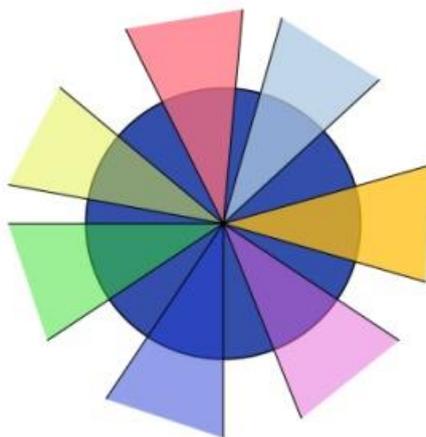


Book of Abstracts of the 10<sup>th</sup> IFORS Conference of  
Operational Research  
Barcelona 2014

Euro Working Group  
Methodology of Societal Complexity (MSC)

Volume 28

Dorien DeTombe (Ed.)



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Dorien DeTombe (Editor)

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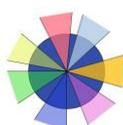
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Euro Working Group

Methodology of Societal Complexity (MSC)

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Chair: Prof. Dr. Dorien DeTombe

International Research Society on Methodology of Societal Complexity (MSC)

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### The subject of Methodology of Societal Complexity (MSC)

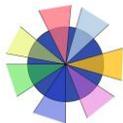
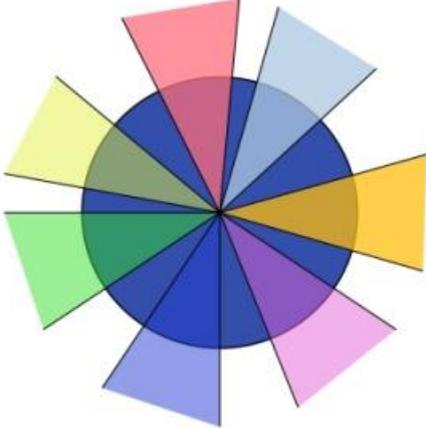
The Field of Methodology of Societal Complexity focuses on methodologies, methods and tools for analyzing, structuring, guiding and evaluating complex societal problems. Complex societal problems are often policy problems that can occur in many fields, like in the Agro-industry (Mad-Cow disease, BSE; Foot and Mouth disease; Fowl Plague), in the transportation sector, in healthcare (Malaria, HIV/Aids, Flu), in Water affairs and in economy (credit crisis). It focuses also on handling local safety problems like large city issues and natural disasters as flood and hurricanes and on global safety problems like war and terrorism. Although many of these issues have different causes, they have so much in common that they can be approached in the same way.

Complex societal problems are unstructured, dynamical, constantly changing and have a large impact on society on macro, meso and micro level. Handling complex societal problems needs a special multi-disciplinary approach. The content knowledge comes from content experts. The process knowledge comes from facilitators. The power is in the hand of actors. The attention of the research of Methodology of Societal Complexity is on the methods and tools facilitators need for guiding these kinds of problems. The facilitators use methodologies specially created for the field of societal problems combined with methods and insights derived from fields like medicine, law, economics, societal sciences, methodology, mathematics, computer sciences, technology, engineering sciences, socio-cybernetic, chaos theory and operational research combined with content knowledge. Often a combination of methods is needed.

The set of lectures presented on the 10<sup>th</sup> IFORS conference in Barcelona 2014 in the track of Methodology of Societal Complexity focuses on methodology of handling real life complexity with an emphasis on global safety, sustainable development, healthcare and economy.

