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INVENTING THE FUTURE IN AN AGE CONTINGENCY

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In an age of contingency, the future seems to be a horizon which moves further and further as one tries to get closer. Risk, contingency, catastrophe and unpredictability turn the "future" into an unusual world in everyday semantics and, for example, in political communication. The word "future" often appears linked to the semantics of pessimism and catastrophism. Nevertheless, inventing the future is becoming more and more strategic in an age in which finance is the metaphor for value and wealth construction, and the convergence of Robotics, Informatics, Nanotechnologies and Genetics, or the so-called RING Singularity, is simultaneously turning the human being itself into contingency and infinite possibilities (Heidegger's Gegnet), clarifying once again that the future cannot be predicted but can be invented. This conference challenges worldwide scholars to, directly or indirectly, answer this question:

How would you utilize the systemic toolkit to design the world in 2030 in its key economical, juridical, sociological and technological aspects?
The official language of the conference is English.
Panel speakers are limited to 15/20 minutes for their presentations and 5 minutes for a roundtable debate of their presentations with the chairperson and the public.

CONFERENCE SCHEDULE

FRIDAY 7 TH

8:15 a.m.	**CONFERENCE REGISTRATION**
8:30 a.m.	**WCSA Presidential Address A. PITASI**
9:00 a.m.	**WCSA Scientific Director' speech A. SPILZINGER**

I PANEL:
PANEL CHAIR Andrea Pitasi, WCSA President

PANELISTS

9:30 a.m. – 9:45 a.m.	**Pierre Delattre's contribution to contemporary systemic epistemology its implications for a complex approach to Law** Andrè Folloni, Programa de Pós-Graduação em Direito – PUCPR, Brazil
9:45 a.m. – 10:00 a.m.	**The problem of time and evolution from the perspective of systemic sociology** Jiří Šubrt, University in Prague, Czech Republic
10:00 a.m. – 10:15 a.m.	**Grounding CompLawxity: Towards a Dynamic Theory of Law (VIRTUAL PRESENTATION)** Pedro Miguel Mancha Romero, C.U.E.S.A - University of Cadiz, Spain
10:15 a.m. – 10:30 a.m.	**Understanding Cultural Differences - Avoiding Communication Gaps** Gerhard Chroust, IFSR Secretary General
10:30 a.m. – 10:55 a.m.	**The digitalization of everyday life and the forms of social control** Michele Bonazzi, University of Bologna Emilia Ferone, G. d'Annunzio University, Chieti-Pescara, Italy

10:55 a.m. – 11:15 a.m.	**Debate**
11:15 a.m. – 11:30 a.m.	**COFFEE BREAK**
11:30 a.m. – 1:00 p.m.	**HONORARY LECTURE** **The Three S's of SucceSS: Systems, Strategy, Sustainability** Alexander Laszlo, 57th President and Chair of the Board of Trustees of the International Society for the Systems Sciences (ISSS)
1:00 p.m. – 2:15 p.m.	**LUNCH BREAK**

II PANEL: DIGITAL REALITY AND SOCIAL COMPLEXITY: DISORDER AND ORDER SELECTIONS IN A CONNECTED WORLD

PANEL CHAIR Alfredo Spilzinger WCSA Scientific Director

PANELISTS

2:15 p.m. – 2:30 p.m.	**Complexity And Criminal Law: The Sociology Of Risk As Criminal Political Support Of Negligent Crimes (VIRTUAL PRESENTATION)** Michelle Gironda Cabrera, Mestranda do Programa de Mestrado em Direito Empresarial e Cidadania do Centro Universitário Curitiba – UNICURITIBA
2:30 p.m. – 2:45 p.m.	**Analyzing actors, incentives, relationships and information in local decision-making through the field methodology: pilot cases in regulation of urban services** Franco Becchis, Elisa Vanin and Daniele Russolillo, Turin School of Local Regulation, Italy
2:45 p.m. – 3:00 p.m.	**The systemic approach to urban identity for the understanding of social contingency (VIRTUAL PRESENTATION)** Laura Appignanesi University of Macerata, Italy
3:00 p.m. – 3:15 p.m.	**Shaping and development of library-based scientific world-conception** Edit Fabó, Eötvös Loránd University, Budapest, Hungary
3:15 p.m. – 3:30 p.m.	**COFFEE BREAK**
3:30 p.m. – 3:45 p.m.	**Interactive Media Art And The Materiality Of Communication Towards Cultural Agency** Graziele Lautenschlaeger**,** Humboldt Universität zu Berlin
3:45 p.m. – 4:00 p.m.	**Elevating contradictions between political leadership and systems thinking: introducing backcasting techniques into policy-making** Gábor Király, Alexandra Köves, Bálint Balázs Corvinus University of Budapest, Hungary
4:00 p.m. – 4:15 p.m.	**The social representations of the future and the scientific imagination** Massimiliano Ruzzeddu, Unicusano, Rome, Italy

4:15 p.m. – 4:30 p.m.	**Radical innovation: the case of ectogenesis** Valentina Di Simone, Gabriele d'Annunzio, Pescara, Italy Giulia Mancini Gabriele d'Annunzio, Pescara, Italy
4:30 p.m. – 4:45 p.m.	**Debate**
7:00 p.m.	**SOCIAL DINNER**

SATURDAY 8TH

8:45 a.m. **CONFERENCE REGISTRATION**

III PANEL: POLICY MODELLING

PANEL CHAIR Alexander Laszlo, Saybrook University, San Francisco, USA

9:00 a.m. – 9:15 a.m.	**The Great Citizens and the social construction of reputation, study of the Czech and Slovak case in the longue 20 century** Nicolas Maslowski, Faculty of Humanities Charles University, Prague
9:15 a.m. – 9:30 a.m.	**Complex Adaptive Systems. Interaction, co-evolution and specialisation as a source of diversity in highly interconnected societies. Why convergence is just one option (VIRTUAL PRESENTATION)** Root Hilton, George Mason University, Virginia Paola Zambano, Department of Political Economy, King's College London, England
9:30 a.m. – 9:45 a.m.	**General Principles of Systems** Janos Korn, Business Systems Laboratory (BS-Lab)
9:45 a.m. – 10:00 a.m.	**A new systems tool for predicting the future in an age of contingency** Dr. dr. ir. Gerard Jagers op Akkerhuis, Wageningen University, Netherlands.
10:00 a.m. – 10:15 a.m.	**The Place of Our Earth in the Universe and Turning-Points in Its Life Thoughts Induced by the Climate Change.** Ralovich Béla, member of the Hungarian Academy of Sciences
10:15 a.m. – 10:30 a.m.	**New Approach to Complex Ecological Dynamic Systems Analysis and Modeling (VIRTUAL PRESENTATION)** Migdat I. Hodzic, International University of Sarajevo, Sarajevo, Bosnia and Herzegovina
10:30 a.m. – 10:45 a.m.	**Debate**
10:45 a.m. – 11:00 a.m.	**COFFEE BREAK**

