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BERTALANFFY CENTER FOR
THE STUDY OF SYSTEMS SCIENCE

emcsr 2016



Book of Abstracts
**European Meetings on Cybernetics and
Systems Research Vienna 2016**

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Layout and Cover Design

hipe.at

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ISSN: 2227-7803

This book is available from

<http://emcsr.net/book-of-abstracts/>

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Bertalanffy Center for the Study of Systems Science

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welcome avantgardist!

The present future of a Systems Science generation: emcsr avantgarde

Stefan Blachfellner & Tess Marja Werner

Bertalanffy Center for the Study of Systems Science,
European Meetings on Cybernetics and Systems Research

The European Meetings on Cybernetics and Systems Research look back on more than 40 years of history. In 1972, the emcsr offered its first forum for discussion of converging ideas and new aspects of different scientific disciplines, co-founded by the Austrian Society for Cybernetics Studies, chaired by Robert Trappl, who established the Austrian Institute for Artificial Intelligence in Vienna, too. Since then every two years top scientists from all over the world met in Vienna to present their latest research results and discuss the rapid developments in our society.

The emcsr avantgarde is the 23rd meeting in Vienna building on these legendary times. But we face a crucial turn in the history of the meetings. In 2016 we call for leading a tradition into the future, a delicate process of redesign. We want to establish a milestone for the 21st century scientific avantgarde, still connected to the roots of the provocative avantgarde in the 70s. The name avantgarde shall reflect the vision and the core of the new programme and design.

Thus we decide, from 2016 to set the main stage for the young researchers, too. We want to co-create the first prototype of a 'scientific talent scouting' independent of the age and career status of the candidate. Contemporary Systems Science shall meet philosophy, science, engineering, economy, architecture, design, art and any convergence of these disciplinary foundations with a systems perspective!

We are aware that the present-day avantgarde also calls for new formats of interplay! The 1st pop up conference in the field of Systems Science and Systems Design is announced from March 30th to April 1st 2016. We envision a smaller and more exclusive framework for meaningful meetings and conversations, to promote the future science leaders in a fast adventure, emerging the unexpected and unthinkable into the present and future existence.

We called for participation in a playful contest. An international scientific committee of renowned experts in their respective fields selected the competition attendees and their submissions. Starting in January we dared the experiment to engage the international community of young researchers in only three months with a multi-channel approach, through social media and our well established worldwide organizational networks. With a 66% acceptance rate in this book every selected researcher is a nominee for 'The Ludwig von Bertalanffy Young Scientist Award' donated by the main organizer of the event, the Bertalanffy Center for the Study of Systems Science.

The winner was chosen through real-time voting by the audience during the emcsr avantgarde meetings. Everyone who was peer reviewed was a peer reviewer. The experiment demanded deep listening and engagement with people and ideas, to co-develop knowledge rather than presenting individual findings. Together we were inquiring our future vision, the next impactful advances in science and society, what we might be able to co-create for future oriented life concepts and thrivable ecologies, a flourishing planet, meaningful technologies, and a futable humanity.

Next to the competition the emcsr avantgarde also includes satellite workshops focusing on specific topics organized by invited groups of already established researchers. They offer opportunities to showcase and further elaborate contemporary trends in Cybernetics, Systems Science and Systems Design.

We are thankful to the Sigmund Freud Private University for their heartily invitation to hold the meetings at their University.

We were able to design a whole new experience thanks to the modern architecture and full freedom to establish an extraordinary enabling space for the lively interactions, alongside with various partners, who combine future oriented social causes with their business offers, from hotels and restaurants to a cultural social programme. We have chosen to complete our avantgarde vision!

We are proud that today the emcsr avantgarde builds a bridge between the achievements of the past and the inspiring interdisciplinary Systems Science potentials of the future in philosophy, natural, technical and social sciences, engineering, economics, architecture, art and design, recognized by internationally renowned university professors and inquired by young researchers, as well as innovators and practitioners.

We hope you enjoy the emcsr avantgarde book and its contributions as much as we have enjoyed meeting and interacting with the selected nominees and all participants.

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Welcome to the emcsr avantgarde 2016

When History Converges with Systems Science

Gerd B. Müller

Vice President of the Bertalanffy Center for the Study of Systems Science
Head of the Department of Theoretical Biology, University of Vienna

As vice president of the Bertalanffy Center for the Study of Systems Science (BCSSS), I am delighted to present the Book of Abstracts of the 23rd European Meetings on Cybernetics and Systems Research 2016. History seems to converge with this year's meeting in many facets. On the one hand, the Bertalanffy Center, as the main organizer, has carefully chosen a contemporary theme to connect the more than 40 years old tradition of the EMCSR meetings with the present scientific state of the art. On the other hand, also the location of the meeting is historically meaningful, because a nearby birthplace of modern biology in Vienna had strongly influenced Ludwig von Bertalanffy. Finally, the Sigmund Freud Private University (SFU), which we thank for the hospitality and generous support, provides yet another historical connection through Freud who, attracted by the theory of evolution, had started out as a student of biology.

Near the SFU, which is close to the Vienna Prater, there once existed the *Biologische Versuchsanstalt* (BVA), founded in 1902 by Hans Leo Przibram and his academic associates Wilhelm Figdor and Leopold von Portheim – all professors at the University of Vienna. They envisioned a research facility that was able to experimentally address a suite of open questions in biology that were at the core of the scientific debate of the period.

At the same time, through rigorous quantification and mathematization, the institute was meant to help transform biology into an exact science. Since the universities were not well equipped for large-scale experimental work, in the minds of the founders nothing less than an independent institution had to be created. This took place in what is known today as the 'Wiener Moderne' that intellectually fruitful atmosphere of interactions among science, art, and society in turn-of-the-century Vienna. In 1914, the BVA, housed in the former Aquarium building of the 1873 Vienna World Exhibition, was donated to the Austrian Academy of Sciences and became a model for experimental research institutions around the globe.

Przibram's pioneering work influenced a close confidant of the BVA biologists, the young Ludwig von Bertalanffy who, amongst others, debated with Paul Kammerer and Paul Weiss, both working at the BVA. Bertalanffy (1932) created a theoretical biology that was based on physical principles, quantification, and mathematization - precisely those priorities that also underlay the program of the BVA. Today the name Bertalanffy is associated with some foundational terminologies, concepts, and theories that stretch beyond biology, such as "General Systems Theory" and "Steady State" as well as the growth model he developed (1938) still known as the 'Bertalanffy Growth Function' today. 'General Systems Theory' (1968) has influenced many individual sciences, ranging from philosophy and medicine to cybernetics, computer science, ecology, and the social sciences. Bertalanffy's conceptualization of 'Open Systems' (1950) probably had the most lasting intellectual effect, far beyond the fields of biology and Viennese zoology.

Today, the BCSSS also is a privately funded, independent research institute in Vienna. The center is internationally known for promoting the heritage of systems science and for hosting the Ludwig von Bertalanffy Archive. At the same time, the next steps in applied systems research are prepared, moving systems science towards sustainable solutions. In this way, the BCSSS intends to contribute to solutions for the multitude of pressing problems that are emerging at the interface of scientific and societal processes.

We hope that the emcsr avantgarde 2016 contributes to this vision, which we are very happy to share with our international partners and with the many talented systems scientists who have joined us in this meeting.

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Ludwig von Bertalanffys Systemtheorie und die „Wirklichkeit“ psychologischer Konzepte

Giselher Guttman

Former Chairman of the Senate
Sigmund Freud Private University Vienna

Meine erste persönliche Begegnung mit Ludwig von Bertalanffy verdanke ich Viktor Frankl. Er war es, der zu einem Treffen eingeladen hatte, auf dem - zu meiner damaligen Überraschung - Kongruenzen im Denken dieser beiden Forscher diskutiert wurden, die ich zuvor nicht vermutet hätte. Die formal-naturwissenschaftlich orientierten Konzepte Bertalanffys scheinen mir nämlich von Frankls philosophisch-antropologischem Programm weit entfernt zu liegen. Doch ich erfuhr, dass die Äquifinalität eine für Frankl wichtige Brücke war, über die er sein Konzept der Sinnfindung mit biologischen Konstrukten zu verbinden versuchte. Erst viele Jahre später stiess ich auf Arbeiten, in denen von Bertalanffy schon zum Zeitpunkt dieses Zusammentreffens vor mehr als drei Jahrzehnten auch über die Problematik der Wirklichkeit wissenschaftlicher Konstruktionen wegweisende Aussagen getroffen hatte. So stellte er in seiner Arbeit „Robots, Men and Minds“, 1986 erschienen, fest: “Man is not a passive receiver of stimuli coming from an external world, but in a very concrete sense creates his universe. ... Perception is not a passive mirroring of a world outside like a color photograph; rather, incoming informations are, by a creative act, organized into a universe.”

Und an anderer Stelle: “We have to remember what science - representation of the ‘given’ in suitable conceptual constructs - actually means. Science, with the expansion of empirical knowledge and increasing conceptual refinement, undergoes a process of progressive deanthropomorphization.”

Bemerkenswert ist die Einsicht, dass die Modellvorstellungen über einen Realitätsbereich weitgehend von den Methoden bestimmt werden, mit denen dieser erforscht wurde: “If you manipulate a dog according to Pavlov, a cat according to Thorndike, or a rat according to Skinner, you will obtain the results described by these authors. That is, you select, out of their behavioral repertoire, such responses as may be controlled by punishment or reward, you make the animals into stimulus-response machines or robots. The same, of course, is true of humans.” Die experimentell-laborhaft arbeitende Psychologie verwandelt ihre Versuchstiere in Reiz-Reaktions-Automaten und Menschen in „subhumane Automaten“. “However, in so doing, you de-rattize rats and de-humanize humans. That is, you remove everything that may interest a rat in its natural habitat, or you bring a cat into a „surrealistic universe“ (Koestler) such as Thorndike’s device. We don’t know what a rat feels in a Skinner box, and what consequences the experiment has for its mental well-being.”

Alltagserfahrung wird durch Konstrukte von zunehmender Abstraktheit und Komplexität ersetzt. Eine Einsicht, die für alle Wissenschaften gilt, die jedoch - wie Bertalanffy in dieser Arbeit aufzeigt - für die Psychologie von ganz besonderer Bedeutung ist. Zweifellos ist für jedes Fach die Frage der Wirklichkeit seiner Konstruktionen entscheidend. Doch wenn beispielsweise ein Zoologe die verwandtschaftliche Nähe verschiedener Gruppen einzuschätzen und ein Klassifikationssystem zu erstellen sucht, geht er von konkret existierenden Individuen aus und stehen jedenfalls die Objekte seines aktuellen Forschens außer Streit. Wie aber steht es in der Psychologie mit den ‚Objekten‘ ihres Forschens? Wie viele Geschmacksqualitäten, Gefühle, Triebe, Intelligenzfaktoren - die Aufzählung lässt sich beliebig fortsetzen - gibt es ‚wirklich‘ und mit welchen Verfahren können ihre Verwandtschaftsbeziehungen studiert oder Grenzziehungen zwischen ihnen begründet werden?

Seit der Jahrhundertwende werden derartige Fragen - die nicht nur von akademischem Interesse sind, sondern höchst praxisrelevante Konsequenzen haben - im Hinblick auf die Struktur der menschlichen Intelligenz gestellt. Ist Intelligenz als eine einfache, homogene Begabungsdimension anzusehen, deren Ausprägungsgrad dafür entscheidend ist, dass jemand unterschiedlichste Probleme mehr oder weniger gut zu lösen vermag, oder gibt es mehrere, voneinander unabhängige Begabungskomponenten?

Verbleiben wir bei diesem Beispiel, weil uns in dieser Frage tatsächlich seit der Jahrhundertwende eine ganz besonders große Zahl von widerstreitenden Ansichten begegnet: So stellte Spearman eine g-Faktor-Theorie auf, die alle Unterschiede im intelligenten Handeln von Menschen auf eine einzige Begabungsdimension zurückführt. In den 30er-Jahren konnte Thurstone erstmals diese schon bald vielfach angezweifelte Behauptung empirisch widerlegen und nachweisen: Nicht eine einzige, sondern sieben Begabungsdimensionen sind es, die - von einander unabhängig - unser intelligentes Verhalten bestimmen. Wer also beispielsweise im Faktor ‚Sprachbeherrschung‘ gut ausgestattet ist, wird imstande sein, feinste Nuancen von sprachlichen Formulierungen zu erkennen. Davon wird aber seine Ausstattung im Faktor ‚Raumvorstellung‘ unabhängig sein, also der Fähigkeit, Aufgaben zu lösen, bei denen mit räumlichen Beziehungen operiert werden muss. Doch in der Folgezeit trafen laufend weitere Vorschläge über die „wirkliche Anatomie der Intelligenz“ ein und der gegenwärtige Rekord für die Zahl der Begabungsfacetten, die wir zu unterscheiden haben, liegt in Guilfords Modell bei 120. Es besteht also offenkundig nicht einmal in der bescheidenen Frage Einigkeit, wie viele unterschiedliche ‚Objekte‘ wir in diesem wichtigen Teilbereich der psychologischen Forschung zu betrachten haben.

