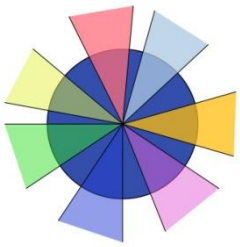
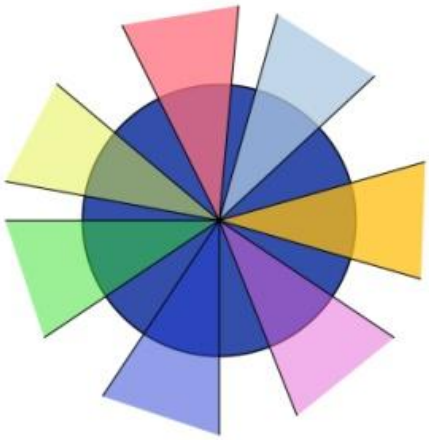


Book of abstracts of the 25th European Conference on Operational Research Vilnius 2012

Euro Working Group Methodology of Societal Complexity

Volume 23

Dorien DeTombe (Ed.)



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Publisher: Greenhill & Waterfront, Europe, The Netherlands, Amsterdam; UK, Guilford; North-America: Canada Montreal
greenhillwaterfront@hotmail.com
ISBN /EAN 978-90-77171-38-7

Version 001, 22 pages, June 2012
Nur 916
Language English
10 Euro

Euro Working Group
Methodology of Societal Complexity

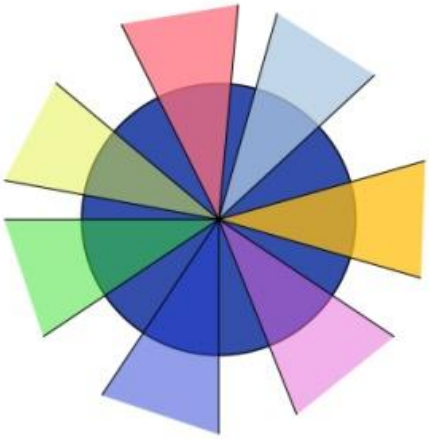
http://www.complexitycourse.org/EuroMSC.html
http://www.euro-2012.lt

Chair:
Prof. Dr. Dorien DeTombe
International Research Society on Methodology of Societal Complexity
Euro Working Group on Methodology of Societal Complexity
P.O. Box. 3286, 1001 AB Amsterdam,
The Netherlands, Europe Tel: +31 20 6927526
E-Mail: DeTombe@nosmo.nl
http://www.complexitycourse.org/doriendetombe.html

The subject of Methodology Societal Complexity

Methodology of Handling Complex Societal Issues focuses on 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 global safety problems like war, terrorism. Although many of these issues have different causes, they have so much in comment that they can be approached in the same way.
Complex societal problems, as such, are unstructured, dynamical and constantly changing and have a large impact on society on macro, meso and on 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 group is on the methods and tools facilitators need for supporting these kinds of problems. The facilitators use methods specially created for the field of societal problems combined with methods and insights derived from their original field like medicine, law, economics, societal sciences, methodology, mathematics, computer sciences, technology, engineering sciences, chaos theory and operational research combined with content knowledge. Often a combination of methods is needed. In this way the field of societal complexity uses all kind of methods from social sciences and operational research.
The set of lectures focuses on methodology of handling real life complexity with an emphasis on global safety, sustainable development, healthcare and credit crisis.

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



The 25th European Conference on Operational Research EURO XXV Vilnius July 2012
Euro Working Group Methodology for Complex Problems
Chair Dorien DeTombe

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I SOCIETAL COMPLEXITY AND HEALTHCARE

Chair Prof. Dr. Dorien DeTombe

I-1 How To Handle Societal Complexity

Prof. Dr. Dorien DeTombe (MSc.Ph.D.)