11:00 a.m. – 1:00 p.m.	**ROUNDTABLE FUNDRAISING POLICY FOR SYSTEMIC RESEARCH IN SOCIAL AND ECONOMICAL SCIENCES** Alexander Laszlo, Saybrook University, San Francisco, USA Rok Bukovšek, General Manager at Ota-S d.o.o., Slovenia Alfredo Spilzinger, Lord of Brownsel, SFAI President Andrea Pitasi, G. d'Annunzio University, Chieti-Pescara, Italy Gandolfo Dominici, Scientific Director B.S. LAB George Csepeli, Eötvös Loránd University, Budapest, Hungary Marjolein van Griethuysen, Director European Affairs, Rotterdam
1:00 p.m. – 2:30 p.m.	**LUNCH BREAK**
	FINAL SESSION
2:30 p.m. – 3:15 p.m.	**Editorial Event** **Coordinator** Giulia Mancini, WCSA vice president Andrè Folloni, Programa de Pós-Graduação em Direito – PUCPR, Brazil
3:15 p.m. – 3:45 p.m.	**Debate**
3:45 p.m. – 4:00 p.m.	**COFFEE BREAK**
4:00 p.m. – 4:30 p.m.	**WCSA WORKSHOP APPLIED SYSTEMIC APPROACH AND VISION FOR STRATEGIC BUSINESS CONSULTING** **Rok Bukovšek, General Manager at Ota-S d.o.o. Slovenia**
4:30 p.m. – 6:00 p.m.	**WCSA General Assembly (for members only)**

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D.M. 20 04 2006 G.U. n° 118 del 23 05 2006

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DISCLAIMER:
Panel speakers must have paid their conference registration fees before they give their presentations otherwise they will not be admitted to speak.

I PANEL

Pierre Delattre's contribution to contemporary systemic epistemology and its implications for a complex approach to Law

Prof. Dr. André Folloni – PUCPR, Brazil

Pierre Delattre (1926-1985), as a physicist and a biologist, was interested in the systemic approach and established a theoretical dialogue with major authors of the systems' theories of his time. He was aware of very important epistemological problems when dealing with systems' theories. These issues are examined in various works, especially *Système, Structure, fonction, évolution: essai d'analyse épistémologique* (1971), and are compiled in his book *Théorie des systèmes et épistémologie* (1979). According to Delattre, systems' theories are related to two connected problems: the disintegration of knowledge, caused by the deepening of knowledge and multiplication of disciplines, and the interest about complex systems that cannot be well understood by the traditional analytical method since their emergent characteristics only manifest when the parts are inserted into the whole. This is why systems' theories and interdisciplinary are closely linked. This paper exposes Delattre's most important arguments and examines how they can help on building a Law complex approach on the relations between State intervention and socioeconomic and human development, a deep problem in third world countries. Delattre thinks about scientific language, how concepts are made and how they could be used in different disciplines, and his arguments are useful, *e. g.*, to think about "development" as a legal, sociological and economic concept. He is also worried about analogy and treats metalanguage as an analogy between scientific language and reality, trying to rehabilitate analogy as a scientific partially useful method. Delattre studies the relations between the whole and its parts, reductionism and holism as opposed scientific methods, and aims to define when and how to use analytic and synthetic procedures, which can elucidate some problems of the legal positivist separation of Law and its environment. Delattre examines the relations between a system and its environment, which is a system itself, and the modifications of levels of explanation: from an element to a system, and from this system to its environment – *e. g.*, a rule (part) in law (whole/system) and law (part/system) in society (whole-system). He tries to establish the necessary requirements to understand how a system behaves in the environment and so it helps to comprehend how Law can – or cannot – modify social and economical structures. Delattre thinks about causality, finalism and intentionality in a systemic approach as well and his arguments can be helpful in Law research. He also worries about chaos and order in a complex view, two very important concepts in Philosophy of Law. Delattre studies logic as well, to distinguish "*to be*" and "*to become*" and to claim the importance of time to avoid the confusions of some dialectic approaches that happen in Law study as well. All these issues don't exclude others that Delattre mentions, like ideology and ethics in Science, which are very relevant in Social Sciences' epistemology in general and specifically in Law, since a lot of Law researchers are lawyers and judges as well.

Keywords: Pierre Delattre; System' theory; complexity; development; State intervention

The problem of time and evolution from the perspective of systemic sociology

Jiri Subrt Faculty of Humanities Charles University in Prague

In the older conception of social evolution, the view prevailed that social development is the inevitable process of change associated with the concept of civilizational growth, social progress, humanity's increase, and so on. In one modern strand of evolutionary theory such a position is queried and abandoned. Niklas Luhmann understands social evolution as a process of socio-cultural differentiation. Increasing complexity awakens orientational uncertainty, against which pre-modern societies sought support from the past and tradition, using history as their *magistra vitae* (teacher of life). In modern society, however, the range of possible futures cannot adequately be derived from history, and history has lost its model character. Inwardly orientated systemic history has become insufficient, and attention has shifted to the future, to social planning, which - according to Luhmann - represents an effort to“de-futurize” the future. The increasing unlikelihood of anticipating this future arises from the constantly accelerating complexity of a planless world.