Keywords: Methodology, Complex Societal Issues, Decisions, Sustainable Development, Healthcare, Economy





**The 10<sup>th</sup> IFORS Conference on Operational Research Barcelona July 2014  
Euro Working Group Methodology for Societal Complexity (MSC)  
Chair Prof. Dr. Dorien DeTombe**

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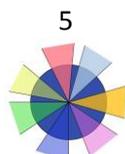
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## I METHODOLOGY OF SOCIETAL COMPLEXITY AND ECONOMY

**Chair Prof. Dr. Dorien DeTombe**

### I-1 A PROPOSITION OF THETICAL AND ANTITHETICAL BUSINESS MANAGEMENT

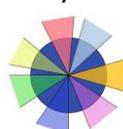
**Prof. Dr. Eizo Kinoshita**

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In this paper, the author discusses the theme of "Thetical and Antithetical Business Management." The thetical business management signifies "a management style which enables such formulation as to make consumers' minimum amount of service goods expenditure an objective function, while making a minimum guaranteed level of expenditure concerning service goods a constraint condition at the same time." On the other hand, the antithetical business management is "a management style which enables such formulation as to make consumers' maximum satisfaction concerning service goods an objective function, while making the maximum limits of their service goods expenditure a constraint condition at the same time". In other words, the thetical business management can be formulated as Primal Problem of Linear Programming, whereas the antithetical business management as Dual Problem of Linear Programming. A typical example of the thetical business management is "McDonald's", and that of the antithetical business management in Japan is "Gi-on (Ichiriki-tei)." The author demonstrates how different the management philosophies of the two entities are, which are diametrically opposed to each other (demonstrating duality), in this paper by citing concrete examples.

The thetical business management is formulated as Primal Problem of Linear Programming, whereas the antithetical business management as Dual Problem of Linear Programming. The thetical business management signifies a management style which enables formulation of consumers' minimum amount of service goods expenditure an objective function, while making a minimum guaranteed level of expenditure concerning service goods a constraint condition at the same time. On the other hand, the antithetical business management enables formulation to make consumers' maximum satisfaction concerning service goods an objective function.

Keywords: Economic Modeling, Business Management



## I-2 REPORTING AND MISREPORTING BEHAVIOR – A REVIEW OF EXPERIMENTAL STUDIES IN DECISION THEORY

**Prof. Dr. Ulrike Leopold-Wildburger**

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This paper focuses on reporting behavior under information asymmetry within a company. Manipulation of performance measures and misreporting of information within companies are some of the central topics in operations research literature. We investigate our research from the experimental perspective of management accounting and from behavioral research. Experimental studies are classified, and the major findings are discussed referring to honesty in decision making. The experimental evidence shows that standard economics theories cannot explain the observed reporting behavior neither in experiments from the field of business nor those from the field of socio-economics.

Keywords: Experimental Studies, Socio-Economics, Companies



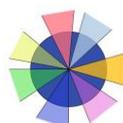
### **I-3 THE EMANCIPATORY SYSTEMS METHODOLOGY FOR ADDRESSING THE COERCIVE ORGANIZATIONAL PROBLEMS**

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Creatively dealing with the coercive management problem contexts, in which power sources can be identified, implies the emancipatory paradigm and employment of corresponding systems methodology. Pursuant to its philosophical foundations and methodological development, Critical Systems Heuristics (CSH) enables to reveal the normative content of the proposed or existing designs of organizational systems. Through use of critically heuristic categories and dialectical debate between those involved and those affected by the designs, but who are not included in designing organizational systems, CSH endeavours to - in application - support the process of improving position of all stakeholders.

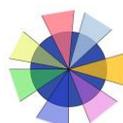
Keywords: Systems Methodology, Critical Systems Heuristics



## **I-4 INFORMATIZATION OF THE MONEY WILL IMPACT THE SOCIAL SYSTEM AND EXISTING MONEY VALUE**

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This study is to clarify social impact. That rapid informatization of money influences exiting money value along with the development of information technology. On the surface, we can explain that electronic money revitalize our economic activity, However, the money we pay when we buy a bread and the money we pay to buy some items on online games are different, This study is to define the difference between them and how this influences in our society.