Viele unterschiedliche Mikrowelten stehen also, mit einer Formulierung des konstruktiven Realismus ausgedrückt, zur Auswahl und jeder darf sich für die ihm am tauglichsten erscheinende entscheiden, wobei jeder Anbieter für sein Produkt auch viele empirische Daten liefern wird, welche die Richtigkeit seiner Lösung unter Beweis zu stellen scheinen. Bleiben wir bei diesem Beispiel und betrachten wir die zwei genannten Begabungsdimensionen ‚Sprachbeherrschung‘ und ‚Raumvorstellung‘, die sich wohl auch aus der Alltagserfahrung als zwei unterschiedliche, ‚wirklich‘ unabhängige Begabungsdimensionen anzubieten scheinen.

Denn damit sind wir bei der entscheidenden Frage angelangt: Welche Wirklichkeit ist mit dieser Formulierung gemeint? In unmissverständlicher Klarheit wurde schon zur Jahrhundertwende ausgesprochen, dass unser Erleben ein „Bewusstseinsstrom“ ist und unsere Vorstellung von verschiedenen „psychischen Funktionen“ das Ergebnis einer von uns vorgenommenen Abstraktion. So sagt etwa Friedrich Jodl in seinem Lehrbuch der Psychologie: „dass es keine Erregung des Bewusstseins gibt, bei welcher nicht sämtliche Vermögen der Sinne, wenn auch in verschiedenem Grade mitwirkten, indem nicht nur Fühlen und Wollen, sondern auch Vorstellen, Denken und Wollen einander wechselseitig voraussetzen und in fließender Reihe ineinander übergehen“. Und im Anschluss an seine Klassifikation der Bewusstseinstätigkeiten in Empfindungen, Gefühle und Strebungen macht er die bemerkenswerte Aussage, dass diese lediglich

„...drei verschiedene Formen und Erscheinungsweisen des allgemeinen Vorganges primärer psychischer Reaktionen sind, von denen bald die eine bald die andere Seite von uns zum Zwecke wissenschaftlicher Betrachtung und logischer Abstraktion speziell herausgehoben wird“. Ohne Zögern deklariert er somit seine eben sorgsam aufgebaute Klassifikation ausdrücklich als Konstrukt. Warum ist diese Betrachtungsweise in Vergessenheit geraten? Ist es die Angst, dadurch in Beliebigkeit unterzugehen? Der Wunsch, auch in der Psychologie Verbindlichkeit herstellen zu können?

Es hat in der Psychologie tatsächlich ein bemerkenswertes Programm gegeben, dessen Ziel das Erreichen von Verbindlichkeit war und das gerade durch die Wiener Schule von Hubert Rohracher, einem Pionier der Erforschung der hirnelektrischen Phänomene, besonders konsequent verfolgt wurde. Er konnte nämlich schon wenige Jahre nach der Erstbeschreibung des Elektroenzephalogramms durch Hans Berger (1929) wegweisende Arbeiten über die psychologische Bedeutung der hirnelektrischen Aktivitäten publizieren und damit der Vision von Gustav Theodor Fechner näherkommen, der in den „Elementen der Psychophysik“ meinte, dass es in ferner Zukunft möglich sein würde, über die biologischen Grundlagen des Psychischen - „Innere Psychophysik“ - einen Zugang zum Erleben zu erschließen. Diesen „objektiven Blick ins Fremdpsychische“ suchte Rohracher, um mit Hilfe des EEGs eine „objektive Psychologie“ mit naturwissenschaftlichem Fundament und verbindlichen Modellvorstellungen begründen zu können.

Ich habe die Faktoren ‚Sprache‘ und ‚Raumvorstellung‘ deshalb als Beispiel gewählt, weil bei uns im Wiener Institut in den letzten Jahren von Herbert Bauer und Oliver Vitouch einige Studien über hirnelektrische Aktivitäten beim Lösen von Aufgaben in eben diesen beiden Leistungsbe- reichen durchgeführt wurden. Dabei interessierte uns allerdings nicht das konventionelle EEG, sondern die kortikale Gleichspannung. Unser Gehirn ist nämlich, einer Batterie vergleich- bar, elektronegativ aufgeladen, wobei dieses Gleichspannungspotential (DC-Potential) ein sensibler Indikator für die Erregbarkeit der betreffenden Hirnrindenzone ist, der ihre aktuelle Funktionsbereitschaft anzeigt.

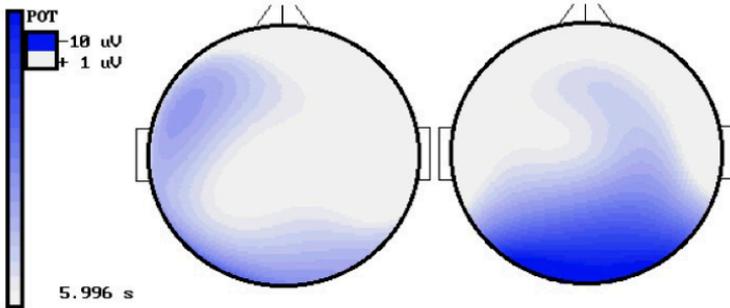
Bauer hat in jahrelanger Entwicklungs- arbeit neue Verfahren zur Registrie- rung, Verstärkung und Darstellung dieser Potentiale entwickelt, mit deren Hilfe nun die aktuellen Erregungs- muster des Gehirns bei verschiedenen kognitiven Aktivitäten beobachtet und Zonen von erhöhter bzw. herabge- setzter Erregbarkeit sichtbar gemacht werden können. In einer dieser Arbei- ten wurden nun Raumvorstellungs- aufgaben vorgegeben, wobei jeweils von zwei Würfeln mit unterschiedlich bemalten Seitenflächen zu entscheiden war, ob diese nach einer geeigneten Rotation - welche die Versuchsperson in der Vorstellung vollziehen muss- te - dieselbe Ansicht bieten würden. Die ‚Erregungslandkarte‘ des Gehirns zeigte dabei, dass im Augenblick der Problemlösung in genau dem für die Raumorientierung zuständigen Bereich der rechten Hemisphäre eine deutliche Negativierung auftrat.

Ein ganz andere Bild bot sich hinge- gen, wenn denselben Personen (aus- schließlich Rechtshänder) sprachliche Aufgaben von der Art:

Vogel : Nest = Mensch : Wohnung

mit dem Auftrag vorgegeben wurden, ihre Richtigkeit zu beurteilen. Unter dieser Bedingung trat während der Lösung eine eng begrenzte linkshe- misphärische Aufladung in genau der Region auf, in welcher das Sprachzent- rum lokalisiert ist.

Wir haben also auf einer biologischen Realitätsebene Informationen gesam- melt, die sich völlig mit den aus dem psychometrischen Bereich stammenden Modellannahmen Thurstones decken und können mit Staunen und Befriedigung eine perfekte Isomorphie von zwei höchst unterschiedlichen Realitätsebenen zur Kenntnis nehmen. Mit von Bertalanffys Worten: “If both mental and behavioral or physiological events can be described by the same models, this means isomorphism between them.” Doch was folgt aus dieser Korrespondenz? Haben diese beiden Intelligenzdimensionen durch diesen Befund gleichsam einen höheren Grad an Wirklichkeit erhalten?



Die Verteilung der Gleichspannungspotentiale beim Lösen von sprachlichen Aufgaben (linkes Bild) und beim Bearbeiten von Problemen, die Raumvorstellung erfordern (rechtes Bild). Die dunklen Zonen zeigen Bereiche mit hoher elektronegativer Aufladung an.

Mit Fritz Wallner gilt es, durch Verfremdung zu erproben wie sich eine Mikrowelt unter verschiedenen Bedingungen bewährt. In diesem Sinne können wir den neuropsychologischen Zugang als gutes Beispiel für eine nutzbringende Verfremdung ansehen, durch welche wir uns für dasjenige von mehreren möglichen Modellen entscheiden, für welches wir zwischen dem Bereich der Neurobiologie und der Ebene des Erlebens optimale Korrespondenzen feststellen können. Dieses kann somit als das geeignetste angesehen werden, das die brauchbarsten und verlässlichsten Vorhersagen liefern wird, ohne in die Feststellung zurückfallen zu müssen, dass es ‚wirklich‘ die beiden Intelligenzfaktoren ‚Sprachbeherrschung‘ und ‚Raumvorstellung‘ gibt. Damit wird Beliebbarkeit aufgehoben, ohne gleichzeitig die überkommene Vorstellung einer universell verbindlichen Wahrheit bemühen zu müssen.

Ich möchte diese überaus wichtige Position mit Heinz von Foersters Relativitätspostulat illustrieren, zu dessen Veranschaulichung er sinnvolle und zulässige Annahmen über das Rotationszentrum unseres Planetensystems abzuwägen vorschlägt: Ist die Position von Ptolemäus ‚richtig‘, der meinte, dass die Erde der Mittelpunkt des Universums ist, um den die Sonne und alle Planeten kreisen oder hat Kopernikus recht, für den die Sonne im Mittelpunkt steht? Und warum sollten wir nicht einen anderen Mittelpunkt, etwa den Mars, vorschlagen? Es müsste ja sowohl dem Mars- wie auch dem Erdbewohner das Recht zugestanden werden, ein Modell zu entwerfen, in dem jeweils sein Planet zum Mittelpunkt erklärt wird.

Und an diesem Denkspiel kann die entscheidende Einschränkung aufgezeigt werden, dass zwar die Wahl des Zentrums zunächst beliebig ist, aber Erde und Mars von einer Gemeinschaft der Mars- und Erdenbewohner nicht gleichzeitig zum Mittelpunkt erklärt werden kann. Somit ist für diese nur eine Modellvorstellung, nämlich die Annahme eines heliozentrischen Systems sinnvoll und zulässig.

Vermutlich könnte dieser Auffassung für den psychologischen Bereich ein Großteil der gegenwärtigen Fachvertreter durchaus zustimmen. Es gibt allerdings ein Problem, bei dem die Psychologie dieselben Schwierigkeiten hat, wie die Philosophie seit altersher, nämlich das Ich-Erleben. Dass da draußen eine Außenwelt existiert, die ich wahrnehme und erlebe, wird - in der naiven Einschätzung unserer Lebenswelt wie auch in den meisten wissenschaftlichen Reflexionen - als eine unbestreitbare Tatsache angesehen, die überhaupt nicht zur Diskussion zu stellen ist, sondern die Basis aller weiteren Überlegungen darzustellen hat. Descartes ‚cogito ergo sum‘ ist das solide Fundament dessen Unbestreitbarkeit von zahlreichen anderen kritischen Denkern betont wird, wie etwa von John Locke: “For nothing can be more evident to us, than our own Existence ... If I doubt of all other Things, that very Doubt makes me perceive my own Existence, and will not suffer me to doubt on that”.

Mit dieser für die Alltagsicht unserer Lebenswelt zweifellos nützlichen Ansicht hat sich freilich gerade die Psychologie eine Fülle von Problemen geschaffen, die uns meist unter dem Oberbegriff „Leib-Seele-Problem“ begegnen, deren Lösung man sich neuerdings besonders von den Neurowissenschaften erhofft. Durch eine eingehendere Betrachtung des Gehirns und seiner Feinstrukturen sollte nämlich endlich klar werden, wie „aus Materie Psychisches entsteht“.