Grounding CompLawxity: Towards a Dynamic Theory of Law

Pedro Miguel Mancha Romero, C.U.E.S.A - University of Cadiz, Spain

Since Seventeenth Century, legal thinking has been pervasively influenced by scientific method and thought. However, it seems as though this influence had been stuck at classic mechanistic and linear science findings, irrespectively its arguments are used to either supporting or refusing such influence in the legal realm. This notwithstanding, there is a slowly increasing trend within legal scholarship proposing to adapt legal issues studies to complexity theory
framework.
It is pretty difficult to offer a sound proposal about how such theory could be helpful to legal practice in a broad sense, for not even their main representatives agrees on what this theory comprises. But we find that complexity studies could be extremely useful in three ways.
Firstly, it has only been merely attempted a legal narrative about philosophical grounding of the so named complexity and chaos theories. Law and legal systems are all about order, but what is order? Does it include justice? Does justice have anything to do with nature as it is displayed before us? Is there anything like a Natural Law growing from Nature itself? Is such Natural Law
written in stone? These are eternal questions incardinated and discussed within the only paradigm apparently considered in the Western tradition, the reductionist, idealistic and dualistic parmenidean one. Complexity theory, though, shows evidence that a different approach should be attempted when considering such issues, this resulting from a re-consideration of heraclitean thought. As legal practitioners, judges and law makers do not come out of anywhere, a first action
to be taken would be seriously considering and explaining such alternative at Law
Schools.
Secondly, it is time now to consider that both mankind and human legal order are not separate from Nature as a whole, but parts of it. Indeed, we hypothesize that legal systems are one of the wildest complex systems due to the inherent unpredictability that poses the exercise of human free will. It would be extraordinarily valuable attempting to identify complexity traits within legal systems and practice, both quantitative and qualitatively, no matter these attempts are doomed to fail. A strange attractor, for instance, is a bunch of independent and infinite results, but also the boundary within which such results take place. Is there anything like that in Law? Why certain initial/intermediate condition produces a phase transition like a revolution or a constitutional
amendment whilst others not?
Finally, and without prejudice of being wrong or unsuccessful with the previous attempts, we might seriously deem complexity thinking as a strong ally for democracy reinvigorating. Sensitive dependence on initial conditions, path dependence or network analysis prove altogether that individuals matter. We the People is not a flat expression. Rather, it is a promise supported by findings of cutting-edge science, the Science of Complexity

“The impact of Cultural Differences on Communication and Coordination”

Prof Drr Gerhard Chroust
IFSR General Secretary

Global Economy, global communication like outsourcing, and global cooperation in case of crisis, be it financial, technical or physical, needs the communication of and the cooperation between many people from different nationalities and backgrounds.
Normally the technical infrastructure outside ofthe disaster domain is intact, the difficulties usually result from cultural differences between people and the resulting effects on mutual understanding and coordination. One needs a high level of cultural proficiency (the range can be characterized as going from ‘ignorance’ to ‘competence’) . Lacking this is a sure path to mismatch of understanding and cooperation and as a consequence frustration and failure.

In this session we intend to cover the underlying theories of cultural differences and proficiency, their roots and their effects in specific crisis situations and their results (success and/or failure) and examples for it.
Potential topics are:

- Syntactic, semantic and pragmatic problems in language and communication
- Culturally different understandings of a person’s role
- Circumventing communication gaps caused by external disruptions
- Bridging communication barriers by multiple channels (voice, picture, body language, …)
- Culturally caused showstoppers to communication
- Problems in command and control structures due to cultural differences (e.g. power distance, high / low context cultures, etc.)
- Cultural differences in reacting to alerts and alarms.
- Theoretical underpinning of cultural differences (Hofstede&Hofstede, Hampden & Trompenaars, etc.)
- Anecdotic evidence and examples

The digitalization of everyday life and the forms of social control

Michele Bonazzi, University of Bologna
Emilia Ferone, G. d'Annunzio University, Chieti-Pescara, Italy

In recent years we have attended to the unavoidability of the process of digitalization of everyday life, which occurs through the use of technologies (and its supports) that is even more massive and pervasive. The speed with which technological innovations break into our daily lives makes us say that "Technology is anything that wasn't around when you were born" as affirmed by the computer scientist Alan Kay. This is the result of a natural and inevitable dynamic that modifies our space and our social time, our being in the world and the same categories of understanding and coding of our social universe. This evolutive dynamic is reflected in every aspect of our daily lives, by invoking the concept of "total social fact" of Marcel Mauss, and in this sense also in the social control of individuals. The purpose of this paper will be to analyze some forms of control typical of the web society and how it is changing more and more the concept of security, inasmuch in the web society (Cipolla) we are passing from a concept of physical-real security to the concept of virtual-digital security within a context of augmented reality. Our body in its two forms reified itself to become a "beyond of reality", through the union of atoms and bits in a complex optic. This leads to a process of anthropomorphism that combines physical and digital worlds, a unique identity that moves on a multidimensional life plan that con-fuses the two worlds, real and virtual. Analyzing the impact of certain technological innovations and revisiting and actualising the Foucauldian concept of Panopticon we are trying to photograph this changeable reality.

II PANEL

COMPLEXITY AND CRIMINAL LAW: THE SOCIOLOGY OF RISK AS CRIMINAL POLITICAL SUPPORT OF NEGLIGENT CRIMES

Michelle Gironda Cabrera, Master of Criminal Law by Unicuritiba. Research conducted in Curitiba, Paraná – Brazil.

Keywords: Criminal law, Interdisciplinarity, Complexity, Nietzsche.

Research objectives: This paper deals with the axiological-normative adjustment of the current criminal dogmatic, regarding the founding idea of the analytical system of crime.

The criminal legal doctrine, since the French Revolution and the gains of the Enlightenment, came to be translated into a normative structure, product of enlightened thought of the Enlightenment. And the system's general theory of crime tried to produce a study of crime from their subdivision on objective analytical substrates.
The problem is that this model no longer was aware of the concerns and problems faced by the criminal law late last century. The new forms of crime, global reach and little tangible consequences, encouraged the emergence of a distinct criminal law, to leave behind the epistemological simplification that work only with the logical coherence of the concepts brought.
It is known since Nietzsche, that the concept of truth is related to a moralist prejudice invented to legitimate the superiority of certain metaphysical values. And, it is even know that the life is not an argument. In criminal law, it would be no different. This research sought to examine how the risk - inherent in today's society - reflected in the criteria for charging the offense, making new dimensions on which the criminal law arise was given the mission to treat. The security environment and immobility that, in legal matters, seems to rule out the error of scientific life, it forgets that many times, the error is necessary to the human condition.

It is easy to see the existence of a favorable ambiance for wrongful classification. The self-understanding of criminal law involves the understanding of the expansion of the risks arising from technological advances scenario, imposing the persecution by conduct that, although risky, do not exceed the level of risk allowed or tolerated by society.

So discussing the task assigned to the negligent crimes and the cause of its expansion, which, under the political-criminal aspect, is not "zero" risks coming from human activities, but minimize them. Still questioning whether this task, in the twenty-first, it is certain that the criminal law, through negligent crimes, aims to reduce the feeling of insecurity caused by the awareness of the risks.

Results achieved: contextualize the new universe in which the criminal law is inserted. The criminal dogmatic shows its instrumental character and the political-criminal gains strength, choosing one for a teleological structure of the penal system.