## II METHODOLOGY OF SOCIETAL COMPLEXITY AND HEALTHCARE

**Chair Prof. Dr. Eizo Kinoshita & Prof. Dr. Cathal Brugha**

### II-1 EFFICIENCY OF ORTHOPEDIC WARD IN ACUTE HOSPITALS

**Prof. Dr. Zilla Sinuany-Stern\***

**Prof. Dr. Lea Friedman\***

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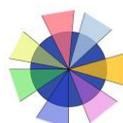
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We study the effect of the socio-economic status on the efficiency of orthopedic wards in all acute hospitals in Israel (20 hospitals), from the view point of the regulator – the ministry of Health. At the first stage, Data Envelopment Analysis (DEA) is used with two input (number of beds, and number of hospitalization days) and 3 outputs (no. of: orthopedic operations, death, and patients). Various versions of DEA are used and compared. As a second stage, regression analysis is utilized to test the effect of the socio-economic status of the patients on the efficiency. Our hypothesis is that there is a negative effect of the socio-economic status of patients on the efficiency of orthopedic wards. Regional differences will be tested too in our analysis.

Keywords: Healthcare, DEA, Orthopedic Wards



## II-2 HANDBOOK HANDLING SOCIETAL COMPLEXITY

### Prof. Dr. Dorien DeTombe

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*Handling Societal Complexity: A Study of the Theory of the Methodology of Societal Complexity and the COMPRAM Methodology with Examples of Applications on Global Safety*, by Dorien J. DeTombe is a handbook on the Theory of the Methodology of Societal Complexity. The book describes the theoretical development of the Field of the Methodology of Societal Complexity and provides the foundation for the application of the Compram Methodology, a methodology for policy making on handling complex societal problems.

Interesting for:

The book is meant for scientists, practitioners, politicians, master and PhD students in the field of Methodology, Social Sciences, Operational Research, Management and Political Sciences, as well as people who are professionally involved in handling complex societal problems. Complex societal problems are the problems on the front page of the quality newspapers. Complex societal problems have a huge impact on society, involve many phenomena and actors, and are therefore difficult to handle. The structured Compram Methodology gives guidelines to handle real life societal complex problems in a democratic, sustainable and transparent way based on a scientific methodology.

Examples of the use of the Compram Methodology are given in the domain of Global Safety on the subject of Healthcare, Economics, Climate Change, Terrorism, Large City Problems, Large Technological Projects and Floods.

Why a special methodology for handling societal complexity?

Understanding societal complexity is absolutely needed in order to develop a safer world. In the intertwined and global world of today there are many complex societal problems: world-wide and local problems; man-made and natural problems. Many every day real life problems are complex societal problems, which exceed the boundaries of the state.

How should complex societal problems be handled?

Complex societal problems should not be handled as domain specific problems, but as interdisciplinary societal problems. They must be treated as multi-disciplinary, multi-actor, multi-level and often as multi-continent issues. These problems should be handled with a multi-disciplinary knowledge approach and a multi-actor power approach taken into account the emotional aspects of the problem and the problem handling process, including the micro, meso and macro level, using the methodology, methods, models and tools from the Field of the Methodology of Societal Complexity.

The Compram Methodology supports increasing the level of living



A good methodology like the Compram Methodology with its set of adequate methods, models and tools combined with an adequate training of policy makers improves the problem handling process and will increase the quality interventions and therefore the quality of life. Handling complex societal problems could save lives, trouble and money.

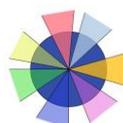
Handling complex societal problems remains complicated

No matter how difficult, simple solutions are not the answer to these complex real life problems. The book explains why complex societal problems are so complicated and why a methodology like the Compram methodology should be used to analyze and guide these kinds of issues. The book indicates how to formulate policy on complex societal issues in order to generate sustainable interventions in a democratic way.

Content of the book

The theory is explained in chapters one to seven. Global safety is the central theme of the examples of how to use the Compram methodology in real life. The chapters eight to thirteen deal with different aspects of Global Safety: the HIV/Aids Problem, Sustainable Development, Climate Change, Credit Crisis, Large City Problems, Large Technical Projects and Floods. These chapters show how the Compram methodology can be used to analyze and handle Complex Societal Problems. Each chapter emphasizes different aspects of the Compram methodology.