Gerade in dieser kritischen Frage, welche der Psychologie eine Fülle von Scheinproblemen beschert und viel Forschungsenergie gebunden hat, nimmt auch von Bertalanffy eine bemerkenswerte Position ein: Er bekennt sich nämlich ganz unmissverständlich zu jener kleinen Minderheit, die diese Dualisierung nicht als eine fundamentale Selbstverständlichkeit ansieht, sondern vielmehr als das Produkt eines Entwicklungsprozesses: “Our direct experience is, of course, of things outside in space: chairs, tables, houses, stars seen in the telescope and cells in the microscope, etc., and a perceiving, feeling, thinking, willing self. But this is not a simple and ultimate ‘given’. The experienced universe is the outcome of innumerable factors and processes by which a primitive ‘stream of experience’ is organized and differentiated into ‘outside worlds’ and ‘self’.”

Bei der Diskussion der Genese des Ich-Erlebens bezieht sich von Bertalanffy bemerkenswerter Weise auch auf Jean Piaget, einen der wenigen Psychologen, der in dieser Frage gleichfalls eine klare Position bezogen hat und betont: "From a state of primary adualism (to use Piaget's term) ... our experienced world is the product of a long evolution, cultural history, and individual learning of the child. As psychiatrists say, the "ego boundary" is established slowly and in complex (but widely known) processes; and may again be obliterated in psychopathology". Und an anderer Stelle: "From a state of primary adualism (to use Piaget's term) ... eventually the differentiation of objects and subject, material things and immaterial self arises, as experienced by the adult European."

Auch die Dualisierung unserer Welt-sicht nicht als fundamentales Faktum anzusehen verursacht allerdings nicht nur Unbehagen. Sie ist auch nur mit Mühe sprachlich vermittelbar und wird eher Verständnislosigkeit als Zustimmung auslösen.

So muss Josef Mitterer, der in seinem bemerkenswerten Werk „Das Jenseits der Philosophie wider das dualistische Erkenntnisprinzip“ den bemerkenswerten Versuch unternahm, eine nicht-dualisierende Redeweise zu entwickeln, im Vorwortes feststellen: „... diese Abhandlung wurde im wesentlichen in den Jahren 74-78 geschrieben, die Reaktionen schwankten zwischen Verständnislosigkeit, freundlicher Ablehnung und einen Jux will er sich machen“.

Daher kann eine übergreifende, systemtheoretische Deutung erfolgen: "It is the beauty of systems theory that it is psychophysically neutral, that is, its concepts and models can be applied to both material and nonmaterial phenomena." Denn: "... a model which is abstract and psychophysically neutral is applicable both ways".

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Cybernetics and Systems Research

A tour d'horizon, exemplified by their biennial European Meetings from 1972 to 2010

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It all started with two seminal works, a paper and a book, published around the middle of the last century: Ludwig von Bertalanffy's paper "An Outline of General Systems Theory" in 1950 and Norbert Wiener's book "Cybernetics or Communication and Control in the Animal and the Machine". While von Bertalanffy was a biologist and Wiener a mathematician, both saw the importance of leaving the unidirectional view of the world behind and of reasoning about interdependencies between multiple elements and the resulting complex behaviour, from biological systems to technical and social systems.

To clarify the concept of "system": A system consists of the set of elements and the set of relations between these elements. The set of relations between the elements is called "structure". Systems usually have a boundary, the outside of the system being called "environment". When relations of some elements of the system also reach to elements in the environment, then we call it "open system", else "closed system".

The principle of cybernetics is the "feedback loop", where the output of the system is fed back, usually negatively, into the system. The goal is either to follow a target or to keep a value as constant as possible.

Both problems are in principle identical, e.g. a driver of a car can follow the curves of a road or she/he can keep the distance from the right border of the road constant. An important aspect is the "stability" of the feedback loop, e.g. it should not take too long to follow the object or there should not occur a big "overshoot" or even an oscillating behaviour. Cyberneticians usually study by far more complex systems consisting of many of these loops, with a special interest in their time behaviour.

In 1968 I gave my first lecture on systems in the bio-sciences at the University of Vienna, at that time as lecturer. But I realised that I had to do more than that, I should give cybernetics and systems theory an organisational foundation in Austria. Therefore, in 1969, together with like-minded friends, I founded and officially registered the „Österreichische Studiengesellschaft für Kybernetik (OSGK)" (Austrian Society for Cybernetic Studies).



The happy organisers after the successful EMCSR 1972
Paul Hanika (left) and Robert Trappl (right)

In 1970 I received a phone call from a man named Paul Hanika, officially Francis de Paula Hanika, who told me that he was a retired professor of the University of Karthoum, that he planned to settle in a small village in Styria, and that he was eager to work with me in the OSGK. I met a fascinating man of 70 years, full of energy, the author of a book about new thinking in management, translated into five languages. From our vivid discussions arose the idea of a conference on cybernetics and systems research. How to name it? We didn't know how many participants we would have, thus "Meeting" seemed to be the adequate word for it. And from where would they come? Probably at least a few participants would come from Germany or perhaps Czechoslovakia or Hungary, thus "European" would not claim too much.

Therefore, in 1972 the first "European Meeting on Cybernetics and Systems Research" took place, in the Palais Palfy at Josephsplatz, in the center of Vienna. And to our surprise, 112 scientists and practitioners participated, most of them giving presentations, more than at another conference which was named "World Congress on Cybernetics"!

We had famous speakers at this EMCSR, among them one of the most interesting cybernetician who also was an artist, a magician, Gordon Pask, who became famous for his "Conversation Theory", a cybernetic framework explaining how interactions lead to the construction of knowing, and Margaret Mead, who had analysed the familial system in the island of Somoa, and later became one of the icons of the feminist movement.

Together with several participants we ended the last day of the EMCSR in a small pub in the center of Vienna and I will never forget how Margaret fell asleep and rested her head on my right shoulder...

Since this EMCSR was such a success and many participants encouraged us to continue, we decided to make it a biennial endeavour, thus the 2nd EMCSR took place in 1974, already at the University of Vienna, with an opening in the Great Festival Hall, and so on.

It is no exaggeration to say that the leading scientists in our areas came to the EMCSRs and presented their fascinating research findings. To mention a few: Stafford Beer, the founder of management cybernetics who worked for Salvador Allende when he tried to make Chile a democratic and socially balanced society.

Stafford developed an interactive system which enabled “simple” workers to understand the functioning of a company and how to manage it successfully. Valentin Braitenberg, then director of the Max-Planck-Institute for Biological Cybernetics in Tübingen who showed with simple hypothetical vehicles how the impression of purposeful actions like in living beings could be generated. Humberto Maturana gave an opening lecture on the famous concept of Autopoiesis which he developed together with Francisco Varela, who gave another lecture. Marvin Minsky, a pioneer of Artificial Intelligence and a great personality who, unfortunately, died in January this year, gave a lucid presentation of his concept of the emotion machine, AI having focused mainly on rationality and neglected the importance of emotion.



Opening of the EMCSR 1980
Great Festival Hall of the University of Vienna

Given my space budget for this chapter, I have to stop here with describing all the great personalities whom I had the pleasure to meet and with several of whom I was fortunate to establish a lasting friendship. The end of me chairing the EMCSRs is trivial: My colleagues at the OFAI who had to work for the EMCSRs for many years since our budget did not permit hiring a professional organisation started complaining already in the early zero-years of this century whether I really wanted to continue the EMCSRs.

Thus I was happy when Wolfgang Hofkirchner from the BCSSS expressed his interest in continuing with these “Meetings”. I am therefore happy that I can present to you this outline of the history of cybernetics and systems research of more than 50 years, in a very relaxed mood.

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Pinwheel Recursion: A Viable System Model Approach

Allenna Leonard, Ph.D.

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It is common to assert that organizations exist in complex environments that are subject to varying rates of change and explosions of variety. Multiple time frames, multiple perspectives and other scenarios and projections are used to explore weak signals and possible futures. Stafford Beer's Viable System Model is one flexible template that is useful in describing, diagnosing and prescribing for organizations. One of its most helpful aspects is the concept of recursion: that each viable system is embedded in other more comprehensive systems and, in turn, is composed of less comprehensive viable subsystems.

A Viable System diagnosis usually focuses on a particular organization and examines the system one step up and down in comprehensiveness according to one or more dimensions. The consideration of multiple dimensions is less common – because work is often done for clients who are interested primarily in their own organizations and because their success or failure is measured according to limited criteria. It is also constrained in commercial organizations by the fact that shareholder interests dominate the selection of dimensions explored. Public and non-profit organizations are often limited by their mandates. However, organizations do exist and play roles in multiple dimensions.

They are or can be held accountable for their decisions and actions in all these dimensions for their effect on the larger societies of which they are members.

A pinwheel presents a good metaphor for the factors affecting an organization. It is often comprised by a rainbow of colors and may be depicted in a set of concentric circles. Depending on their different types or roles in different environments, different aspects may be attended to as the pinwheel spins and one set of colors or another is seen.

A typical company, for example, may be part of a corporation that is part of a hedge fund on an ownership dimension but the same company is part of a corporation that makes a product that is part of an industry, an industry sector and manufacturing at large on another. That same company could be part of initiatives on sustainability, improvement of practice, hiring and training of underserved populations and/or experiments on non-hierarchical management. They are also employers in a community, a region and so on, part of a system of laws and regulations to which they are subject and tax paying entities of several jurisdictions. Each of these dimensions is recursive but only one usually has comprehensive as opposed to particular authority.

The others have increasingly targeted accountability based on compliance (laws and regulations) collaboration (communities of practice or sustainability initiatives) or common interests (regional or industry membership). These may sometimes or over time migrate from collaboration to compliance such as when good environmental practice becomes a legislative requirement. All, like a pinwheel in the wind, are blown faster or slower depending on the changes that affect them although changes in different dimensions rarely occur at the same rate.

The currency used in each dimension may differ as well depending on whether it is money itself or different types of information or action.

The Viable System Model is useful from a policy or a governance perspective to map the relevant dimensions and their potential for consistency or inconsistency and to consider the time frames applicable to each. This is one variation on the templates surrounding the Viable System Model but one that is especially useful in determining gaps and inconsistencies and addressing them before they become problems.

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Inspirational Systems Change Needed

Katri-Liisa Pulkkinen

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Inspiration and sustainability are more connected than it seems at first. We are in the current situation because we have been for too long inspired and attracted by activities and possessions that are systemically unsustainable. So, the natural follow-up from this is that we would need to limit ourselves. Limiting does not work well – especially with the current system that is based on growth. We talk about transition to sustainability, but yet keep on crossing the planetary boundaries. We know that we would need to reduce our harmful environmental impact and cut the ecological and carbon footprints 50–80 %, but the majority of human-kind does not seem to be interested in changing their behaviors in the radical ways that would be required to reach these sustainability targets.

However, there are some people who proactively and voluntarily do even more than this. These regenerative sustainability pioneers live in such ways that aim to not only reduce the negative, but even reach for a net-positive impact. They practice e.g. small-scale gardening that harvests carbon, and they build solutions that strengthen local biodiversity and ecosystems. They innovate local currencies and build community resilience. Regenerative sustainability pioneers build new, inspirational and positive models of sustainability.

As the current mainstream understanding of what comprises a good life often values choices that sum up to unsustainability, these pioneers show that it is possible to have a high quality life that is sustainable; the trick is to change what is considered to be quality in one's life. The regenerative sustainability pioneers do not have less good; they have much more of different kind of good. It is not about limiting, but changing the system entirely – even though at the same time, also the limits are respected.

Regenerative sustainability is a different way of thinking. It starts from the realization that humans not only can, but in the current state of the system, also must be a positive influence within the natural system. Behind this idea is a worldview that perceives the living planet as an interconnected, complex web of life. This whole systems view maintains that nature is not a simple resource for us to benefit from, but a containing system that we intrinsically are a part of.



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The current system is more or less in a lock-in: we seek for growth even though we know that we are in an ecological overshoot. Part of the lock-in is that it is difficult to imagine a way of living that is not based on competitive exploiting of the natural systems. To steer away from this, it is crucial to develop inspirational models and solutions that can attract people away from the harmful ways of living. These models activate bottom-up, cascade-like system changes. The regenerative sustainability pioneers show that it is a great pleasure to live in sustainable, net-positive ways. It is very human and very natural to follow what is attractive, and to have a need to be inspired by possibilities rather than depressed by limitations.

As said, the key is in the change of perception; we need to be attracted to reconsider and relearn about where we are, who we are and why we are, in relation to the natural systems. That gives the grounds and building materials for a true quality of life.