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Analyzing actors, incentives, relationships and information in local decision-making through the FIELD methodology: pilot cases in regulation of urban services

Franco Becchis, Fondazione per l'Ambiente and Turin School of Local Regulation Torino, ITALY

Elisa Vanin St. John International University / Castello Della Rovere, Vinovo (TO), ITALY

Daniele Russolillo, Fondazione per l'Ambiente and Turin School of Local Regulation Torino, ITALY

When either designing policies or investing in public services and infrastructures, an important issue to consider is the tangled web of complex and asymmetric relationships among actors. The nature of these actors, their information endowment and the information flow amongst them, the incentives that drive their choices, the type of relationships established, are all features that influence the outcome of policies and projects, their success or failure.
The case of economic regulation of urban services (like water and sanitation, urban waste management, district heating, local public transport) is a prime example, since relationships amongst actors are so much intertwined that the enforcement of regulation (investments planning, tariff and price setting, rent control, sanctions) is extremely challenging. The identification of these peculiar features (actors, incentives, relationships and information flows) is a preliminary condition to get a deep insight into complex situations and to design institutional mechanisms and individual incentive schemes for the implementation of an efficacious local regulatory framework, especially where this framework still does not exist or it is very recent (like in developing countries and transition economies).
This paper presents FIELD (Framework of Incentives to Empower Local Decision-makers), a multidisciplinary methodology for the analysis of local actors, incentives and information endowment that surround and lie behind the success or the failure of local services, infrastructures and projects, defining the playing field where such activities and projects are implemented.
The methodology, which is under development and refinement within the network of the Turin School of Local Regulation (TSLR), is deeply rooted in a domain of interdisciplinary knowledge and literature, from game-theory to social network analysis, going through sociology, social physics and anthropology.

In the first part the paper intends to present the methodology and how FIELD aims to narrow the gap between the outcomes of academic research and strategic decision-making process in local public service governance. The methodology is mainly designed to address the problem of misaligned incentives that is the main cause of policies' failure. Its fallouts can be ex-ante (for "to be implemented" actions), in progress or ex-post (screening the past for better future interventions).
Secondly, the paper describes the collections of relevant information on the basis of a predeveloped list of questions to be submitted to privileged observers, named as correspondents.

In the second part, the paper presents the preliminary results of the application of FIELD methodology to some specific case studies in two urban service sectors: urban water and sanitation services (Cairo, related to the situation before the social uprising of 2013, following the destitution of Morsi's government, Sofia, Belgrade and Bangalore) and district heating (Berlin and Turin). The limited geographical representativeness of case-studies does not allow to provide, for the time being, relevant conclusions: nevertheless the first results identify some trends and suggest new

patterns for research that can enrich the current debate on local regulation, with positive fallouts on local policy making and infrastructure investments decisions.

In the conclusions, an overview on the future steps and potential developments of the research is presented.

JEL Classification: K23, L43, L51, L97
Keywords: urban services, economic regulation, players, information, incentives, institutions

The systemic approach to urban identity for understanding social contingency

Laura Appignanesi, University of Macerata, Italy

The concept of "system" as epistemological criteria can turn into realty if we apply the systemic perspective to the urban space.
Nowadays some drivers of change have a global impact and the related urban development seems to be a concrete model of the contemporary social evolution. According to this premise, the paper aims to argue the loss of identity in the metropolis as a paradigm of the increasing complexity of global society, through a challenging interdisciplinary dialogue between System Theory and Urban Planning.
The thesis is that philosophical orientation and Urban Planning are linked by the same long term historical evolution, thus at the present time and probably in the future, it will continue this parallel development. After an historical overview, we propose a rethinking of the "structural-functionalism" reflected on the rigid functionalization of urban areas. Cities and megalopolis are expanding quickly and disorderly; digitalization and globalization are changing physical and sociological aspects of the urban dimension. In this context, some technical tools of reading, such as "zoning" or "layers", that divide the Whole into Parts, are no more able to interpret this dynamic realty. Complexity needs a new interpretive analysis, consistent with social contingency.
This paper does not presume to provide pre-packaged solutions, but just an hermeneutical instrument for understanding the contemporary urban evolution. Because "understanding" is a prerequisite for management, governance and project strategies. Therefore, with the aim

Shaping and development of library-based scientific world-conception

Edit Fabó, Eötvös Loránd University, Budapest, Hungary

At the beginning of the 21st century, the Internet gives global access to both content providers and users. Authenticity, accuracy, reliability of data services and of other uploads are very important factors. The difficulty of information control, the faith in authenticity of some acts, as well generally shaken confidence stand in background of acceptability of globality and of the biggest crisis phenomenon of our time.

Also the credibility is basis of recognition and of prestige of the sciences and of science results. Achieves and libraries are the oldest sources and guardians of scientific knowledge. Written communication had a key role in cultural history of mankind, as written facts had a proof of power, because contents of the documents bridged spatial and temporal limits of human. Therefore, these facilities are considered authentic locations of common culture and history.

Significant achievements and results of the history of library science in the 19th and especially the 20th centuries that created a complex system of rules which allows that users can see cultural and scientific works systematized with their correlations. Identifiable description of each document, highlighting of setters, exploring of content are strictly regulated. In integration of various levels of library databases, the mass of incomplete data service does not help scientific sophistication. Respect of rules supports the situation of taxonomy of sciences that the actually document put into the field of knowledge which is relevant for creators in reality also. Because of their motivation, known as scientific libraries should invest in enforcing of these rules with special emphasis, as one of the formal criteria of the scientific rigor is the bibliographic accuracy. Published on the Web, catalogued data serve science only in their entirety and correlation. After all the guided researcher orienting in the complex system inevitably do such discoveries that would otherwise remain hidden.

After early failures of forced informatization and digitalization aiming user needs meeting as soon as possible is necessary to realize and recognize that the perfect keeping of the rules and in addition scientific work, its knowledge and practice are essential to expected, desired level and quality of data service of scientific libraries. There is very much need for several information specialists, however there is a great need for dedicated commitment for sciences in science libraries that finds a balance between detected market demand and choosy scientific information service. In fact, the only credibility striving scientific database is able to establish valid scientific world-conception.