Prof. Dr. Dorien DeTombe (MSc.Ph.D.)
Chair International Research Society on Methodology of Societal Complexity
P.O. Box. 3286, NL-1001 AB Amsterdam, The Netherlands, Europe
Tel: +31 20 6927526 DeTombe@nosmo.nl
www.complexitycourse.org/doriendetombe.html

In the intertwined and global world of today there are many complex societal problems such as the global complex societal problems of climate change and credit crisis, and local complex societal problems like traffic and pollution. Policy makers handle these problems globally or locally depending on the problem. However most policy makers are not educated nor capable or sometimes not willing to handle these problems in the most optimal way in order to come to sustainable changes. To improve this situation, policy makers should be aware of the complexity of the problem and learn how to handle complex societal problems. Therefore they need a good scientific education on academic level. When policy makers are not trained during their academic education they should ask for scientific support on handling complex societal problems or attend special courses for learn how to handle societal complexity. A scientific methodology for handling complex societal problems is developed in the field of Methodology of Societal Complexity: the methodology Compram (complex problem handling method) DeTombe (1994-2011). Applying this methodology leads to a more stable and sustainable changes of complex societal problems.

Keywords: Complex Societal Problems, Compram, Policy Making

I-2 The Threats to Contemporary Civilization in Small Towns

Prof. Dr. Justyna Kobylarczyk

Prof. Dr. Justyna Kobylarczyk
Institute of Urban Planning
Chair of Residential Development
Faculty of Architecture, Cracow University of Technology
j.kobylarczyk@op.pl

The threats of contemporary civilization make it more and more difficult to live in the city. Therefore, sustainable development is becoming a profound need of modern times. The author's environmental research carried out in some small towns of Southeastern Poland (the Province of Podkarpacie) made it possible to enumerate the most important needs of the inhabitants of this region. They influence the creation of a healthy housing environment which is the imperative objective of sustainable development. Among other features, they include safety, quiet and privacy as well as the nearness of nature.

Keywords: Sustainable Development, Cities, Safety

I-3 Successful Sustainability by Matching of Environmental, Health, Safety and Social Responsibility Strategy in Project

Prof. Dr. Abolfazl Beheshti, Prof. Dr. Amin Padash

Prof. Dr. Abolfazl Beheshti
International Relations and Energy Economy
Member of "Think Tank "of European Institutions in Brussels
abolfazl_behesht@yahoo.com

Prof. Dr. Amin Padash
Member of Department of Environmental Engineering
Academic Center for Education, Culture and Research (ACECR)
Sharif University Branch, Tehran-Iran
Tel/Fax :(0098) (021)66035177
Mobile: (0098)912300 0586
Aminpadash@gmail.com

The man is the main pivot in the sustainable development. Possibility, planning, and implementation of any project or plan which include even technical or economical advantage, if there were any disadvantages or if the principles of health, safety and environmental rules were in danger, it is not advisable to be recommended. Thus, the national and international standards are generated (Committee on Environmental Policy, 2006).
Considering the three mentioned subjects and their inevitable relations, in addition to their advantages of implementation, such as reducing the taxes and costs and being timesaver nowadays they health, safety and environment are studied and considered as a united group.
The field of sustainable development can be conceptually broken into three constituent parts: environmental sustainability, economic sustainability and sociopolitical sustainability.
Requirements for health and safety and of environmental and social topics in the world are proof for anyone. If the system does not have an Environmental Health, Safety and Social Responsibility (EHSSR) in place now, it may be required to implement one soon.