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Keynote

Biomimicry Nature-Inspired Innovation in Form, Process and System

Regina Rowland

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The term Biomimicry refers to the philosophy of applying nature's genius to human systems. Underpinning the work is the premise that life creates conditions conducive to life (Benyus, 1997) and that human activities could be designed and conducted in harmony with the laws of nature. Biomimicry as a practice refers to a transdisciplinary design process that combines system thinking, design thinking and biology and/or ecology and can be applied to any kind of challenge across a variety of genres.

The opportunities for the application of nature's genius are literally endless because there are an estimated 30+ million species living on this planet that have undergone 3.8 billion years of research and evolution (Benyus, 1997). Nature has been refining their designs over eons, moving those that work forward and discarding those that either did not work or did not contribute to the health of the whole.

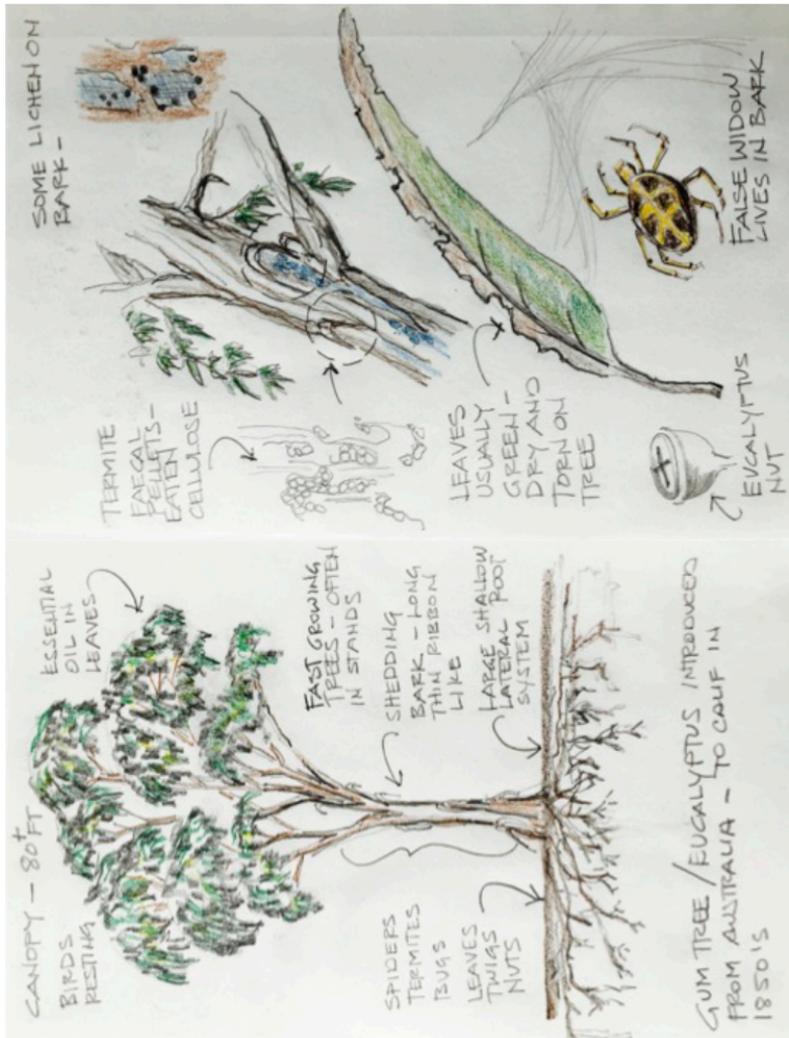
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It thus makes common sense that humans would be wise to not only learn from these design strategies and processes, but also realize that their species can only survive on this planet if they contribute:

- a) to the wellbeing of all living beings,
- b) to the health of the biosphere upon which their own lives depend
- c) to the diversity in the ecosystems in which they live.

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Sample iSite, 'Life Along a Tree'
© Colleen Mahoney, Biomimicry Specialist

Generation Europe Youth investigating youth: Systems thinking in empirical application

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Europe's future relies on the next generation of citizens. Will those who are young today be able to tackle the challenges of European Integration and develop a European identity? Stakeholders put many hopes into this, but what do we actually know about young Europeans today? We will answer this question systematically and empirically, in order to create detailed information for decision makers on various levels (European, national, regional, municipal...).

In respect to system theory our research approach is innovative and participative. This means we are supporting *the ones concerned by the research to conduct the research* themselves: Youth is investigating youth. Young researchers are enabled to decide upon the course of their research and voice what is important to them. The project team consists of people from different disciplines (psychologists, sociologists, educational researchers, historians, designers, media communicators, etc.) and cities (Bochum, Graz, Lviv, Magdeburg, Olomouc, Vienna...).

The participants physically meet in these cities in order to jointly investigate their generation there. They receive instructions on empirical methods (how to conduct interviews or group discussions, take documentary pictures) and learn about design and communication techniques for the public presentation of their findings. From city to city (i.e. from workshop to workshop) participants broaden their (and our) understanding of the diversity and communalities of young people living in Europe.

A major strength of the project is its sustainability. While participants from different European cities jointly learn how to create a valuable information data base of the young generation in Europe, they become a valuable European resource themselves!

The goal of the project is the project itself: When participants are given a stage to investigate what young Europeans with different backgrounds have in common, they are also provided with the opportunity of working together and personally experiencing the significance of “having something in common with one another”. Hence the young project participants are developing a shared European understanding out of their joint practise.

But, on a broader scale, the systems approach of participatory research in our European project even affects the everyday lives of other people in Europe: a) top down—as it improves the information data base for policies and measures that better fit their real life situations in different places, b) bottom up—through the European understanding that develops out of the very people that participate in the project. The deep personal involvement resulting from their joint research practise and the experience of self-efficacy enabled by the participatory approach turns the young participants into active multipliers for the European idea.

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WIN-WIN not a solution. What next?

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The win-win deal is supposed to be a situation which is advantageous for everyone, in which the outcome benefits each party. In dynamic studies *win-win games* are called games without losers. If we look at *Human actions within ecosystems* or at living and banking systems comparison, the *win-win* solution is never a solution but always a problem. EcoSystems are not *win-win* associations: whatever the actors in a network *there are never advantages for some ones without disadvantages for other ones*. The win-win approach is not a systemic one: *nobody* must be a permanent winner. No couple of actors can be isolated from *the global network* of actors in which they are sharing advantages and disadvantages. *Whatever the system and its level* of organisation, it is structured with an endophysiotope that is hosted by an ecoexotope of survival. The space-times are modular, by embedment and juxtaposition of systems of systems. Whatever the level of organisation the local modules are in interaction at different scales, within and between levels of organisation, but governed by *the same fractal power law*. The modularity of the actors and their interactions, causes of advantages or disadvantages, are at the origin of exaptation processes.

Sooner or later winner-loser interactions like will give rise to *an Association for the Reciprocal and Mutual Sharing of Advantages and DisAdvantages (ARMSADA)*, in which, for one to survive, all the others must survive first, in which everyone is both a winner and loser.

... but a problem!

P.R. China

Taking into account all actors that are in interactions and share the hosting capacity of the same ecoexotope, at the system level you cannot always be a winner; sooner or later you will be a loser. Your capacity to be hosted must be in-between. And you must be lucky!

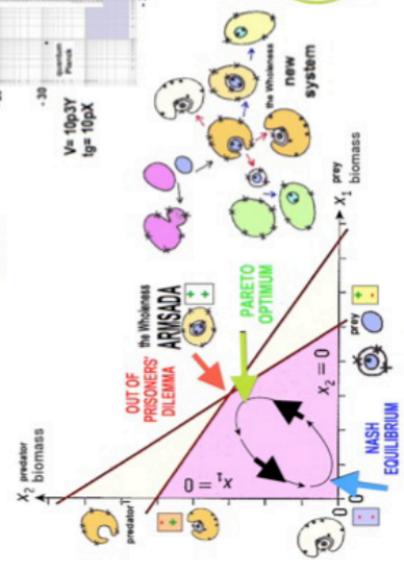
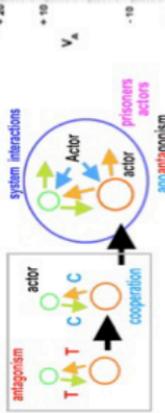
There are never advantages without disadvantages. Greater the advantages for man, greater the disadvantages: a more and more degraded ecoexotope of survival and the emergence of new risks. Species frequencies changes are indicators of ecoexotope changes. Some species are winning whereas others are losing. Balance is changing and the current changes create more losers than winners. It is a “who wins will be a loser” game. Sooner or later winners become losers and losers become winners.

Mankind must take into account the lessons of Nature. ARMSADA is the only long lasting resilient solution between Man and Nature. We need to change our mind with education for a holistic way and at all levels.

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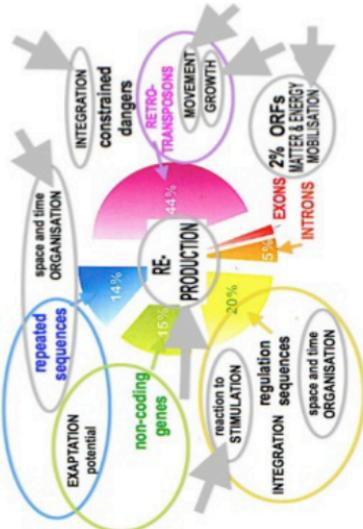
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- 2 NEW WORDS: **ECOEXOTOPE & ENDOPHYSIOTOPE**
- 2 "TRIVIAL" CONCEPTS:
 - * TO SURVIVE IT IS "TO EAT" & "NOT TO BE EATEN"
 - * THERE ARE NEVER ADVANTAGES WITHOUT DISADVANTAGES
- 1 NEW PARADIGM:
 - ALL THE LIVING SYSTEMS EMERGED FROM AN ARMSADA ASSOCIATION for the RECIPROCAL and MUTUAL SHARING OF ADVANTAGES and DISADVANTAGES
- 2 "EVIDENT" FACTS: **MODULARITY & ERGODICITY**

ARMSADA emergence



gauche invariance (new paradigm):
 the 7 functional capabilities of all living systems
 whatever the level of organisation
 (here at the cell genes level)

Living systems laws of building, functioning and emergence

Quadruple and Quintuple Helix Innovation Systems

Elias G. Carayannis

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David F. J. Campbell

University of Applied Arts Vienna

The Triple Helix innovation model concentrates on university-industry-government relations (Etzkowitz and Leydesdorff, 2000). In that respect, Triple Helix represents a basic model for knowledge production and innovation application. The models of the *Quadruple Helix and Quintuple Helix innovation systems* are designed to already comprehend and to refer to an extended complexity in knowledge production and knowledge application (innovation), thus, the analytical architecture of these models is conceptualized broader. To use metaphoric terms, the Quadruple Helix embeds and contextualizes the Triple Helix, while the Quintuple Helix embeds and contextualizes the Quadruple Helix (and Triple Helix). The Quadruple Helix adds as a fourth helix the “media-based and culture-based public”, “civil society” and “arts, artistic research and arts-based innovation” (Carayannis and Campbell, 2009 and 2012, p. 14; see also Danilda et al., 2009, and Bast, Carayannis and Campbell, 2015). *The Quadruple Helix also could be emphasized as the perspective that specifically brings in the “dimension of democracy” or the “context of democracy” for knowledge, knowledge production and innovation.*

The Quintuple Helix innovation model is even more comprehensive in its analytical and explanatory stretch and approach, adding furthermore the fifth helix (and perspective) of the “natural environments of society” (Carayannis and Campbell, 2010, p. 62) (see Figure 1).

The Triple Helix is explicit in acknowledging the importance of higher education for innovation. However, it could be argued that the Triple Helix sees knowledge production and innovation in relation to economy, thus the Triple Helix models first of all (primarily) the economy and economic activity. In that sense, the Triple Helix frames the knowledge economy. The Quadruple Helix brings in the additional perspective of society (knowledge society) and of democracy (knowledge democracy). The Quadruple-Helix-innovation-system understanding emphasizes that sustainable development of and in economy (knowledge economy) requires that there is a co-evolution of knowledge economy and knowledge society and knowledge democracy. The Quadruple Helix even encourages *the perspectives of knowledge society and of knowledge democracy* for supporting, promoting and advancing knowledge production (research) and knowledge application (innovation).