Interactive Media Art And The Materiality Of Communication Towards Cultural Agency

Graziele Lautenschlaeger, Humboldt Universität zu Berlin

Although we count on known powerful thoughts and tools for overcoming the diversity of problems arisen with the advent of digital technology, in practice, we are still attached to a dispersive and consuming-based culture lifestyle, which also influences Media Art scene. Media Art production is plenty of very hermetic conceptual and technical artworks and processes, and at the same time of very superficial and naive ones, in which proposals do not go beyond a mere rearrangement of the brand new made in China electronic/digital tools offered in the market. Considereing that few initiatives in the world have realised the potential of Media Art as a means to allow expression and autonomy of people, this research investigates procedures for creating more successful thinking-acting attitude in this field, in a way to embrace its essential transdisciplinary aspects. The starting point is to develop within the interactive Media Art field the notion of "Materiality of Communication". As a guideline for such discussion, the chosen object of studies are "sensors", whose concept and materiality play a key role as an elementary piece of contemporary interactive media art installations and performances. Sensors are object of analysis that enables us to make the bridge between the micro universe of physical world and the broader and infinite universe of making sense through body experience in space. Furthermore, sensors often take part of the so called tangible interfaces in Media art, as a strategy to capture presence and engagement of public, meanwhile the role of the interactor is itself part of the artwork. The used methodology has a historical and analytical approach, through Media Archaeology, Cultural Techniques and Second-order Cybernetics. The Media archaeology approach assists us in regarding responsibility over our choices, questioning the idea over Media Art production embedded in a fictitious natural order of facts. How do artists and other creatives are dealing with technology to make decisions about devices and techniques they are going to use? And what are the implications of their decisions for the otherness and for the environment? Observations and analysis over practical experiences are conducted, in order to identifiy successful examples around ideas of empowerment of people and communities, sustainability and ecology of knowledge; testing their ability in contributing to participants' autonomy and the accountability of their choices.

Keywords

Interactive Media Art, sensor, materiality of communication, Media archaeology, cultural agency.

Elevating contradictions between political leadership and systems thinking: introducing backcasting techniques into policy-making

Gábor Király[a], Alexandra Köves[b], Bálint Balázs[c],

[a] Budapest Business School and Institute of Sociology and Social Policy, Corvinus University of Budapest, Hungary

[b] Department of Environmental Economics and Technology, Corvinus University of Budapest, Hungary

[c] Environmental Social Science Research Group, Szent István University, Hungary

This paper argues that the failure to implement sustainability policies is not necessarily due to the fact that successful political leaders lack systems intelligence or foresight but that their motivations strongly influence their judgements. By demonstrating the psychological-institutional-political complexity of the matter, we argue that it is undeniably crucial to understand how leaders acquire and process information and how their systems thinking perspectives guide their cognitive procedures when turning pieces of information into policy interventions. Furthermore, we highlight that leaders are embedded both in institutional and political contexts that also deeply affect their political decisions and practices. Under the current rules of politics, political leaders' main motivation is to increase the chances of their own political survival drawing upon their multifaceted systemic understanding. Introducing reverse-forecasting participatory techniques like backcasting may elevate some of these vital contradictions.

Consequently, it can be argued that political leaders will care about environmental issues and the interests of future generations if their political survival depends on it. Political leaders may be strategic in their conduct, have and exercise the capacity of long-term planning and have a systemic view of their political system but this orientation focuses on their political survival. Even in democracies, politicians take into consideration environmental issues if the political salience of such a topic is high and it seriously affects their chances to stay in power. In doing so, they will only consider those environmental issues that have direct and visible effects on human health and/or the economy, thereby also affecting their political future.

This means that if political leaders are not forced by the rules of their political institutions to care about sustainability, it is significantly less likely that they will do so. Political leaders, therefore, are not ignorant about environmental issues but they are not motivated enough to care about them. Empirical results demonstrate that the political neglect about the environment is highly selective, in other words, political leaders have a systematic and strategic perspective on what environmental issues they absolutely have to care about to stay in power.

The main question, thus, is how to broaden the scope of these issues to make them essential for political survival. While this is a hard and highly sensitive issue, we argue that there is a need to change political institutions so that they cope better with the wicked problems of sustainability. Political motivation is the key in this matter. Therefore, a new and creative vision is needed about strategies to broaden the groups political leaders have to care about to stay in office.

The transition management technique of backcasting may just be one tool that on the one hand can broaden the scope of issues and on the other introduce the perspectives of those social groups that are otherwise disenfranchised in or marginalised by the current political structures. Introducing transition management techniques into political institutions as a social dialogue procedure may just provide enough impetus to initiate thinking on how sustainability can be better incorporated into policies.

Keywords: systems thinking, political leadership, political survival, environmental policy-making, environmental quality, backcasting

The social representations of the future and the scientific imagination
Massimiliano Ruzzeddu, Unicusano, Rome, Italy

The incertitude that has characterized the so-called post-modern era also emerges in the social representations of the future, both from the epistemic and the sociological points of view.
On the epistemic side, crucial is the awareness that the main representations of social change -in many cases expressed as determinist laws- are too affected by subjective bias to yield reliable previsions. Furthermore, nobody has so far shown able to take into account those biases and neutralize their effects in the scientific activity.
On the sociological point of view, which will be the main object of this work, this incertitude does not appear as the fear of the unexpected, rather as the incapability, for social actors to assess what kind of future is desirable.
More in detail, after the famous "end of the ideologies", no representation of the future emerged, that could translate social needs and expectations into projects for the future, and, consequently provide social-collective actions with orientation criteria.
This condition of incertitude characterized most Western countries and caused the market to become the unique regulating institution for social life; nevertheless, after the crisis of 2008, even market lost its reliability.
Because a condition of absolute incertitude is simply unbearable, nowadays the need is strong to overcome this lack of cognitive references.
Consequently, a task for contemporary sociologists is to understand what cultural representations seem nowadays suitable for social actors as a criterion of interpretation of reality, especially the next future.
One of the most important criteria is *technology*, whose progresses -especially in the field of communication- have been, in the last twenty years, so huge that they even have changed the perceptions of the world of worldwide social actors; nevertheless, so many and important are the social needs that technology has not met yet (green fuels, clean energy, etc.), that it necessarily affects every idea of the future time. In other words, the expectations towards technology are an important variable to assess what the representations of the future are among social actors.
Within this framework, the analytical instruments needs to be more refined and complex than in the past, when public opinions used to believe that scientific progress was unavoidable and only divided according to the positivity of those changes. Within this framework, the only useful variable was the *opinion*, whose modalities were *progressive* and *conservative* (or *apocalittici* and *integrati*).
On the contrary, contemporary problems -hunger, poverty, climate change etc.- are so heavy, that more and more individuals believe that science will not find any solutions.
Thus, the possible attitudes also depend on the believes of the growth capability of science, the relationship with economic interests and so on.
In conclusion, my paper will focus on the contemporary social expectations of science and technology; namely, I will try to outline a few ideal types of the possible attitudes towards the possibility and the suitability of progress and to match those attitudes with social interests and representations of the world.

III PANEL

The Great Citizens andthe social construction of reputation, study of the Czech and Slovak case in the longue 20 century

Nicolas Maslowski, Faculty of Humanities Charles University, Prague

This intervention aims to propose a syntactical analysis of the last 120 years of the Czech and Slovak acknowledgment of the great citizens. This historical-sociological Project is targeting the study of elite groups 'canonized', in Czech and Slovak, lands. This process of "canonization", that began much earlier in the Western/Northern Europe - since the Enlightenment, was a part of the the nation building process in Central and Eastern European societies since the 19th century, the end in our case. One of its aspects, the one that we study there, is the citation of their members in national biographical dictionaries. This canonization is understood as an entrance for them into the national collective memory. Those national biographical dictionaries were constituted as a project of dynamic and often idealist nation-builders. This work was based on testimonies probably more than on other types of historical activities.

