

Preface

The book “Mathematical-Statistical Models and Qualitative Theories for Economic and Social Sciences” is part of the important series “Studies in Systems, Decision and Control” published by Springer. This is the result of a scientific collaboration, in the field of economic and social systems, among experts from “University of Defence” in Brno (Czech Republic), “G. d’Annunzio” University of Chieti-Pescara (Italy), “Pablo de Olavide” University of Sevilla (Spain), and “Ovidius University” in Constanța, (Romania).

The variety of the contributions developed in this volume reflects the heterogeneity and complexity of economic and social phenomena; thus, in this book, there is a convergence of many research fields, such as statistics, decision making, mathematics, complexity, psychology, sociology, and economics. The different studies included in this book, selected using a peer-review process, present also empirical interesting researches conducted in various countries. Each chapter was peer-reviewed by two independent referees (e.g., J. Beránek, J. Čermák, D. Řezáč, and V. Voženílek, (CZ); M. Grega, S. Filip, and J. Klučka (SK); A. Porrovecchio (FR); N. Bortoletto, M. Squillante, and A. Ventre, (IT); E. Barrera Algarín, O. Vazquez-Aguado, and C.M. Vicente (ES)). The volume is divided into two parts: The first one is “Recent Trends in Mathematical and Statistical Models for Economic and Social Sciences,” whereas the second one is “Recent Trends in Qualitative Theories for Economic and Social Sciences.”

Part I collects research of scholars and experts on quantitative matters, who propose mathematical and statistical models for social sciences, economics, finance, and business administration.

The book opens with the contribution of Veronika Mitašová, Ján Havko, and Tomáš Pavlenko. They propose a study titled “Correlational Research of Expenditure Spend on Slovak Armed Forces Participation in Peace Support Operations Led by NATO” in which a multifactor single-equation econometric model is created and tested.

Salvador Cruz Rambaud, Fabrizio Maturo, and Ana María Sánchez Pérez aim to develop three approaches for obtaining the value of an n -payment annuity, with payments of one unit each, when the interest rate is random. To calculate the value

of these annuities, the authors assume that only some non-central moments of the capitalization factor are known. The first technique consists in using a tetra parametric function which depends on the arctangent function. The second expression is derived from the so-called quadratic discounting, whereas the third approach is based on the approximation of the mathematical expectation of the ratio of two random variables by Mood et al. (1974). A comparison of these methodologies through an application, using the R statistical software, shows that all of them lead to different results.

Josef Navrátil and Veronika Sadovská concentrate on the health risk assessment of selected pollutants derived from residential fire simulated in fire container. The key interest of their study is dedicated to polycyclic aromatic hydrocarbons (PAHs) and their toxicity and harmful effects on the health of firefighters, whose protection by breathing apparatus is insufficient.

Qualitative and quantitative comparison of the results of the entrance draft tests and the entrance tests of mathematics is illustrated by Radovan Potůček. His contribution focuses on the applicants for the bachelor and master study at the Faculty of Military Technology of the University of Defence in Brno. He refers to tests organized by the Department of Mathematics and Physics and presents the results of the applicants (from the military secondary school and civilian secondary schools), comparing and evaluating them from the qualitative and quantitative point of view.

Recent trends in digital ethnography are presented by Vanessa Russo. She shows theories, models, and case studies with the aim of defining the boundaries of digital ethnography. Finally, with the help of the comparison between empirical cases, she tries to understand critical points, limits, and research prospects for digital ethnographers.

Lenka Hrbková, Jozef Zagraban, and Roman Chytilék analyze the demand side of negativity and privatization in news with an experimental study of news consumer habits. They remark that negativity in media and emphasis on personal side of politics are often cited as a common journalist practice, which is harmful to democratic processes. Journalists and media houses are often held accountable for these phenomena because they prioritize profit over the quality of content. Then, they offer an analysis focused on demand side of both negativity and privatization of political news. Using the Dynamic Process Tracing Environment (DPTE), they test the assumption that both of these features of political media coverage may be driven by audience demand for negative and personal news.

