
Editorial

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Biographical notes: Willem Karel Brauers received a PhD in Economics, University of Leuven; a Master of Arts in Economics, Columbia University, New York; a Master's in Management and Financial Sciences and Political and Diplomatic Sciences and a Bachelor's in Philosophy, University of Leuven. He is a Professor in the Faculty of Applied Economics at the Institute for Development Policy and Management, University of Antwerp. Previously, he was a Professor in the University of Leuven, the Belgian War College, the School of Military Administrators and the Antwerp Business School. He was a Research Fellow in several US institutions such as Rand Corporation, the Pentagon, the Institute for the Future, the Futures Group and extraordinary advisor to the Center for Economic Studies of the University of Leuven. He was a Consultant in the public sector, such as the Belgian Department of National Defense, the Department of Industry in Thailand, the project for the construction of a new port in Algeria (the Port of Arzew) and in the private sector such as the International Seaport of Antwerp and in electrical works. He was the Chairman of the Board of Directors of SORCA Ltd. Brussels, Management Consultants for Developing Countries, linked to the worldwide group of ARCADIS. Currently, he is the Chairman of the Board of Directors of MARESCO Ltd., Antwerp, Marketing Consultants and General Manager of CONSULTING, Systems Engineering Consultants. He is the Member of many international scientific organisations. His specialisations include optimising techniques with several objectives, forecasting techniques, public sector economics such as for national defence and for regional suboptimisation and input-output techniques. His scientific publications consist of 12 books and more than 100 papers and reports.

Edmundas Kazimieras Zavadskas is a Dr. Habilius, Professor, Dr. Honoris causa of Poznan, Sankt Petersburg and Kiev University's, Vice Rector of Vilnius Gediminas Technical University, Lithuania. He has been a Member of Lithuanian Academy of Sciences, the President of Lithuanian Operational

Research Society and the President of Alliance of Experts of Projects and Building of Lithuania. He is Editor-in-Chief of the journals such as *Journal of Civil Engineering and Management*, *Technological and Economic Development of Economy*; Editor of the *International Journal of Strategic Property Management*. In 1973 he received a PhD in Building Structures. He had been an Assistant, a Senior Assistant, an Associate Professor, Professor in the Department of Construction Technology and Management. In 1987, he was Dr. Sc. at Moscow Civil Engineering Institute (construction technology and management). He had made research visits Moscow Civil Engineering Institute, Leipzig and Aachen Higher Technical Schools. He maintains close academic links with the Universities of Aalborg (Denmark), Salford and Glamorgan (UK), Poznan University of Technology (Poland) and Leipzig University of Applied Sciences (Germany). He is the Member of many international scientific organisations, Member of Editorial Boards of some research journals. He is the author of 14 monographs in Lithuanian, English, German and Russian. His research interests include building technology and management, decision-making theory, design automation and decision support systems.

Introduction

The first introductory paper attempts to give a general overview of normalisation on the one side and decision making on the other. The term 'Normalisation' got many interpretations. As normalisation in decision making is mainly interested in measurement, normalisation in technology is an important starting point, besides normalisation in money terms and in dimensionless measures. Personal touch, by decision-makers or stakeholders, may influence the normalisation process too. In the second introductory paper application is demonstrated for multiple objectives. General aggregative methods rather than methods of partial aggregation are discussed, either in a discrete or in a continuous way. For the discrete methods, the additive linear method with weights obtains bad points, whereas other methods like reference point theory and ratio systems are preferred. For the continuous way, the methods of application are more restricted.

The prime objective of the paper 'Introducing reliability measures into multicriteria decision making' by Vaidogas and Zavadskas is to introduce reliability and availability into the mathematical framework of multicriteria decision making. The main message is that the mathematical framework of multicriteria decision making is sufficiently flexible to adopt probabilistic attributes of alternative designs. This paper considers incorporation of specific attributes such as probability of human errors, which can crucially influence reliability. Application is brought in the paper by Vaidogas, Zavadskas and Turskis under the title: 'Reliability measures in multicriteria decision making as applied to engineering projects'. This paper contains two examples of a combined application of multicriteria decision making and reliability analysis. The first example is concerned with a comparative planning and arranging of a building construction process. The second one has to do with comparison between alternative designs of a floor structure. Reliability of alternative construction plans and failure probabilities of alternative arrangements of floor structure are taken as attributes used for multicriteria decision making. Various normalisation methods and decision-making criteria are applied to solve problems

considered in the examples. It is demonstrated that reliability measures used in multicriteria decision making can create interdependence between attributes of the alternatives under consideration. Introducing reliability measures into decision making generates the need to replace traditionally deterministic attributes by random entities such as mean values. The examples concern rather simulations instead of statistical estimations.