Keywords: Complex Societal Problems, Compram, Methodology



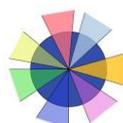
## II-3 FROM COMMUNITY CONCERNS TO SOCIETAL RISK PERCEPTION

### Prof. Dr. Xijin Tang

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In current China social stability is emphasized to develop a harmonious society by the government. A number of social indicators contribute to measure the societal state. Most of them require conducting time-consuming surveys on social attitudes. As search queries, BBS posts and even microblogs reflect the community concerns timely and more truly, we explore to correspond the hot search words, BBS posts or even microblogs with societal risks, and then to measure the on-line societal risk levels every day. Such an approach provides additional measures toward societal states.

Keywords: Complex Societal Problems, Big Data, Decision Support Systems



## II-4 BUSINESS GAME 'BUSINESS AND RISK'

### Prof. Dr. Zhana Tolordava

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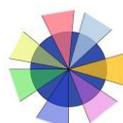
There are currently no effective and practically used models and methods for the quantitative analysis of the operational risks of an industrial enterprise. Therefore, the purpose of a business game "Business and Risk" we have developed, is identification of potential sources of risk, allowing to predict the manifestation of risk factors in specific settings and proceed to the systematic development of measures that weaken the undesirable effect of risk factors, thus contributing to the establishment of the economically safe business operation regime. Detection and identification of risk factors is currently among the most important tasks in the economic analysis of an industrial enterprise.

Business game "Business and Risk" is implemented in the two game sections:

- The first one is built on the team solving the business case for establishing a risk management program for the real sector industrial enterprise;
- The second one simulates the process of preparing a business plan for a real electromechanical enterprise by a group of people interested in acquiring investment from a professional investor, or a lender bank).

In the first part of the game the players, acting as a group of specialists in the business risk management, based on the description of the enterprise (business case), perform all steps of the risk management process. Their task is to identify all types of risks that may arise in the course of the project implementation.

Keywords: Business games, risks



## II-5 KHUDONI CONSTRUCTION IN SVANETI MOUNTAINS – A COMPLEX SOCIETAL PROBLEM

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We consider the problem of the giant hydropower “khudonihesi” construction at the remote region Svaneti of Georgia. It is estimated that this kind of construction of hydropower plant is a complex societal problem and finding solutions to community level should be solved. A list of the causes of the problem and the problem of all the participants involved (as in the private sector as well as government).

We described Khudoni HPP construction problem as the complex societal problem and were divided into constituent sub-problems. Analyzed the reasons why it is not optimal and effective solution to the problem of building a hydroelectric power plant. Some of these components are described as operations research sub-problem task. Compiled list of the scientific disciplines, from which must be chosen the qualified experts. Theoretical methods for solving these sub-problems indicated. Compram method has been developed for the problem of optimal and efficient solutions to some of the theoretical recommendations.

A Brief History: Khudoni hydropower plant (HPP Khudoni) Construction began in 1979, but was suspended in 1989, the national political situation, environmental and seismic activity. By this time some of the venue construction was already well developed, including several kilometers of tunnels were dug inside the turbine room of the mountain, and was withdrawn from the roads and some of the foundation work was done on the left abutment of the dam. Hydropower plant is planned and executed in the Soviet standards. But the dam itself was not built.

The project has sparked interest in the restoration of 1990. Modification of the project started in 1992, but the national situation and the lack of funding has halted its development. The preliminary (“pre-feasibility”) studies were completed in 2008.

Power plant construction and compelling economic arguments are not strong enough. Environmentalists, local residents and the general public in large part to insist that high seismic activity, landslides, and expected problems due to the accumulation of large amounts of water for local residents and surrounding areas safe living environment and their health.

Keywords: hydropower plant, hydropower “khudonihesi”, complex societal problem, operations research, Compram, construction, Modification, pre-feasibility, landslides, Environmentalists