Martin Hubacek and Vladimir Vrab propose a constructive simulation for cost assessment of training. They highlight that constructive simulation, which is used as a tool for training of commanders and staffs of military units, has important benefits for a higher quality of training. Furthermore, constructive simulation gradually penetrates into other spheres such as the training of emergency staff. However, relevant studies about the economical benefits of the use of constructive simulation for training are relatively rare. The presented cost comparison of the exercises is based on the authors' experience gained during the implementation of various types

of exercise, at the Center of Simulation and Training Technologies of Brno, with the use of constructive simulation OneSAF.

Social problems and decision making for teaching approaches and relationship management in an elementary school are the topics of interest of Luciana Delli Rocili and Antonio Maturo. Their chapter illustrates teaching experiences in the primary school and applications of theories regarding the choice of teaching methods in this particular context. In order to decide the most appropriate intervention strategies, both in terms of teaching and for an efficient management of relationships within the class and with the students' families, they consider that the first step is to discover the students' social and environmental background. The experience described herein is at the basis of the final proposal on how to concretely implement some decisional procedures at school, as for instance those linked to the limited rationality and the analytic hierarchy process theorized by Saaty.

Ferdinando Casolaro and Alessandra Rotunno propose a chapter titled "From the pictorial art to the linear transformations." In particular, the authors suggest a path for the teaching of geometry in Italy that reflects the development, which took place over the past two centuries. Moreover, they highlight the social aspects of a teaching based on the graphical visualization as required by the projective geometry.

Bekesiene, Hošková-Mayerová, and Diliunas focus on the identification of effective leadership indicators in army forces of Lithuania. They remark that leadership is of overriding importance in the military sphere because the foundation for leading a unit consists in influence, motivation, and soldiers' inspiration by the leader's personal example. The Lithuanian Army seeks to develop a military leadership identity as a way to promote mission success. This study is sought to identify the effective leadership style, which is appreciated by soldiers in the Lithuanian Armed Forces. The authors adopt the Leader Behavior Description Questionnaire (LBDQ) for measuring the behavior of leaders. The data collected from military personnel, holding different ranks and doing their professional military service of all the units of the Lithuanian Armed Forces, were analyzed using structural equation models (SEM).

"Why We Need Mathematics in Cartography and Geoinformatics" is the title of the chapter of Václav Talhofer. He highlights that mathematics is necessary for understanding of many procedures that are connected to modeling of the Earth as a celestial body, to ways of its projection into a plane, to methods and procedures of modeling of landscape and phenomena in society, and to visualization of these models in the form of electronic as well as classic paper maps. Not only general mathematics, but also its extension of differential geometry of curves and surfaces, ways of approximation of lines and surfaces of functional surfaces, mathematical statistics, and multicriteria analyses seem to be suitable and needful. Moreover, he suggests that the underestimation of the significance of mathematical education in cartography and geoinformatics is inappropriate and lowers competences of cartographers and geoinformaticians to solve problems.

Hana Svatoňová and Radovan Šikl investigate the cognitive aspects of interpretation of image data. Interpretation of image data is a complex of complicated

intellectual operations, which is based on visual. The theoretical part of their study summarizes the scientific knowledge of processes of visual perception applied in the process of visual interpretation of satellite, aircraft, and map image data. Author presents partial phases of image data interpreting process: from the initial recording of the image to detection, identification, and objects classification. The complexity of the cognitive process with regard to biological and psychological characteristics of the individual is highlighted. The research section presents the results of image data interpretation research according to gender of individuals/research respondents.

Engin Baysen, Šárka Hošková-Mayerová, Nermin Çakmak, and Fatma Baysen study the misconception regarding providing citations. Their research aims at finding out citation understandings of Czech and Turkish secondary and high school students. Except for few students, secondary and high school students have misconceptions concerning providing citations. Students are unintentionally vulnerable to plagiarize while reporting. The study shows that only secondary and high school education is not enough for implementing honesty regarding citation. Therefore, the authors remark the importance of educating and informing students about honesty in research and plagiarism.