Furthermore, the Quadruple Helix is also explicit that not only universities (higher education institutions) of the sciences, but also universities (higher education institutions) of the arts should be regarded as decisive and determining institutions for advancing next-stage innovation systems: the inter-disciplinary and trans-disciplinary connecting of sciences and arts creates crucial and creative combinations for promoting and supporting innovation. Here, in fact, lies one of the keys for future success. The concept and term of “social ecology” refers to “society-nature interactions” between “human society” and the “material world” (see, for example, Fischer-Kowalski and Haberl, 2007). The European Commission (2009) identified the necessary socio-ecological transition of economy and society as one of the great next-phase challenges, but also as an opportunity, for the further progress and advancement of knowledge economy and knowledge society.

The Quintuple Helix refers to this socio-ecological transition of society, economy and democracy, the Quintuple Helix innovation system is therefore ecologically sensitive. Quintuple Helix bases its understanding of knowledge production (research) and knowledge application (innovation) on social ecology. Environmental issues (such as global warming) represent issues of concern and of survival for humanity and human civilization. But the Quintuple Helix translates environmental and ecological issues of concern also in potential opportunities, by identifying them as possible drivers for future knowledge production and innovation (Carayannis, Barth and Campbell, 2012). This, finally, defines also opportunities for the knowledge economy. *“The Quintuple Helix supports here the formation of a win-win situation between ecology, knowledge and innovation, creating synergies between economy, society and democracy”* (Carayannis, Barth and Campbell, 2012, p. 1).

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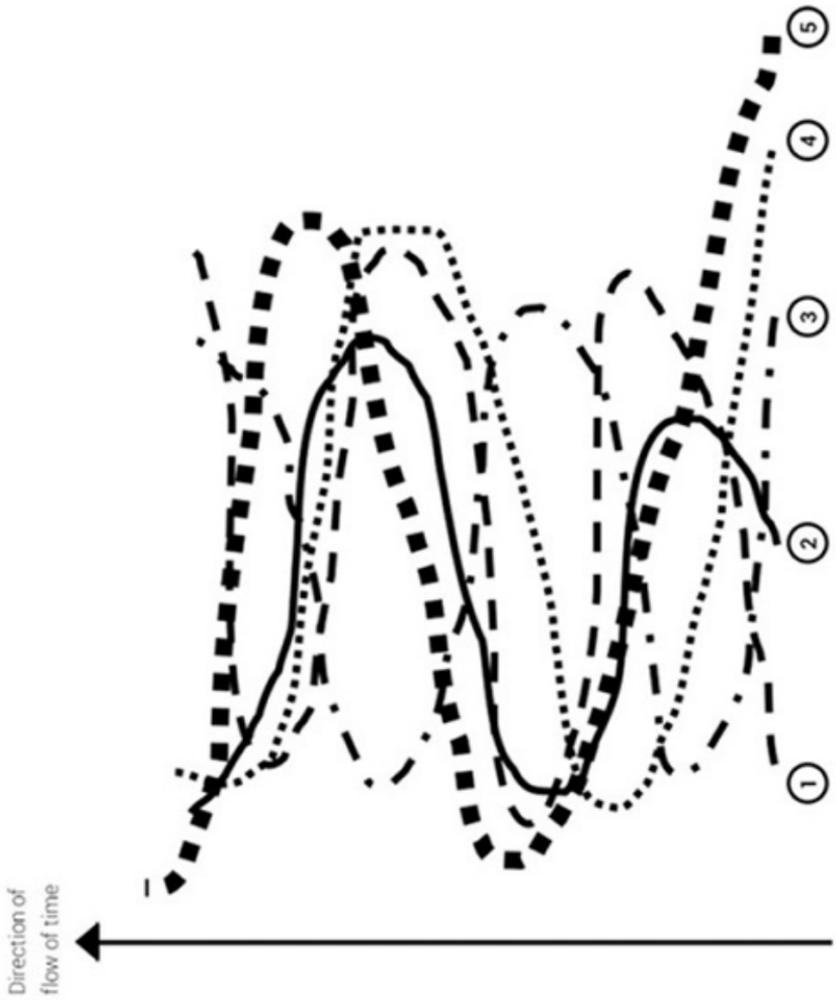


Figure 1
 The Quadruple and Quintuple Helix innovation systems
 © Elias G. Carayannis & David F. J. Campbell

The Quadruple and Quintuple Helix innovation systems

1 First Helix

Academia / Universities

Universities (higher education institutions) of the sciences and of the arts.

2 Second Helix

Industry / Business

Also: creativity economy and creative industries.

3 Third Helix

State / Government

4 Fourth Helix

Media-based and culture-based public / Civil society / Arts, artistic research and arts-based innovation

culture and innovation culture, knowledge of culture and culture of knowledge, values and life styles, multi-culturalism and creativity, media, arts and arts universities, multi-level innovation systems with universities of the sciences and arts.

5 Fifth Helix

Natural environment / Natural environments of society and economy

social ecology, society-nature interactions, socio-ecological transition.

Authors' own conceptualization based on Etzkowitz and Leydesdorff (2000, p. 112), Carayannis and Campbell (2009, p. 207; 2012, p. 14; 2013) and Danilda et al. (2009).

Source: Carayannis, Elias G. / David F. J. Campbell (2014). Developed Democracies versus Emerging Autocracies: Arts, Democracy, and Innovation in Quadruple Helix Innovation Systems. *Journal of Innovation and Entrepreneurship* 3:12

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The complex information system model in communication process

Lin Bi

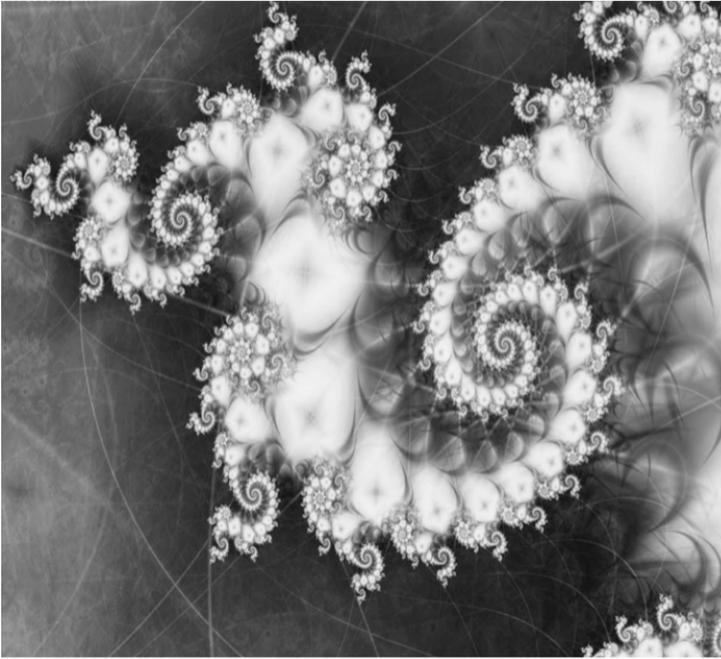
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Classical communication studies have been focussing mainly on the transfer of information in social systems. However, as Thomas Kuhn said “normal science” seems to put everything in a box that is shaped in advance without elasticity. So the following five sections of communication processes have been scrutinized: disseminator, content, channel, audience and effect. This led researchers to limit their approaches towards the phenomena of information. There have been rarely studies on a bigger picture.

A bigger picture would demand to go beyond interdisciplinary studies and become transdisciplinary, advance to a meta-level and include philosophical and system theoretical perspectives. Here, informational agents are not restricted to social, human actors - rather they populate the broader universe - and communication processes are not the only information processes.

There is an evolution of information that unfolds in three fields, as the triple-c model of Wolfgang Hofkirchner suggests: communication is based on cognition of informational agents and promotes cooperation among them. The philosophy of information set up by Kun Wu distinguishes between information in-itself, information for-itself and regenerative information. It extends from ontology to epistemology, and from evolutionism to axiology.

According to the viewpoint of systems theory, levels occur through the nesting of systems. Elements of systems are systems themselves on a lower level and systems are elements of other systems on a higher level. Social actors are elements of social systems, which, in turn, can be (collective) social actors in a social supra-system.



Spiral: A possible illustration of a system

Regarding information, the human communication process can be located as intermediary between a micro- and a macro-level: on the micro-level, social actors act, they produce cognitions that change their inner structure; when they interact they communicate their cognitions, which is an extension of their cognitive behaviour, as they try to understand each other's cognitions for the sake of certain goals within the social system they are elements of; when social actors co-act they interlace by stable relations and cooperate for common goals within their social system.

Those relations can be conceptualised as cognitive inner structure of the social system itself when considered as a collective social actor. By doing so, human communication can be explained more thoroughly. Its main function is to mediate between the social micro- and the macro-level. This is of utmost importance in our age of global challenges.

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Design and Science in an Age of Entanglement

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The MIT Media Lab launched the *Journal of Design and Science* (JoDS) in early 2016 with four essays that aims open “new connections between science and design”. The central themes are the emergence of “participant designers” within “an age of entanglement” and the shifts inherent in this approach to design. The JoDS essays theorise an engaged design practice but the political economy of design is under-theorised and a particular problem with the representation of the ecological is evident.

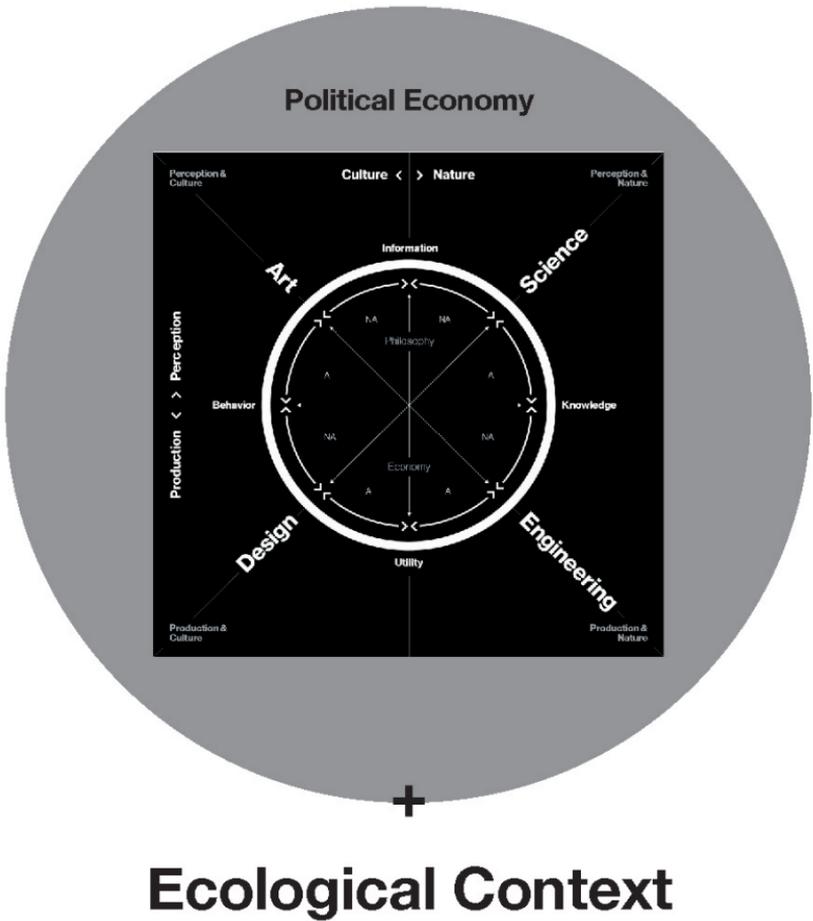
The ways in which nature is understood enable or disable the design of sustainable ways of living. The dismissal of the ecological in the ways we think, in design theory and in design practice is the legacy of a culture that has ignored the interests of natural world. One way to examine the dismissal of the ecological in theory is to refer to Gregory Bateson’s theory of “epistemological error”. The western premise of radical independence is wrong. Humankind has conceived of itself as the sole proprietors of sentience and the rest of the world “as mindless and therefore as not entitled to moral or ethical consideration” (1972, 62).

The narrowing down of our epistemology to reflect only our own interests (or even the interests of our own species) and the instrumental processes we use to do this are at the root of the most severe environmental problems.

In the section titled “The End of the Artificial” Joichi Ito claims that “it appears that nature and the artificial are merging”. Danny Hillis claims: “We humans are changing. We have become so intertwined with what we have created that we are no longer separate from it. We have outgrown the distinction between the natural and the artificial... We are at the dawn of the Age of Entanglement”. It is true that plastic debris is clogging up the guts of marine animals and there are endless examples of similar entanglements. The artificial and the organic are definitely interacting in countless ways on all scales across the global ecosystem. But the “end of the artificial” concept has more to do the legacy of epistemological error and the particular type of political economy that emerged from this error than the so-called merging of the ecological and the artificial.