This „encyclopedic work „changed its form during the communist period, after the second world war. The national biographical dictionaries were then written under the control the centrally organized history and society. Despite internal changes within the regime, and periods of instability, we can observe the weight of the power on the publications.

The fall down of this authoritarian soviet type regime, with the velvet revolution in Czechoslovakia brought to an intensive activism in testimonies, with new dictionaries, films, interviews, in order to write a new national memory. But in the troubled period of the Internet and other modern technologies, it became easier to produce this kind of documents. The fight for the legitimacy of the source became a new battle for the memorial activists. The production of the activities are in the hand of the Academy of science, a centrally controlled institute for "national memory", some associations, radio, universities…

The Great citizens, socially constructed, are there representing hierarchies, values, in various sectors. The prosopographical publications are not only a mirror of the societies in certain periodes. They are socializing the future world to particular „legitimate" forms of citizenships

Complex Adaptive Systems. Interaction, co-evolution and specialisation as a source of diversity in highly interconnected societies. Why convergence is just one option

Root Hilton, George Mason University, Virginia
Paola Zambano, Department of Political Economy, King's College London, England

The traditional view of modernisation and change processes among political andeconomic systems links a nation's economic development with its receptivity to liberalvalues. According to this view, the emerging countries that have been experiencing economic growth will inevitably converge to democratic forms of governance.
But, in spite of this prediction, social institutions in developing regions are not evolving in that direction.
The interactions among political, economic, and technological development within a nation may lead to unpredictable outcomes and cause the larger system of international relations itself to undergo a change.
To understand these dynamics a new approach is needed. The study of Complex Adaptive Systems offers a new perspective. Processes of interaction, co-evolution and specialisation in a highly interconnected global society can produce behaviours and institutions that operate far from the optimum and that can persist for decades and centuries.
The paper argues that convergence towards a liberal model that encompasses free market economies and democratic governance is just one option among many
trends in global development.
It identifies the behavioural foundations of policy diffusion and collective learning and offers a complex systems approach as a more justifiable description of the properties, behaviour, interactions, and dynamics in the evolving system of in ternational relations. It enables us to determine how coevolution among coexisting regimes may influence the evolutionary dynamics of the system. It provides insights about how a particular set of national institutions is embedded in a network of interactions with other coexisting nations and how its peculiarity is a specific instance of system-level properties. It shows the weaknesses of Modernisation Theory and how practitioners of New Institutional Economics may actually introduce misguided policy prescriptions. It explains how a system may exhibit relative stability at the macr level, despite, or perhaps because of, a constant flux at the micro level.

GENERAL PRINCIPLES OF SYSTEMS

Janos Korn, Business Systems Laboratory (BS-Lab)

Before and since von Bertalanffy the 'systemic or systems view' of parts of the world by and large has evolved along speculative and diverse lines without appreciable attention to assessing its truth value. This 'view' is supplemented by modelling techniques with vague notation without basic theoretical support. However, speculative thinking is useful when generating new ideas, it is the basis of any progress and policy construction. Subsequently the 'systems view' has become fragmented into control systems, information systems, methodologies with design flavour with little appreciation of the notion of problem solving etc without underlying principles. It has given rise to a large number of diverse publications, conferences and teaching courses at university but not at school level. The 'systems view' has not gained appreciable acceptance in society and education.

Following the method of the highly successful and influential 'conventional science of physics' with its precise mathematical models, current work is intended to develop a 'systems science' through a paradigm change but introducing 'linguistic modelling' which is capable of handling human activity scenarios with low repeatability and components with qualitative properties, will, ambition, emotions, caprices and so on.

The notion of 'systems' is an empirical phenomenon and as such requires empirical investigation for teasing out its general principles and symbolism for creating models capable of being exposed to at least thought experiments. This approach is called 'systems science' which essentially is a view of 'structures of qualified objects in qualified relations **or** the same with qualified interactions'.

The '6 principles' is a summary of the empirical concepts underlying 'systems science' :

The 1st asserts that any theoretical object can be identified by its **structure** including chemical and nuclear or the 'structural view' is **pervasive**.
The 2nd provides the means of analysis or converting selected parts of the world into 'static' or 'dynamic' models.
The 3rd introduces the structure of change, both purposive and by chance.
The 4th outlines how hierarchy can be understood and modelled showing how **complexity** is related to new, **emergent** properties of aggregates.
The 5th introduces the idea of universality of **problem solving** activity in the living sphere and the role of 'systems science' in design as an aid in developing 'prototype models.
The 6th asserts the role of **ideas** in generating objectives for the activity of 'systems', it has been included as the '5th cause of Aristotle'.

The 'systems view' and 'systems science' are located in the spectrum of 'human intellectual endeavour' which is used for estimating their influence on elements of a human society.

Essentially the construction of 'static' [mathematics of ordered pairs] and 'dynamic' [sequences of predicate logic conditionals] models uses **stories** or 'narratives' in natural language to describe scenarios as the **first step** in preparing a linguistic model. Using the relations between elements of natural language and the concepts of 'systems science', a story is then converted by 'meaning preserving transformations' into a homogeneous language of one – and two – place sentences. The objective of this exercise called **linguistic modelling**, is to gain a model that can be manipulated or reason.

Linguistic modelling is supported by principles regarded as basic, it is rooted in accepted branches of knowledge like linguistics, logic, network theory etc, it is highly teachable and computable. However, it needs debate and software development for more substantial applications.

A new systems tool for predicting the future in an age of contingency

Dr. dr. ir. Gerard Jagers op Akkerhuis, Wageningen University, Netherlands.

Is our future unpredictable because of contingency? Or is it possible to observe the activities of individual agents and extract large and predictable patterns? As was concluded in a study about general laws (Jagers op Akkerhuis 2014), answers to these questions can be sought in two major fields: processes and structures.

In current research there is much emphasis on processes as a basis for predictions. This has led to important theories about self-organising criticality, tipping points, deterministic chaos, fractals and evolution. Meanwhile, processes involve flows of material or energy. A fundamental thermodynamic approach which offers a unifying perspective for many different flow patterns, and the structures emerging from them, is the constructal law of Bejan (1997). This law states that: For a finite-size system to persist in time, it must change in such a way that it provides easier access to the imposed currents that flow through it. In the paper I offer an overview of how this law can be applied to different basic types of flow processes.