Keywords: Sustainable Development, Health, Safety and Environment, Social Responsibility

I-4 A Framework for Asking Questions about The State of The Art: The Methodology of Societal Complexity

Prof. Dr. Stephen Taylor

Prof. Dr. Stephen G. Taylor
Biology, Champlain Regional College, 900
Riverside Drive, J4P 3P2, Saint-Lambert, Quebec, Canada,
stevetaylorphd@hotmail.com

Predicting the future of humankind is difficult and complex to say the least. The immediate future always continues the past, but while many scenarios can be developed to provide alternate long-term futures, the dominant theme is change. Mediating change will be the predominant occupation of the leaders of the future, and most of these changes are rooted in complex societal problems. Many examples of this category of problems will have been given in the sessions of this conference under the categories of health and disease, global safety, sustainable environments, and financial stability. The proposed participation is envisioned to assist in the workshop segment, where we will discuss the current state and the future of the study of complex societal problems, through the use of the Compram Method. This session will provide a framework to elicit questions, observations, and suggestions from the presenters and participants from the other sessions of this group. The workshop should then help the leaders of this field to determine a pathway toward the future.

Keywords: Change, Complex Societal Problems, Compram Method

II SOCIETAL COMPLEXITY AND SUSTAINABLE DEVELOPMENT

Chair Prof. Dr. Stephen Taylor

II-1 The Principia Nature 2

Prof. Dr. Timi Ecimovic, Sir Prof. Dr. Roger B. Haw, Prof. Dr. Igor Kondrashin, Prof. Dr. Fidel Gutierrez Vivanco, Prof. Dr. Truly Busch, Prof, Dr. Sait Kacapor, Prof. Dr. Jorn Hamann, at all

Prof. Dr. Timi Ecimovic
Head of SEM Institute for Climate Change
University Ljubljana and Slovenian Society on Methodology for Complex Solving Problems
Triaijkac 25, 1000 Ljublijana, Slovenia
Tel: 38 6 61 76 8313 Fax: 38 6 6175 2756

timi.ecimovic@bocosoft.com

The Principia Nature 2 is about the planet Earth research by using tools of system thinking, operational research, the requisitely holistic approach, global studies, case study, complex problem solving etc. Philosophical and modern sciences approach is offering new perspectives for understanding the present at the planet Earth. It is the second part of "The Principia Nature" and conclusions.

Keywords: Basic Environments, Continuum, Global Studies, Land – Water – Air Environments, Nature, Requisitely Holistic Units, Sustainable Future of Mankind, System Thinking, The Climate Change System, The Planet Earth System, The Star Sun System

II-2 Sustainability of Agriculture – Only A Dream Considering The World Population Growth?

Prof. Dr. Jorn Hamann

Prof. Dr. med. vet., Dr. habil. Jörn Hamann,
Institute of Food Quality and –Safety, School of Veterinary Medicine Hannover, Germany
Platanenring 10, 24119 Kronshagen, Deutschland
Tel: xx49-(0)431-5837488
Fax: xx49-(0)413-5901904
jha911@hamann-kronshagen.de

Sustainability of agriculture tries to meet mankind's needs of the present without compromising the future. CARLOWITZ, as inventor of the term sustainability, stressed that economy, social welfare and mother nature are equal parts. The agricultural sector - cornerstone of food security - has to provide food for almost 50 % more people globally by mid-century. Without doubt, this can and will be reached. However, the question is whether it is possible with a sustainable agriculture. In any case, a lot of money must be spent on agricultural innovations in order to reach the goal of sufficient food for all especially without any further impairment of biological systems.

Keywords: Sustainability, Agriculture

II-3 Anticipatory Aspects in Behavior of Complex Social, Natural and Technical Systems

Prof. Dr. Alexander Makarenko

Prof. Dr. Alexander Makarenko
Institute for Applied System Analysis
National Technical University of Ukraine (KPI), 37 Pobedy Avenue, 03056, Kyiv- 56, Ukraine
makalex@i.com.ua