This coalescing of the natural and the artificial has far reaching consequences. If the artificial things that humans have designed and constructed are of the same order as natural processes that have made it possible for humans to flourish over 40,000 years – this influences the ways we understand and value natural processes.

The ecological sphere has evolved over millions of years to enable life-sustaining conditions on this planet. In stark contrast to the ecological, the artificial has not endured the test of time.



Neri Oxman's "Krebs Cycle of Creativity" - revised

It has not evolved to work in tandem with the ecological. In many places it disrupts the dynamic balance ecosystems need to sustain and regenerate themselves. The climate system is the most dramatic example.

This coalescing of the natural and the artificial has far reaching consequences. If the artificial things that humans have designed and constructed are of the same order as natural processes that have made it possible for humans to flourish over 40,000 years – this influences the ways we understand and value natural processes. The ecological sphere has evolved over millions of years to enable life-sustaining conditions on this planet. In stark contrast to the ecological, the artificial has not endured the test of time. It has not evolved to work in tandem with the ecological. In many places it disrupts the dynamic balance ecosystems need to sustain and regenerate themselves. The climate system is the most dramatic example.

Just because it is possible to ‘edit’ nature (genetic engineering, synthetic biology, geo-engineering) does not mean the organic and the artificial are the same, or that they have equivalent value.

We might redesign nature into what appears to the most cavalier amongst us as a ‘better’ place, to suit human needs and desires – but we cannot predict with certainty the consequences of the most dramatic interventions. On the other hand, nature has experimented for millions of years to refine the evolutionary moment that we find ourselves in now, one that we are quickly degrading. Since humans have already caused irreparable damage to the climate system, to biodiversity and to a vast array of ecosystems and species, now is not the time to build new theory that will further dismiss ecological concerns.

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Complexity Conundrum: A Values Framework for Emotional Reflexive Leadership (ERL)

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Future vision: What kind of life do we want? People envision a life in which they can enjoy the beauty of nature, where all humans are considered to be of fundamental equal worth and can contribute to society in their distinctive ways, and where workplaces invigorate people and are supportive of diversity.

Although inspiring, this vision for the future of humanity and the environmental health of our planet seems to be threatened. With the environmental and societal changes now taking place at the onset of the Anthropocene, such as severe weather or failed nations, living systems are influenced on a large scale. This breakdown of ecological and political systems is unpredictable and unprecedented in human history and the unstable system-environment relationship is putting our visionary aims at risk. The rate, magnitude, and scope of such changes compel individuals to operate from a context that no longer provides the stable environmental background of the preceding geological epoch. The complexity resulting from these challenges calls people to respond through their respective governments, organizations, and by individual efforts.

The author is building on social systems theory (Luhmann, 1995) and autopoiesis (Maturana & Varela, 1980). She argues that as the human race recognizes it is moving into the Anthropocene, social system survival depends on a complex co-coupling relationship with its environment. Consequently, contemporary social system change efforts need to recognize the level of stochastic system-environment complexity currently influencing the transition into the Anthropocene. To facilitate orderly change in the midst of turbulence and complexity, self-reference and self-organizations are the key elements. Self-organization is supported by the self-referential dynamic of individual and group identity (values) and individual and group level emotions. Thus, whenever a system is at a crossroad with an unclear future, complex adaptive human agents need to have the capacity to hold the emotional tension inherent in self-renewal.



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With the fear, hope, sadness and anger generating feelings inherent in novel and unknown situations (Damasio, 2000), individuals are required to exhibit emotional reflexivity and the ability to see events in their wholeness (Burkitt, 2012).

These are capacities individuals do not learn or practice when living in more predictable and stable environments. However, to enact such behavior people need to bring a new set of values to the foreground (Bristol, 2001).

The author presents a values framework that supports emotional reflexive leadership (ERL). It is built on autopoiesis and complexity theory, and integrates recent neuroscientific research on emotions. The author will blend complex, adaptive, and resilient leadership models exhibited in grassroots communities and terrorist groups. The framework suggests that to operate successfully within complex systems, leaders need to enter a complex co-coupling relationship with their environment.

The author asserts that leaders who are acting from a five values orientation (emotional reflexivity, service, co-creation, integration, and navigation) are the harbingers and catalysts in dealing with the complexity conundrum and thus, are the enablers of our future vision.

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Digital Wellness Services

The need for holistic wellness, ecosystems and performative research methodology

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The “ageing population of EU” is a broad and ill-defined segment of the population. The issues are deteriorating health conditions of the 75+ aged citizens and how a modern society should cope with them. A modern society deals with the issues through tax-funded programs. As the proportion of ageing citizens is growing in most EU countries - relatively seen fastest in Germany, Finland and Italy - find trade-offs between the costs and the substance (read: quality) of the care programs as it appears that the tax-paying part of the population simply cannot afford the programs from the year 2030. Thus we need to find another way. We could focus on proactive prevention, i.e. focus on an age group we now call the young elderly - the 60-75 years old - for which we should develop programs to keep them healthy, active and independent. We use *wellness* as the target concept for developing programs to tackle functional impairment as wellness will tackle many aspects of functional impairment. The WHO defines *wellness* as “the complete mental, physical as well as social well-being of a person or groups of persons in achieving the best satisfying or fulfilling life and not merely the absence of disease or any form of infirmity”.

Pro-active prevention is through interventions in daily routines of the young elderly that will introduce subsets of wellness routines. The interventions are digital wellness services implemented with applications for mobile smartphones that have effective back-end support from cloud services. The interventions are: (i) the young elderly develop individual daily wellness routines with wellness services on an omnivore platform over mobile smartphones; (ii) the routines are tailored by/for the users from 100+ smartphone applications; (iii) cloud services support the routines and collect and analyse user data for further and continuous development of the services. There will be some positive, practical and immediate effects of the intervention program that can be monitored and measured, and some more long-term, assessable impacts. In common sense terms it is clear that if hundreds of thousands of young elderly citizens in a country will have better health for 10 years or more, there will be cost savings on the scale of B€ annually.

There are challenges; one challenge is to work out research methodologies that will get us (i) empirically verifiable results on the intervention with digital wellness services, (ii) valid, theory-based results on the design of digital wellness services, and (iii) empirical verification on how digital wellness services will help reduce functional impairment.

Action research has been one of the key directions of service design for a couple of decades and would tackle problems with the development and implementation of digital artefacts.

The development work is often described as co-creative but the validation and verification remain subjective - we cannot be sure that the resulting constructs will work in other contexts and for other purposes.

Design science is fundamentally a problem solving paradigm with roots in engineering and science, and is working out designs in order to find ways to tackle real-world problems.



Digital services are software constructs (artefacts) that we can design and work through jointly with the coming users in co-creative processes; the usability of the artefacts can be tested and the functionality of the services can be worked out in the context and with the users. Most of the designs can be generalised in a positivistic sense and reused for the development of other artefacts.

Action design research (ADR) works with digital artefacts that are ensembles shaped by the user context when designed and developed, and when used.

The ADR deals with the dynamics and the complexity of the context (interventions to create wellness routines) that are problems for engineering-inspired methods. ADR is a promising methodological framework for the design and implementation of digital wellness services; this framework is now being developed as a performative research methodology for information systems research.

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Overcoming Misunderstandings between Cultural and Scientific Systems of Knowledge

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Cultural and scientific systems of knowledge meet where research is involved in the design of public strategies, spaces and policies. The successful implementation of progress and innovation is more likely to take place when the functions, characteristics and values of cultural systems of knowledge are properly understood, which calls for an approach that connects anthropology to systems thinking in the support of scientific findings for the following reasons.

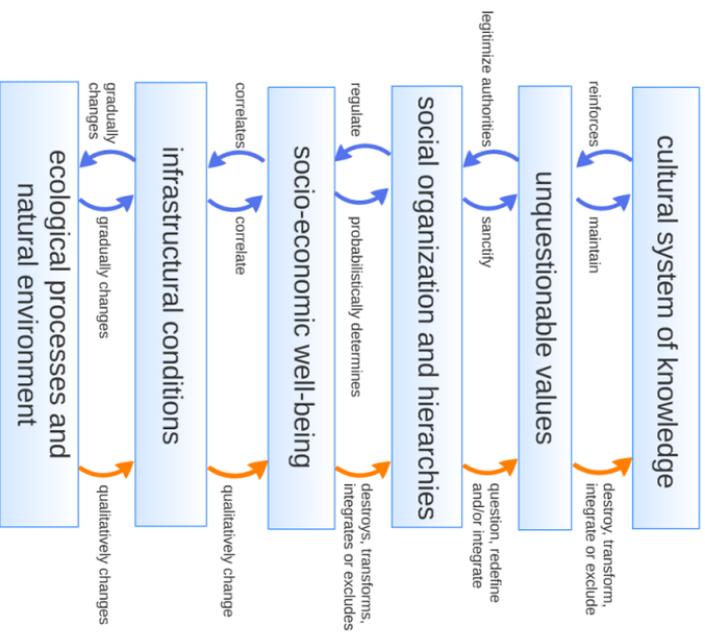
First of all, the majority of systems science or design lacks social data. Thus, this paper is concerned with knowledge and its applicability to those involved in research. It is necessary to understand how scientific systems of knowledge may be more appreciated or even transformative to the local knowledge or behavior of the populations concerned in a research.

Secondly, Anthropology has long been known to be a social science with strong references to systems and their interactions. In this respect there are two paradigms that feature prominently for cultural systems: cultural materialism and cybernetics. The first explains cultural phenomena by means of what is known as infrastructural information, i.e. parameters such as resource density, population density, ecological data and technological advances amongst others.



The second paradigm of cybernetics was introduced to anthropology by Gregory Bateson, whose ideas were later taken up by anthropologists such as Roy Rappaport.

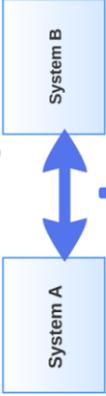
An appropriate combination of this and further knowledge is intended as follows: Each system of knowledge consist of elements which are communicated and some which should not be questioned because this poses a danger to the persistence of the system. These unquestionable elements are the ultimate purposes and values which guide the behaviour and thinking of people. If a perturbing element enters the range of the unquestionable, it will either be excluded or it will change the system of knowledge. Empirical data of infrastructural information correlate with a probable degree of hierarchies which in turn mirror hierarchies of values within a cultural system. The higher the number and density of people involved the higher the level of abstraction of values. Change in a system of knowledge is more probable when material pressure influences social pressure and thus transforms the involved systemic hierarchies by defining smaller subsystems. The aimed changes research intends to implement should take this into account.



quantitative changes

qualitative changes

Processes of two interacting systems of knowledge



A) Integration



B) Transformation 1: Symetrically



C) Transformation 2: Assymmetrically



D) Destruction and exclusion



The ways of interaction and change of cultural systems are basically three-fold: firstly, system A involves system B or vice versa; secondly, system A destroys system B or vice versa; or, thirdly, system A constitutes system B by opposition or vice versa. The third possibility effects change in two ways, as presented by Bateson, symmetrically and asymmetrically.

To conclude with respect to the future of science and humanity, the situation may be summed up as follows. Since we have reached the area of information, knowledge has become a major societal topic. However, cultural disagreements continue to divide the earth through fundamentalist wars and anxiety between religious communities, and cultural disagreement increases provided by the interactions of a globalizing world.

If innovation through foreseeing and participating in change is desired, first we need to see the necessity and the possibilities to do so. Systems Anthropology may contribute to change in cultural systems.

This paper presents a model of the functions of systems knowledge based on a systems approach and qualitative characteristics of humans in their various forms of living and thinking as well as its implications for future work to contribute to a better understanding of each other. The understanding of each other is not only seen as cultural disagreement but also points to approaches in philosophy of science which correlate systems of knowledge with paradigms and their evolution.

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The M3-Model and its application to the public governance of the Brazilian electric power sector

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Governance unfolds in modern societies typically as M3-process: multi-agent, multi-mechanism and multi-level. (i) Multi-agent means that autonomous players with heterogeneous intentions and resources (e.g. political, economic) are involved. (ii) Multi-mechanism means that agent's interactions are guided by different societal mechanism such as "market", "hierarchy", and "network". (iii) Multi-level means that public governance takes place at various political levels (international, national, local). This text presents a conceptual model which integrates all three "M"-dimensions (Figure 1).