In the meantime, one should not forget that dynamic processes are based on objects. And for this reason the toolkit of system science is incomplete without tools for defining these objects. Generally, an object is viewed as showing some form of 'internal' unifying interactions. But so far, no generally accepted theory has emerged which allows a stringent definition of what is an 'object'. The problem seems to be that definitions frequently are based on *a posteriory* classification, instead of using an *a priory* construction of 'objects' as a basis for classification. Filling in this gap, a novel approach has recently emerged, called the Operator Hierarchy (e.g. Jagers op Akkerhuis & van Straalen 1999, Jagers op Akkerhuis 2008). This approach uses the combination of structural and functional 'closed topologies' for defining types of organisation from the ground up. Every next organisation in the type hierarchy is represented by physical units, called 'operators'. For example, the (topologically defined) operator type 'atom' is represented by many different kinds of physical objects, called atoms.

How can the Operator Hierarchy contribute to the invention of the future in an age of contingency? Interestingly, and unexpectedly, the Operator Hierarchy shows an internal logic. Internal logic is typical for so called 'periodical systems', such as the standard model, the eightfold way (for hadrons), and the periodical system of the elements. The internal logic of the operator hierarchy suggests that it may well represent an undiscovered, novel kind of 'periodical system'. If so, its extrapolation can predict future types of operators. Moreover, as such predictions are based on topological laws for organisation, for which reason they are not affected by contingency. It is hypothesised that more research into the internal logic of the operator theory, will add to the toolkit of system science new tools that allow for far reaching predictions about the structure of future operators.

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The place of our Earth in the Universe and turning-points in its life

Ralovich Béla, member of the Hungarian Academy of Sciences

Our hot Earth of dust appeared at a given exceptional moment in the timeless and endless Universe the principles of which never will totally been know by mankind. After some time the Life which is a biological phenomenon and is connected to a structure of a living entity/unit formed on the cooling, inert Earth. The living entity is such a structure, which is bordered from its environment (in the present case the structure means the total material construction of a living biological unit) and which gives the possibility that in itself and through its border energy as well as substance flow has existed, which is accommodated to the given environmental circumstance (among certain conditions – life conditions) in the necessarily arranged way, which is characteristic and positive for the unit till its death. During that period of time there has been a dynamic balance between the entity and its environment. The living unit reacts to the outside effects and in the same time has influenced on its environment, can multiply when its characteristics bequeathed to its offspring and all its processes are directed by the general laws of the Universe. The first living entity probably was a microorganism the formation of which has been unknown. On the basis of the before mentioned facts all questions connected with the Life should be investigated with the help of the biological laws because single rules of the physics, chemistry, economics and politics are insufficient along.

In the Universe at present it seems that the Life is only present in the biosphere of the Earth. The biosphere in respect of the Life is a closed system, because neither Life or men nor the factors which can detrimentally influence the Life are able to spontaneously leave it and furthermore those factors which are necessary for the Life can not freely arrive from the Space. For a continuous life in a closed system – for example in case of a microbial mass-cultivation - it is necessary to ensure permanently the specific life conditions. Erwin Schrödinger and later Atsushi Katsuki supposed that the Life needed an environment of low entropy as compounds of small entropy which were necessary for the Life could be consumed by the living entity only in the circumstances. Convenient entropy condition of the Earth is ensured by the water-circulation. Rains regulate the temperature of our Globe. During the last decades the temperature of the Earth has increased and in the same time the climate, character of the seasons and that of the weather have changed. The later changes are not surprising for us on the basis of the above mentioned theory. The measures have verified that not more energy as earlier has arrived at the Earth from the Sun that means the causes of the increase of temperature which will be listed later are present in the biosphere.

One of the characteristic features of living entity is that it has not only been influenced by its environment but in the same time it has also made effects on its surrounding, too. Therefore since the first living entity appeared on the Earth the fate of our Globe has not only been determined by the laws of the Universe but by the effects of the living entity, too. That was the first turning point in the life of the Earth. The importance of the effect of the living entities may be verified by that supposition on the basis of which the early reductive conditions of the Earth were converted into oxydative ones by microorganisms. In consequence of their metabolism the free oxygen appeared and the new condition gave the

possibility of formation of breathing organisms and finally that of human being. Since the appearance of microorganisms on the Earth they have represented the greatest part of living population. Their number is infinitely big and unknown. Without microorganisms there has not been Life.

The next decisive change in the life of the Earth has started in consequence of the appearance of human being. Till that point of time only natural microorganisms, plants and unconscious animals lived and influenced on their environment besides the natural inanimate processes (volcanoes, meteors, climate changes, and so on). Since the appearance of conscious men they have made their actions to improve the conditions for their more conformable and better life and nowadays mainly for profit. In consequence of these activities as well as the increasing number of mankind have started harmful processes to the Nature.