During the investigations and management of complex social systems many different factors should be accounting. The presentation is devoted to the description of rather new intrinsic aspects complex social objects – namely to the influence of anticipation.
Since the introduction of strong anticipation by D.Dubois and earlier the weak anticipation by R. Rosen the numerous investigations of concrete systems had been proposed. As concentrated (discrete, ordinary differential equations) as distributed (electromagnetic theory equations, cellular automata) systems with anticipation had been considered earlier. Mathematically such objects sometimes frequently have the form of advanced equations. But further development of the theory of anticipatory systems depends on the investigations of new examples of systems with anticipation and their new applications.
So in proposed paper the new examples of distributed and concentrated models with anticipation had been considered.
We propose a list of some properties and manifestations of anticipatory property in different systems and processes:

1. Global sustainable development as strongly anticipative processes;
2. Regional sustainable development as weak anticipatory processes;
3. Origin of scenarios of evolution of complex social systems as the consequences of anticipation manifestation;
4. Self-referencing, reflexivity and mentality aspects in anticipation agents;
5. Medical manifestation of anticipation including schizophrenia;
6. New consciousness models which are based on the anticipatory effects in the brain and artificial intelligence;
7. Quantum-mechanical, microphysics, gravitation and anticipatory analogies in the behavior of large complex systems.

Also the examples of anticipatory effects are described for some real systems. It is proposed neural network models, cellular automata for crowd's movement, sportive games, communication and social networks etc.

Keywords: Anticipatory Property; Anticipatory Systems, Complex Multivalued Behavior, Manifestation of Anticipation Property in Applications; Consciousness Model.

II-4 Critical Systems Practice - A Metamethodology for Problem Situation Managing

Prof. Dr. Slavica Petrovic

Prof. Dr. Slavica P. Petrovic
Faculty of Economics University of Kragujevac
D. Pucara 3, 34 000 Kragujevac, Serbia
pslavica@kg.ac.rs

Critical Systems Practice (CSP), as a metamethodology, is based on critical systems thinking. CSP consists of four phases: *creativity* (to identify key dimensions of the problem situation), *choice* (to select a suitable systems methodology/ies, methods for tackling the problem situation), *implementation* (to make and implement proposals for change) and *reflection* (to assess the intervention and learn about the problem situation as well as the methodology/ies, methods employed). Through paradigm diversity protection, CSP seeks to provide creative and holistic knowledge for managing complex organizational and societal problems.

Keywords: Critical Systems Practice (CSP)

III SOCIETAL COMPLEXITY AND ECONOMY

Chair Prof. Dr. Eizo Kinoshita

III-1 Large-Scale Organisational Downsizing and Workers' Health during The Global Crisis of Late 2000s: A Survey in Four EU Countries

Dr. Elena Andreeva, M Harvey Brenner, Mária Kopp, Töres Theorell, Marcel Goldberg, Ellen Imbernon, Thomas Cox

Dr. Elena Andreeva
Research Scientist and Coordinator
Berlin University of Technology
ACK-185, Ackerstr. 76
13355 Berlin, Germany
Tel.: (+49 30) 314 28 864 (Secretariat)
Tel.: (+49 30) 314 28 867 (Elena Andreeva
elena.andreeva@tu-berlin.de

The Restructuring Survey is the first multi-country study with a comprehensive assessment of various downsizing aspects and job conditions from the standpoint of employees in relation to health.
Interviews were conducted between April 2009 and mid-May 2011 with 1456 workers from Hungary, Sweden, France and UK. The results indicate a sizeable prevalence of massive downsizing events and harsh conditions during and after the downsizing. New evidence was obtained on international patterns of health responses to the downsizing conditions and factors which can modify them.

Keywords: Health, Workers, Downsizing

III-2 Globalization or Isolation?—Ricardo's Model

Prof. Dr. Eizo Kinoshita

Prof. Dr. Eizo Kinoshita,
Meijo University Faculty of Urban Sience, 4-3-3, Nijigaoka, Kani, Japan
kinoshit@urban.meijo-u.ac.jp

Through the attempt to clarify justifiable economic circumstances where a policy of globalization and/or a policy of national isolation is proven valid, the author revealed in this thesis that there are two such economic phases: An economy where the theory of comparative advantage, proposed by David Ricardo, is applicable, and an economy where the theory is not applicable. The author applied his original approach to prove the validity of Ricardo's comparative advantage theory, and found that the theory can be justified only when a macro economy is in the primal problem phase, where a policy of globalization is effective. It is a necessary and sufficient condition for the theory to be valid. In other words, Ricardo's theory of comparative advantage is not applicable when a macro economy is in the dual problem phase, where a policy of national isolation, instead of that of globalization, is valid. The primal problem phase and the dual problem phase of a macro economy, called in this thesis by the author, are a version of an expression quite common in OR (operations research).