Subjective preconditions and objective evaluation of interpretation of image data are analyzed in the chapter of Hana Svatoňová and Šárka Mayerová-Hošková. In learning and teaching, there is an ongoing teaching relationship with specific and bidirectional relations between the teacher and student. Teacher can have either a strongly positive or, on the contrary, a strongly negative impact via his communication and interactions with students. From the wide idea of attitudes and values that constitute the relationship between the teacher and the student, their article is focused on a part of subjective assumptions about the success of students in a specific task: in this case, interpretation of aerial and satellite images and maps. The respondents of the researcher were elementary school teachers and students aged between 11 and 15. The subjective assumptions of teachers were compared with assumptions of students, and subsequently, all subjective assumptions were compared with objective data.

Fabrizio Maturo, Stefania Migliori, and Francesco Paolone analyze the influence of institutional and foreign shareholders on national board diversity of companies. Investigating the external antecedents of board diversity, they suggest the use of functional data analysis for diversity assessment in corporate governance studies. Focusing on a sample of 1230 Italian medium-large firms, their results show that institutional shareholders do not influence national board diversity, while foreign shareholders strongly affect it, especially when they hold more than 50% of shares. Thus, the authors address the research gap on the determinants of national board diversity and enrich comparative European research on this topic.

Francesco Paolone and Matteo Pozzoli investigate the effect of financial crisis of Earnings Manipulation by adopting the Beneish model. Specifically, empirical evidence from the “Top World Enterprises,” ranked by “Sales Revenues” in the fiscal year 2013, is presented. Their results show that there has been a greater propensity for manipulating earnings in the first year of the global crisis:

Companies have had a tendency to increase creation of social wealth, in terms of generating higher profits. This would mean that the crisis has had a positive effect on handling of income by the largest companies in the world because the crisis itself has restricted the earnings manipulation policies.

Reasoning and decision making in practicing counseling are considered by Antonio Maturo and Antonella Sciarra. The counseling procedure is considered as a dynamical decision-making problem, where the awareness of alternatives and objectives and their evaluations are maieutically induced by the counselor. After presenting some relevant practices of counseling and related decision-making procedures, this study shows the use of the mathematical theory of decisions for a formalization of the counseling methods, in order to model, clarify, and make rigorous procedures of decision. Finally, it is shown that fuzzy reasoning can give a useful formal help to the task of the counselor because of its flexibility.

Ana Vallejo Andrada, Šárka Hošková-Mayerová, José Luis Sarasola Sanchez-Serrano, and Josef Krahulec deal with how society views the current wave of migration, specifically in Andalusia (Spain) and Czech Republic. The problem is described in a pre-case study, which covers results concerning citizens' approach to an urgent social topic, i.e., migration and immigration and risks related to these questions. First, the research presents a summary about the history of migrations in both regions; then, the current situation in those regions is characterized; after that, the questionnaire was prepared with the idea of how people feel this phenomenon, and survey was made. Finally, based on the results, possible risks are presented and some strategies on how to deal with inconvenient situations, which might arise, are suggested.

Domenico Di Spalatro, Fabrizio Maturo, and Lorella Sicuro face the issue of inequalities in the provinces of Abruzzo making a comparative study through the indices of deprivation and principal component analysis. The indices of deprivation are a valuable tool to measure the socioeconomic disadvantage in certain geographical areas of interest. This study aims to compare inequalities between the provinces of Abruzzo over the last two decades suggesting some indices of deprivation to capture the key aspects of the great wealth of information relating to population census. Specifically, they propose three indices of deprivation to measure the material and social disadvantage. Moreover, a principal component analysis is performed using the most known indicators of deprivation. Using these methods, their results show an increase in the proportion of disadvantaged areas in the Abruzzo region from 1991 to 2011 in its four provinces.

Part II "Recent Trends in Qualitative Theories for Economic and Social Sciences" collects research of scholars and experts on qualitative matters, who propose and discuss on social, economic, and teaching issues.

