(s), complete address(es), and e-mail address(es). Please state the name of the contact person. All documents must be sent in RTF (Rich Text File) or Doc format by email to the following address icmfii18@isc.tuc.gr. The **deadline for submitting your Abstract is February 15, 2018**.

Selected manuscripts will be considered as potential full-paper publications in **international journals**, subject to peer reviews, to be announced soon at the conference website (http://www.icmfii.com). Early registration fee for academic participants is €250 and for students is €150. The organizing committee will be glad to assist all registered participants who have paid the registration fee in the Visa process.

For any question concerning the organization of the Conference, you may contact the conference organizers at icmfii18@isc.tuc.gr. For further information, please visit the ICMFII website **www.icmfii.com**

This conference is endorsed by the International Society on Multiple Criteria Decision Making

By prof Marco Bohanec,
IFIP DSS 2018: 19th Open Conference of the IFIP WG 8.3 on Decision Support Systems,
to be held during 13–15 June 2018 in Ljubljana, Slovenia.
The theme of the conference is *"DSS Research Delivering High Impacts to Business and Society"* highlights the main purpose of the DSS: providing support to people and organisations faced with difficult decision problems in a variety of contexts. The main topics include, but are not limited to:
Decision Support, Methodologies, Systems & Software;
Decision Making, Behaviours, Data & Decision Models;
Business Analytics, Intelligence & Knowledge Discovery;
Case Studies and Applications of Decision Support.
For further details and Call for Papers, please see the web page http://ifip2018dss.ijs.si/.
The important dates are:
Submissions: December 15, 2017
Author notification: February 15, 2018
Final submissions: March 15, 2018
Early registration deadlines: April 15, 2018
Conference: June 13-15, 2018

Professor Marko Bohanec, IFIP DSS 2018 General Chair.
Scientific Councillor, Jožef Stefan Institute, Ljubljana, Slovenia

Call for Papers

- Journal: **EURO Journal on Decision Processes**

Subject: **Interactive Multiple Criteria Decision Making**
Submission deadline: 1 November 2017
Guest editors: Murat Koksalan, Gulsah Karakaya
Website:
http://static.springer.com/sgw/documents/1611097/application/pdf/40070_EJDP_CfP_Interactive+MCDM.pdf

- For other special issues in EJDP, see:

http://www.springer.com/business+%26+management/operations+research/journal/40070

- Journal: **Advances in Operations Research**

Subject: **Decision-Making for Urban Planning and Regional Development**
Submission deadline: 29 December 2017
Guest editors: Marta Bottero, Alessandro Oppio, Chiara D'Alpaos
Website:
https://www.hindawi.com/journals/aor/si/693910/cfp/

- Journal: **Int. J. of Financial Engineering and Risk Management**

Subject: **Multicriteria Approaches and Stock Market Issues**
Submission deadline: 1 July 2018
Guest editors: Silvia Angilella

Website:
http://www.inderscience.com/info/ingeneral/cfp.php?id=4043



Articles Harvest

(**This section is prepared by Salvatore CORRENTE, salvatore.corrente@unict.it**)

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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).

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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/

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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.

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