Keywords: Ricardo's Model, Globalization, Isolation

III-3 Paradoxes of Complexity, Self Deceiving and Knowledge Mapping

Prof. Dr. Marcos Estellita Lins, Prof. Dr. Angela Cristina Moreira da Silva

Prof. Dr. Marcos Pereira Estellita Lins
Production Engineering Program
Federal University of Rio de Janeiro, Rua Belisario
Tavora 80 ap 506, Laranjeiras, 22245-070, Rio de Janeiro, Brazil
estellita@pep.ufrj.br / estellit@pq.cnpq.br

According to the theory of mind (Malle), understanding of the events puts them in a large network of assumptions and beliefs, generating the pleasure of "consonance" and promising to reinstall the cognitive control, predictability, self-integrity and conceptual coherence. There are some prerequisites for understanding events: the first is the delimitation of the spatial-temporal context, since in the medium/long term death is an overwhelming reality for human rationality. The definition of context cannot be dissociated from the identification of agents and relevant elements. These are necessary to assign attributes of different nature: emotional, sensory, ideational, utilitarian, etc. The establishment of coherence requires not only the construction of this representation of reality, but the deletion of extended perception.
Inside the toolbox of Problem Strucuring Methods there are mapping techniques that help communication among stakeholders and transition amongst different points of view. However, recent literature on consciousness presents some foundations that can enhance the application of methods that facilitate the solution of complex societal problems. This paper proposes such an integrated approach and also shows some demonstrative case studies.

Keywords: Complexity, Self Deceiving, Knowledge Mapping

III-4 A Surprising Equivalence between Consolation of Philosophy and for Societal Complexity

Prof. Dr. Nicolae Bulz

Prof. Dr. Nicolae Bulz
Associate Professor – National Defence College, Romania
Honorary Researcher – World Economy Institute / NERI/ Romanian Academy
Research Associate External - Center for Strategic Economic Studies, Victoria University, Melbourne, Australia
nbulz@yahoo.com

There is the possibility to affirm on a very surprising [methodological] equivalence, beyond a historian space-time, between two important attempts toward the forever difficult "problem solving": I: Consolation of Philosophy, by *Roman philosopher and mathematician Boetius* (ca. 480–524 or 525), and II: Methodology for Societal Complexity, by *professor Dorien J. DeTombe* [*Defining complex interdisciplinary societal problems*. A theoretical study for constructing a co-operative problem analyzing methodology: the methodology COMPRAM. Amsterdam: Thesis publishers Amsterdam (thesis), 1994, 439 pp.]. It is here to point, only, on some occurrence of the concepts problem (4) and solve / solution (3) across the
text of Consolation of Philosophy: Book III. True Happiness and False. "I understand the problem, but I desire to hear how thou wouldst solve it." Book V. Free Will and God's Foreknowledge. Then said I: „But now I am once more perplexed by a problem yet more difficult." If we could know, as He knows, all that is most perplexing in this problem would be made plain. For knowledge depends not on the nature of the thing known, but on the faculty of the knower. Then said she: „This debate about providence is an old one, and is vigorously discussed by Cicero in his 'Divination'; thou also hast long and earnestly pondered the problem, yet no one has had diligence and perseverance enough to find a solution. And the reason of this obscurity is that the movement of human reasoning cannot cope with the simplicity of the Divine foreknowledge; for if a conception of its nature could in any wise be framed, no shadow of uncertainty would remain.
It is obvious that Boetius' texts, here depicted, are comprised into a *theological treaty* (on the realm of the VI century; onto a dramatic context genesis). But any reader could comprehend that the superior cognitive level of the usage of "foreknowledge", co-referring the simplicity of the Divinity and the happiness of the humans, is a subtle methodological acquisition of a VI century meditation - but not only - it is an *in ovo* attempt to a multi-level representation of the real and reality. It is a similar, at least, contemporary attempt toward the *interdisciplinary* representation and solving of the *societal problems* within our complexity. A detailed inquiry within the entire content of Boetius' texts would possible depict significant equivalence
between his and our attempts toward the "problem solving", then enhancing us to an extended attempt, awareness, insight and praxis.