The theoretical background of the model is the socio-cybernetic notion of autonomous (self-referential, operational-closed) agents and interaction and feed-back between them. This is based among others on the work of Luhmann N. and Parsons T. (sociology); E. Husserl (philosophy); Foerster H. v. (cybernetics); and Maturana H., Varela F. (evolutionary biology).

The practical relevance of the M3-model will be presented and discussed, followed by its application in the analysis of the state of the Brazilian electric power sector governance structure and operation.

The Brazilian Electric Power Sector (SEB) refers, in this text, to a set of generation, transmission and distribution companies, (state or private); and the governance structure established by the laws and regulations set by the Brazilian government from liberalizing oriented reforms carried out in the late 90s, and being revised substantially at least twice since then (2004 and 2012).

The starting point of the study was the recognition of the complementarity between the regulatory action and the structuring of public governance in the context of the 15-year evolution of the SEB. The governance solution was defined as a priority issue, because it is less discussed at academic and institutional levels.

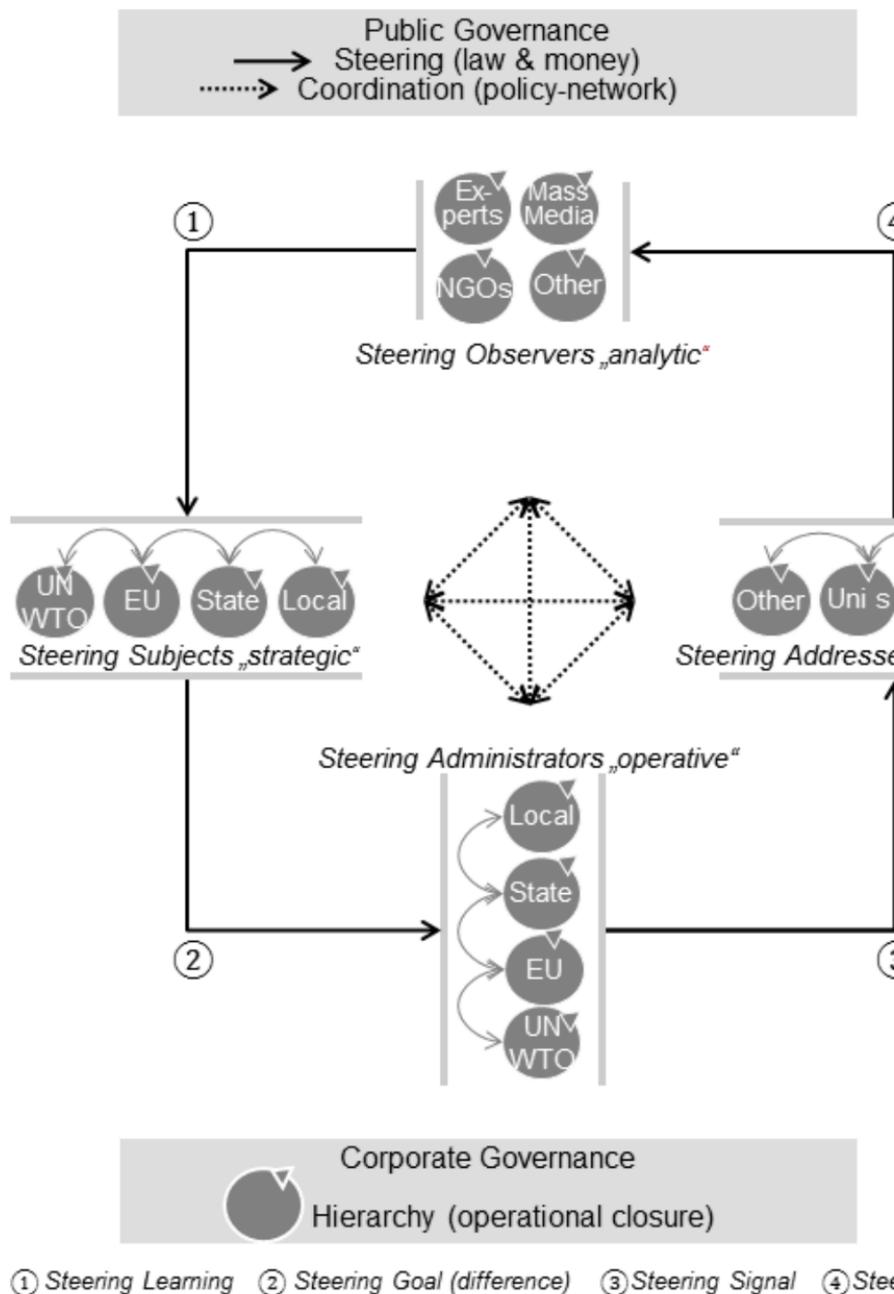
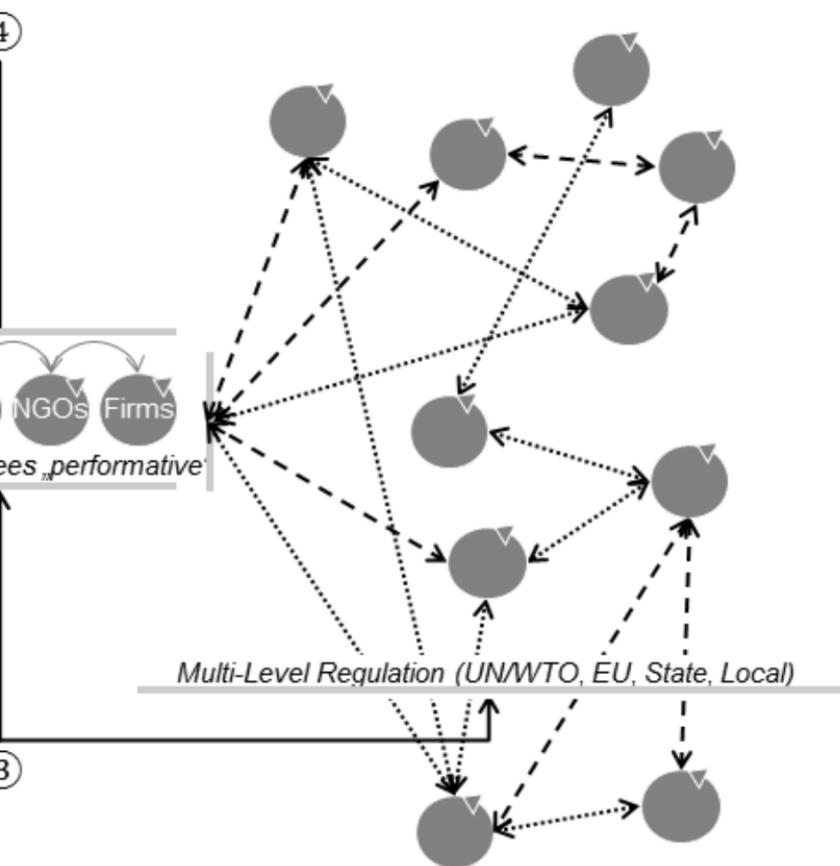


Figure 1
 M3-Model - Multi-agent, Multi-mechanism, Multi-level
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Market Governance

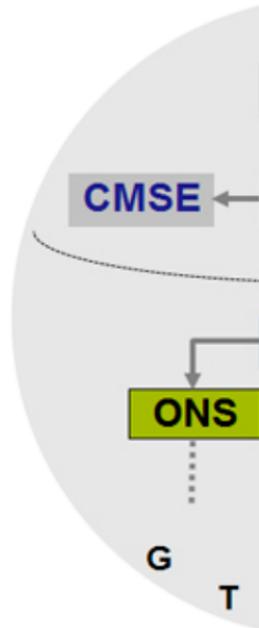
--> Relation via Contract or Price-Mechanism



Network Governance

.....> Relation via (semiformal/informal) collaboration

Spilling Effect

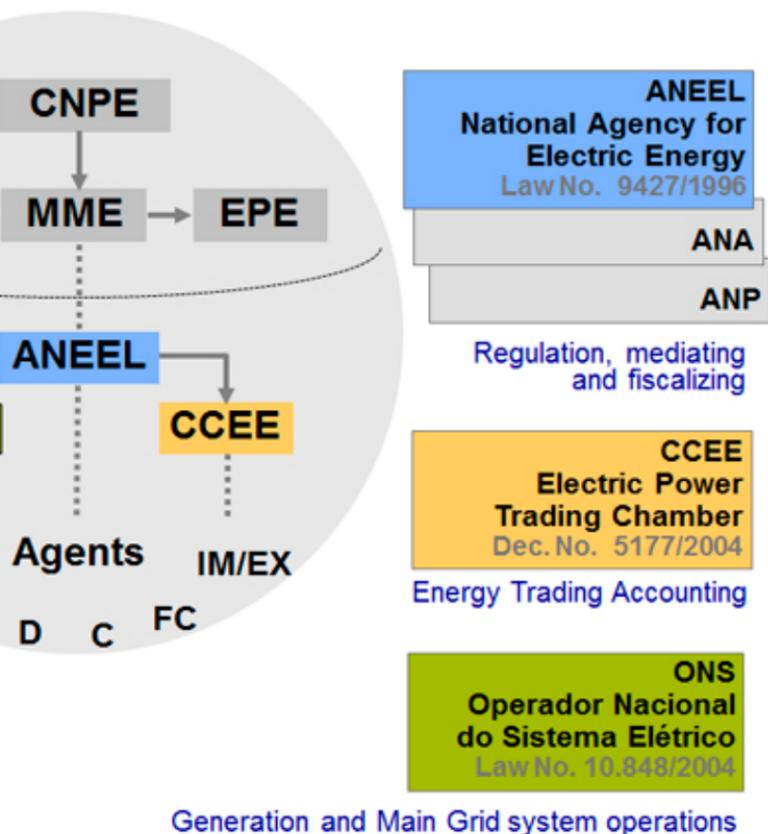


Brazilian Electric Sector Institutional Structure
 © ONS (2015)

From an extensive literature research on governance solutions adopted in different countries, where power sectors have been subject to liberalizing reforms, it was concluded that the appropriate approach to modeling the governance problem – assumed face to the situation as a problem of a complex nature - its conceptual representation would be an adaptive complex system (CAS), with the creation of a corresponding modeling (for instance an

artifact), necessary and sufficient to inform the appropriate architectural and operational conceiving to design a governance solution.

A search for concepts and tools suitable for this purpose, an adaptation of the M3-model was developed and its validity was tested as for the SEB, in the traditional research terms in Design Sciences.



The appropriateness, relevance and effectiveness of the artifact developed was studied, seeking to evaluate pragmatic gains in supporting the project for better governance solutions in the Brazilian context, taking in account: the individual researcher and his long experience in the sector; the advisors; a focus group composed of 11 senior experts; and analysis, discussion, diagnosis and guidance workshops.

The work points to the significant potential on the use of the model created in the formulation and implementation of the SEB's public governance system, illustrating its use in an off exercise as one of the governance mechanisms prevailing in the sector.

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The Evolution of Information Processing Systems

Developing the notion of information further for a systemic analysis of evolutionary processes

Annette Grathoff

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Evolution happens in complex systems as these contain multiple components which react and adapt to patterns which they themselves produce. Those patterns are the macroscopically effective conglomerates of behaviors, which are - like the components - grounded in information. It will be presented, why information is an organizational as well as a physically instantiated concept. A *general* definition for information is introduced, which comprises both the causal-syntactic-aspect of information from Communication Theory by Shannon (Shannon & Weaver, 1972) as well as the effect-meaning-aspect of information known from Mackay, Bateson and Bateson's famous "difference which makes a difference" quote (Bateson, 1979).

General definition of information:

Information is instantiated by processes where part of the energy produced is exported, i.e. made non-available for a reverse reaction. A difference between the blocked reverse reaction and its environment (from where the "missing" energy can't return immediately) is produced.

This difference can be expressed as information. Information is the relationship that forms between components in such processes and it has two defining properties:

1) *It is instantiated;* its erasure affords more energy to be directed into exactly the process which can cause its erasure than is available for this process from its environment (Structural invariance). Like Shannon saw it: A choice is the source of information. And Information is a stored choice.

2) *It is affecting selective processes;* constrained relationships between components of a system as well as between components and regular environmental inputs forbid to arbitrarily change the way of being selectable as well as being itself selective. That is Bateson's difference!