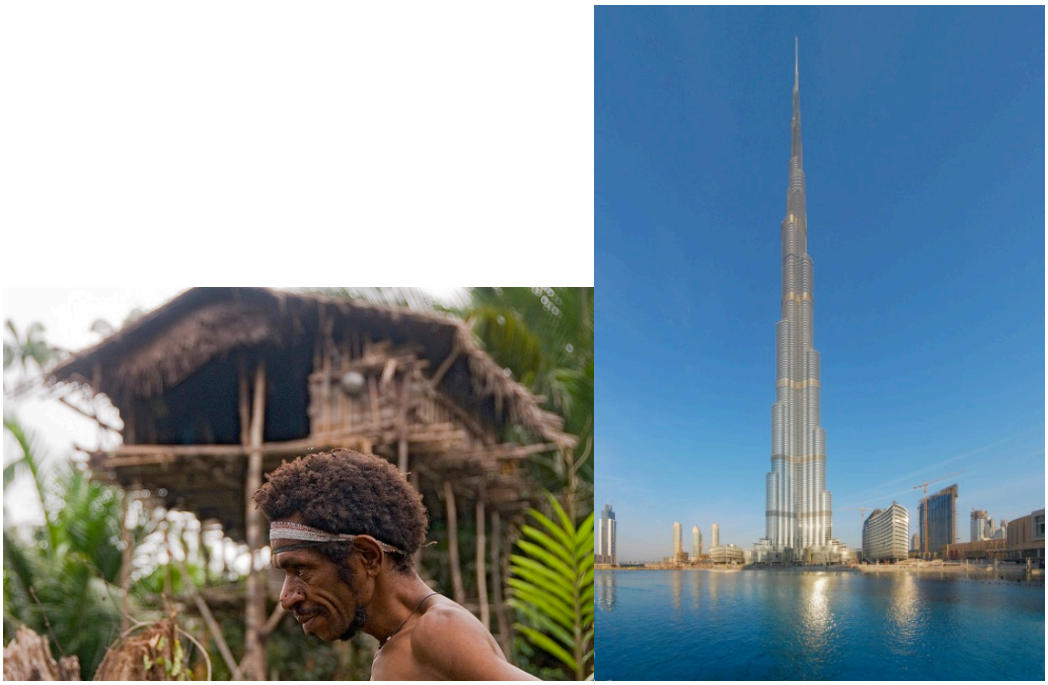

Fig. 1. We started from here and arrived at the biggest tower of the World

That process was moderate and only very local before the industrial revolution. After that the unpleasant processes have been intensified and bigger areas of the Earth have been affected. The size of forests has decreased more rapidly. After the 2nd World War - in consequence of a great euphoria - the speed of this process has risen. First it was observed that the snow disappeared from the Kilimandjaro and the dimension of deserts started to increase as well as the character of the typical seasons altered. The unpleasant processes became global. Finally we arrived at the present serious situation which is characterized by the data of the Table 1. and Table 2.

On the basis of these data it can be told that all the parameters have changed in an unpleasant direction. These alterations have influenced on health condition of human beings, have caused unexpected death cases, have interfered upon agricultural production, animal husbandry and forestry, too. Besides tropical and subtropical insects and diseases have immigrated into the countries of the temperate zone.

In the best case these alterations have meant for me - who is a medical doctor, a microbiologist and a public health specialist - that however both the diagnosis and the therapy to stop the unpleasant processes are equally correct that the „dose" is insufficient in spite of the different efforts have been performed all over the Earth. Therefore it is obligatory to drastically enlarged it as soon as possible! In the worst case neither diagnosis nor therapy are correct or only partly exact. If this would be the

situation at present then everything must immediately be revalued to get the new „medical treatment" which must immediately be started. Otherwise the „patient" will soon be los

Table 1.
Basic demands for the survival of a theoretic human being
and his/her effect on the environment+

Needs

Oxygen: 250 ml. or more/minutes
Calorie by food (depending on the sex): 1500-1900 kilocalories/day
Basic metabolism: 88 w. (in case of a heavy work more than 600 w.)
Drinking water: 2-2,5 liters/day
General water use: 20-500 liters/day (The world average 50 liters/day)
Energy (estimated world average in 2000): 70000 megajoules/day
Weather, temperature and rain: as during the earlier centuries

Products

CO2: 17 liters/day
Heat: About 80% of the total daily energy produced in a body departs into the environment
Steam and water by expiration and sweat: ?
Urine: 1,5 liters/day
Faeces: 100-500 gr./day
Sewage water: Its quantity is equal with that of the water used
Solid communal wast in Hungary: 0,4 t./yr. or 0,6-1,2 m3/yr.

+Note: As the number of human beings is more than 6,7 milliard the values of this Table must be multiplied to get the present daily total sums.
Summarized effect of microorganisms of infinite great number is unknown, however it is sure that without their metabolisms there would not be life in the biosphere. It is known that some kinds of them can use CO. The aerobic microbes need oxygen and liberate CO2. Those which play role in production of compost during that process produce measurable quantity of heat. As to the members of plant-world it is well known that they consume CO2 and produce oxygen during their vegetation period in accordance with the light conditions. Also they have an important role in the water circulation. In the case of animals exact data are not known. It is evident that their species and demands determine their effects.
Here and now we do not deal with the effects of industry, agriculture, transportation, other services and households.

Table 2.
Characteristic data+

Number of population in milliard: 1850: 1,17; 1937: 2,1; 1950: 2,5; 1980: 4,4; 2014: ›6,7
CO2 in the global atmosphere in ppm.: 1750: 250; 1957: 315; 1987: 350; 2014: 400
Average temperature of the Earth: 2 centigrades higher than it was in the sixties
Melting of ice: is general but on the Northern hemisphere more important
Size of forests in milliard ha.: 1882: 5,5; 2005: 4,0 (now the decrease is 13 millions ha./yr.)
Raw materials and their quantities:
- **coal** in million t.: 1937: 1280; 1958: 1762; 1980: ›2805; 2005:5878; 2014: increasing
- **oil** in million t.: 1937: 279,5; 1958: 809,8; 1980: 3059; 2000: 3590; 2014: decreasing
- **gas** in milliard m3: 1935: 71; 1958: ≈ 400; 1980: 1531; 2005: 2778; 2014: increasing
- **fire-wood**: 60% of the lumbered trees

Other energies: sun, wind, water, biomass, geothermic, waste materials and atomic
The origin of total primary energy in 2010 by the International Energy Agency:
- oil: 33%
- coal: 27%
- gas: 21%
- water: 10%
- atomic: 6%
- wood: 2%
- others except water and atomic: 1%

Energy users in Hungary in 2010:
- households: 34,8%
- transports: 25,9%
- other services: 19%
- industry: 17,3
- agriculture: 3%

+Note: It is necessary to mention that the values presented here are not the same in the different publications! All (produced, liberated and collected) energies except those which are used for works burden the environment.

New Approach to Complex Ecological Dynamic Systems Analysis and Modeling

Migdat I. Hodxi, International University of Sarajevo, Sarajevo, Bosnia and Herzegovina

In this paper we present new, dual approach to analysis and simulation of a complex nonlinear ecological system of preys and predators, using classic nonlinear dynamic Lotka-Volterra model (LVM) in parallel with an Agent Based model (ABM), using model attributes description of the system. We propose to implement this dual approach using "mathematical" approach together with an "agent based" approach using appropriate modeling environments. Examples of various Single Prey Single Predator (SPSP) as well as Multiple Prey Multiple Predator (MPMP) models are introduced in a gradual way, from simple to more complex ones. Our goal is to gain insight into (i) predator-prey population relationship, (ii) structural properties of the resulting models, (iii)

understanding of stability in multispecies communities, and finally (iv) improve usability of LVM nonlinear ecological models. With this approach we aim to go towards analytical description of the key classic problems in ecology, such as Paradox of the Plankton, Paradox of the Enrichment, Oksanen's description and tropic level numbers, and other general Complex Systems paradigms such as Adaptivity and Emergence. We also compare LVM analytical stability results with simulated ABM results. We propose to take advantage of flexibility that ABM offers, and in doing so acquire key feedback to reinforce and improve nonlinear mathematics of the LVM as well. This way we can build very complex but usable predator-prey ecological models which are also mathematically tractable.

Keywords: Nonlinear Modeling, Agent Based Modeling, Lotka-Volterra Equation,
Predator, Prey, Complexity, Stability, Decomposition, Structure