Keywords: Boetius, Philosophy, Societal Complexity, Problem Solving

IV-1 Lima's Water Futures: Combining Qualitative Systems Analysis CIB with Simulation Models

Prof. Dr. Hannah Kosow, Dr. Wolfgang Weimer-Jehle, Dr. Manfred Schuetze, Mrs. Aimara Bauer

Prof. Dr. Hannah Kosow
ZIRN - Interdisciplinary Research Unit on Risk Governance and Sustainable Technology Development, University of Stuttgart
Seidenstraße 36, 70174 Stuttgart, Germany
hannah.kosow@sowi.uni-stuttgart.de

The water future of Lima, Peru, is influenced by uncertain and complex developments of climate, socio-economic conditions, political and infrastructural settings. With a group of local stakeholders, we build qualitative, internally consistent scenarios via CIB (cross-impact balance analysis; Weimer-Jehle 2006). The scenarios are quantified and used as sets of input parameters for a water system simulator. First results show that compared to the story and simulation approach (Alcamo 2001), the use of CIB enhances the consistency and the traceability of the combined scenario approach.

Keywords: Complex Societal Problems, Strategic Planning and Management, Sustainable Development

IV-2 An Analysis of the System of Bribery by Using Bayesian Nets

Ass. Prof. Dr. Ahmet Ekici, Ass. Prof. Dr. Sule Onsel

Ass.Prof.Dr. Ahmet Ekici
Faculty of Business Administration, Department of Management, Bilkent University
06800 Ankara
Turkey
ekici@bilkent.edu.tr

Ass.Prof.Dr. Sule Onsel
Industrial Engineering Department, Dogus University
Engineering Faculty Acibadem, Kadikoy
34722 Istanbul, Turkey
sonsel@dogus.edu.tr

Corruption has been identified as one of the most important barriers to worldwide economic development and growth. Bribery is the focus of this paper. Based on the Global Competitiveness Index and by Bayesian networks, our objectives is to identify factors related to bribery activities in a country, to identify a structural model that delineate the relationships between bribery activities and other factors, and to specify the factors that have the greatest impact on the bribery activities. Theoretical, managerial and public policy implications of the findings are discussed.

Keywords: Ethics, Graphs and Networks

IV-3 By Revitalization of Ancient Abandoned Cemetries to Societal and Economic Strengthening of Small Sites

Prof. Dr. Eva Kralova

Prof. Dr. Eva Kralova
Institute of History and Theory of Architecture and Monument Restoration
Slovak university of technology, Faculty of architecture
Namestie slobody 19
81245 Bratislava, Slovakia
kralova@fa.stuba.sk

For societal and economic development of small sites, it is important to utilize local potential. Cultural traditions, local monuments and memory places are parts of the potential source for revitalization. Abandoned cemeteries represent a special group of such socially accepted and venerated places; without an active local societal life it becomes a complex societal problem. We present the case study of an old cemetery in Banska Stiavnica, Slovakia (UNESCO World Heritage). We introduce the approach and processes of revitalization using operational research.

Keywords: Complex Societal Problems, Development, Facilities Planning and Design