In the paper, 'The effectiveness of assessments in multiple criteria decisions', Peldschus concludes that the stability of the solution for minimisation or maximisation problems is not ensured using a linear transformation. In order to avoid an unintentional weighting between maximisation and minimisation, ratio functions are used, which map the normalised values on the interval $[1; \sim 0]$ and which give similar results for equal changes in percentages in both maximisation and minimisation problems.

The paper 'Some problems of evaluating multicriteria decision methods' written by Ginevicius and Podvezko, remarks that for multicriteria analysis complicated methods are mostly used. However, simple multicriteria evaluation methods may as well perform as the more complicated ones. As a simple method, the authors think of the sum of ranks for a set of criteria per alternative, of geometric means and of SAW. As an illustration, the authors give the example of nine financial criteria for ten non-financial sectors in Lithuania. After the example, the methods of the sum of ranks, of the geometrical means and of SAW perform as good as the more complicated ones such as TOPSIS and VIKOR.

In the paper 'Methods of determining objective, subjective and integrated weights of attributes', Ustinovichius makes first the difference between objective and subjective determination of weights. The subjective weights reflect the subjective judgement of a person. On the contrary, objective weights are obtained by mathematical methods. The author would like to integrate both approaches. He is not satisfied with the existing coordination by other authors. Therefore, he comes to his own method.

In the paper 'Sensitivity analysis of a simple additive weight method' by Zavadskas, Turskis, Dejus and Viteikiene, first the authors depict optimality linked to sensitivity analysis. However, the aim is to come to multiattribute utility analysis. Therefore, they go out from Simple Additive Weight (SAW) method, but come to normalisation by the use of ratios, whereas test matrices are formed. It is concluded that only significant criteria relative to all criteria have an impact on the results.

Meszek, in his paper 'Uncertainty phenomenon in property valuation', tries to analyse the uncertainty phenomenon in property valuation. The value of property depends on different characteristics and attributes. The translation in market value is characterised by uncertainty. Therefore, he makes use of pairwise comparisons and of the theory of games of von Neumann and Morgenstern. The discussed strategic model is in the form of a double two-player zero sum game, that corresponds to the essence of the 'Nature with Nature' game. Valuation procedure in uncertain conditions shall be a permanent element of property appraisers' practice.

The paper of Podvezko 'Determining the level of agreement of expert estimates' has to do with the different importance different experts give to different criteria (objectives). Immediately the author gets involved with the mixture of nominal scales (perfect agreement, more or less agreement, disagreement), cardinal scales (weights) and ordinal scales (ranking). After Arrow it is possible to move from cardinal scales to ordinal ones but not vice versa. Nevertheless, different authors try to do the contrary. Also, he gets involved in this mixture. His first method moves from ranks (ordinal) to total of ranks

(cardinal). He compares this method with weights and with the fundamental ten-point scale of Saaty, other example of mixture between nominal and cardinal scales. After some simulations, Podvezko concludes that the highest level of agreement has been obtained by using the direct ranking method, namely by moving from ranks to totals of ranks.

The paper 'A hybrid normalised multicriteria decision making for the vendor selection in a supply chain model' by Haq and Kannan, aims to develop an effective and efficient hybrid normalised multicriteria decision making model for evaluating and selecting a vendor. Therefore, the Analytical Hierarchy Process (AHP), the Fuzzy Analytical Hierarchy Process (FAHP) and an integrated approach of Grey Relational Analysis (GRA) in a Supply Chain Model (SCM) is used. The effectiveness of such a hybrid model is illustrated using the case study of paper manufacturing industry in the southern part of India. The proposed model helps the industry to effectively select the vendor.

In their paper 'Normalisation in the selection of construction alternatives' Migilinskas and Ustinovichius go out from twelve criteria for construction alternatives. For further evaluation, they refer to eight methods of normalisation, which are finally grouped into four groups. They use as support LEVI 3.0, a programme developed in Gediminas Technical University. The authors bring a critical contribution about the four groups of methods.