Part II opens with the chapter of Grazia Angeloni which highlights the reasons why educational institutions should be considered complex systemic organizations. Specifically, she suggests a multidisciplinary approach tending to make use, on the one hand, of different lenses, in order to appreciate the organizational phenomenon taken into consideration, and on the other, it is an effort to join different epistemes for practical purposes.

Jose Luis Sarasola Sánchez-Serrano, Ana Vallejo Andrada, and Alberto Sarasola Fernandez in their study “Sociability and Dependence” illustrate the results of a survey conducted for studying elders sociability in the urban area and its relation with the dependency degree.

Stefania Fantinelli presents her research titled “Knowledge Creation Processes Between Open Source Intelligence and Knowledge Management.” She adopts some interviews on a sample of Italian analysts and experts to reveal what is the common use of “Open Source Intelligence” methods and how they are linked to the knowledge creation and knowledge management processes. Furthermore, she explores this method in a social psychology perspective and in relation to knowledge management in organizations.

Advanced technologies for social communication are proposed by Roberto Salvatori, who highlights the speed of change and spread of ICT in Education, which put the entire educational system in the position of continuously redesigning new methods and teaching models adapted to a globalized and interconnected society, where knowledge is distributed, easily accessible, and constantly updated.

Valentina Savini deals with the concept of social distance as an interpretation of a territory. She shows that the physical and spatial aspects of social distance identified by Simmel disappeared from the theoretical setting when the issue was analyzed in America. Moreover, the approaches that combine the physical and relational dimensions, based on Italian and English sociologists of the last few years, should be preferred.

Gabriele Di Francesco presents a socio-vital areas analysis with a qualitative approach to sociological analysis of urban spaces and social life. He presents the theoretical synthesis and the technical and methodological setting of a research, aimed to analyzing and evaluating the urban places and spaces of social life, where the human interactions take place and the city come to life.

Cultural and natural heritage challenges are illustrated by Zdena Rosická. The author remarks that every cultural heritage object and its content has its unique character and calls for an individual approach considering safety, protection, security, risk-preparedness, and further viable use. The public usually know about high-value losses of cultural property caused by burglary, fire or flood when the mass media report them; however, physical care, including environmental and conservation control, property transfer and transport, personal access, thefts from exhibits during the day, and incidents of smash bring about higher-cost internal losses, which are sometimes not reported at all. In case any disaster strikes, harm to cultural treasure is sometimes serious and losses irreplaceable unless relevant measures are taken in time.

Fiorella Paone aims to contribute to reflection about new form of emerging literacy starting from communicational changes, which characterize new social and cultural paradigm due to the use of electronic media. The narrative paradigm thought as linguistic practice of construction of liquid identities is considered as a possible operative strategy able to promote personal development in a holistic perspective, enforcing both personal and social self.

Vincenzo Corsi takes into account the sociological methods and construction of local welfare in Italy. He describes the importance of the study of the social care needs of the population for the construction of the local welfare system. Then, he shows some aspects of the local welfare system in Italy.

Daniel Flaut and Enache Tuşa analyze some aspects of social life in Romanian villages in the interwar period. At the same time, they describe the standard of living in rural areas, which varied depending on the ethnicity of the residents, using examples taken from the Dobrudja region.

A large spectrum of problems related to statistics, mathematics, teaching, social science, and economics has been presented in this volume. Therefore, a broad range of tools and techniques that may be used to solve problems on these topics has been presented in detail in this book, which is an ideal reference work for all those researchers interested in recent quantitative and qualitative tools. Due to the wide range of topics of the research results collected in this book, it is addressed, in equal measure, to mathematicians, statisticians, sociologists, philosophers, and specialists in the fields of communication, social, and political sciences.

Brno, Czech Republic
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July, 2017

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Mathematical-Statistical Models and Qualitative

Theories for Economic and Social Sciences

Hošková-Mayerová, Š.; Maturo, F.; Kacprzyk, J. (Eds.)

2017, XVII, 437 p. 104 illus., 79 illus. in color.,

Hardcover

ISBN: 978-3-319-54818-0