Information understood more generally is a valuable concept to describe and analyze processes of evolution reaching farther than only to the biologic part of evolutionary processes. This concept allows for a multilevel approach.

It could help in bridging the seemingly deep gap between nature and function of non-living physical and living as well as purposeful systems.

What this has to do with information:

Changes to the structural information in the environment:

Relative distance between human individuals reduced

New selection criterion for plain and even streets

Preexisting street infrastructure and habits from horse based transportation system on hand for fast adaptation

Accumulation of new types of waste

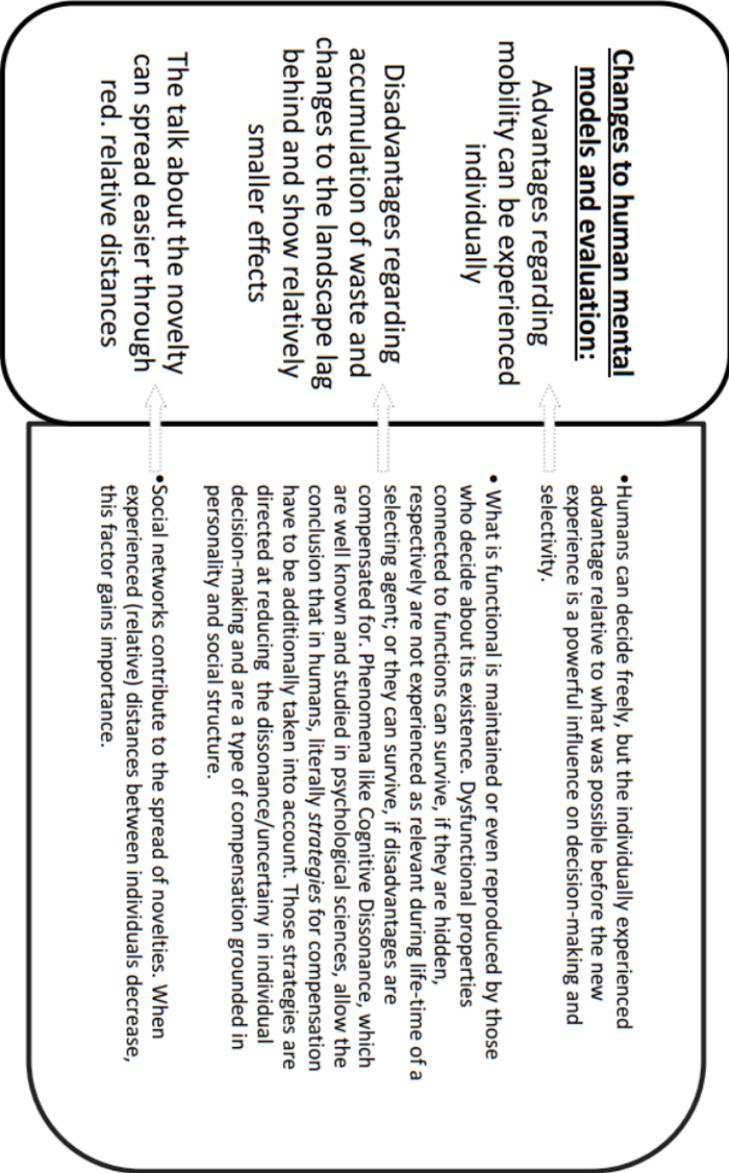
• Important regarding communication networks. Networks are sensible to constraining information and abolishment of existing constraints. Since WATTS and STROGATZ published the small-world networks in 1998, and BARABASI and ALBERT published the scale-free networks in 1999, interest in network evolution theories revived.

• New selective criteria/demands entering a system lead to restructuring. Human concept based communication allows debating before destruction of old structures . Information organizes creation and destruction.

• The presence of structural information similar to the newly demanded one (with low variance regarding applicableness) and to which the system is used already facilitates the establishing of new consumers since the adaptation process itself is guided by humans i.e. from the outside.

• This is a difficult problem as soon as the waste accumulates observably or - in the case of fine dust - can be experienced individually as a risk. But news about individual observations, too have to accumulate first to have effect.

A more general definition of information applied to “evolutionary” processes in an unusual example. Regarding storage of choices and influences on (future) selectivity: Are the differences as huge as it actually seems?



The invention of cars changed the direction of subsequent developments. Cars have a characteristic identity as energy consumers and waste producers in environments. Their design determines the need for “nutrients” and “ecological niches” which were not given in regular human environments from the beginning.

Let me inspire you to see the advantage which the generalized information definition offers for explaining a probable course of events which supported the development with the (seemingly playful*) example shown in the figure.

Bear in mind the core of the concept: *Information is something that can be stored and that influences selection processes.*

Some of the described phenomena can easily be seen as events of information processing, like the spread of information in social networks or the communication of advantageous experiences. Other concepts are not connected to information and information processing at once. They afford a change in perspective to be construed as such.

But the fact that they all are supported when considering 1) & 2) perhaps shows that it is well worth to work on a generalization of the information definition for the systems sciences.

The work presented allows addressing the important question: *Is there an evolution of information and of information processing systems?*

The reason why this seems important is, that if the answer is “yes” the question following would be: Which factors can impact this evolution and how? Both questions could be of certain relevance for future research and not least for our future development of the Intentional Environment we build and build.

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* Especially the words in quotation marks are a play with context and technical terms, but also this is not just for kidding. It is based on Koestler’s idea of the premise for creativity to be triggered by a change in perspective. According to his Bisociation Theory, the creation of new information can best be witnessed in jokes, when events or elements out of different contexts clash together culminating in the punchline, where understanding is coupled to laughter (Koestler, 1964).

Citizen's Game – Playing Society

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The previous work frame *Ein opulentes Spiel mit Design: Das Spiel mit Stadt und Bürgern* [Opulent Game with Design: Game with City and Citizens] presented to the faculty last year, was based on the idea to deal with the concept of a “citizen’s game” which would equally encompass both the network of interactions including cooperation among citizens on the one hand and their experience of community life and its collective embodiment on the other. The explicitly innovative aspect of the concept involved here is that of a design which is actually omnipresent in daily life: At every time, everyone is a designer - primarily of the social environment and thus of society itself (Aicher, 2015; Hirdina, 2008).

This present exposé seeks to further clarify the research objective as sketched out above. The announced paper is meant to illustrate the conceptual background which is necessary in order to create a “citizen’s game” that invites the players to recognize themselves in the first place, and then to involve them (to engage them) in society (Zimmermann & Wiedemann, 2012).

The game developed is to be understood as a model of strategic behaviour in daily life: It is organised as to four essential elements which are *playing field*, *rules of the game*, *partners-competitors of the game*, and *play time (season)*.

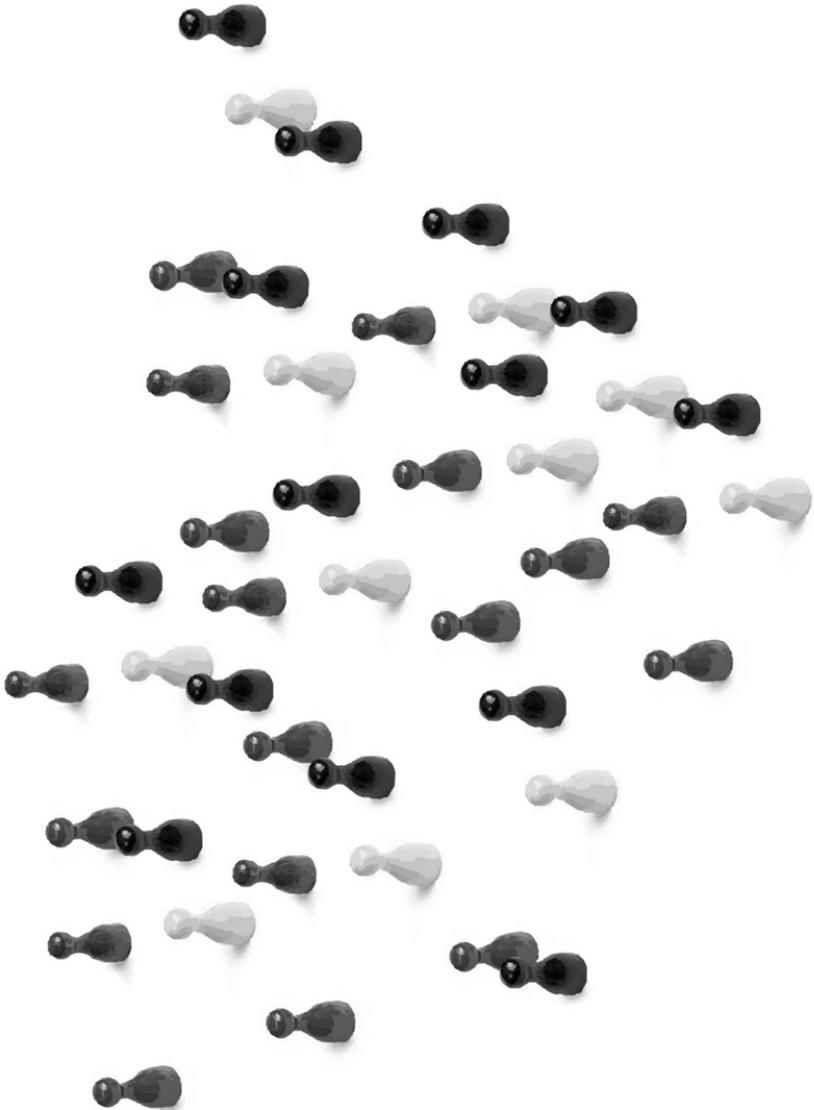
Each element will be discussed in turn as visualized in terms of system theoretical as well as design theoretical aspects. The chief objective is to further the understanding of the structure of a community which is thought of as being isomorphic to the communicative structure of the underlying social groups. By doing so, it is also hoped to develop explicit game strategies that improve the daily conscience of a social motion which is persistent and permanent leading thus forward to an improved concept of participation.

The game’s set-up (temporary changes in boundary conditions included) is structured as following: *The playing field* is seen as a snapshot of the social system involved understood as the totality of all interactions within it (Zimmermann, 2015). Therefore, implicitly, it defines the citizens themselves as social designers (Aicher, 2015; Hirdina, 2008), and by doing so, creates a space of free play which is melted into community space (Zimmermann, 2014).

At the same time, it differentiates and re-structures the social space into various domains of public and private types (Zimmermann, 2014; Gehl, 2010).

The *rules of the game*, while being a permanent characteristic, are subject to the network (Zimmermann, 2015) of interaction within which reflexion and design are actually practised (Brown, 2009).

Social space is thus created as a stable mixture of various strategies and activities (Zimmermann, 2014; Gehl,



The *rules of the game*, while being a permanent characteristic, are subject to the network (Zimmermann, 2015) of interaction within which reflexion and design are actually practised (Brown, 2009). Social space is thus created as a stabile mixture of various strategies and activities (Zimmermann, 2014; Gehl, 2010).

The *partners-competitors of the game* are the actual agents of the interaction network (Zimmermann, 2015): They motivate the actions undertaken and perform social motion proper (Moebius & Schroer, 2010). Essentially, they follow the rules mapped in terms of game theory. Their explicit interactions demonstrate thus the interdisciplinary character of the approach (Brown, 2009). Consequently, these interactions are discussed in terms of dynamical processes intrinsic in the modern theory of systems (Zimmermann, 2014; Zimmermann, 2015).

The *play time (season)* is visualized as the genuine simultaneity of macro-levels and micro-levels of the system involved, in fact, still influential beyond the system's boundary (Zimmermann, 2015). This simultaneity can be understood as a reflexive model of the interaction of the system's spatial closure as well as opening within its characteristic dynamics, and also as the Mediation between personal encounters within the mediation of private and public space (Zimmermann, 2015; Zimmermann, 2014; Gehl, 2010).

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A Treatise of Entirety

Magda C. Kaspary

Interdisciplinary HR

Examples of flattening vertical structures and non-traditional power distribution¹ illustrate how our zeitgeist is marked by emergent ways of thinking and organizing our society even as we² also face fear and scarcity³. However, what might happen if we create a different societal framework to strengthen collaboration and develop more sustainable human-to-human and human-to-planet relationships?

In workplaces, professional specialization, lack of intercultural readiness, geographical dispersion, and flexible types of employment are some factors that might be in play to create silos and disengagement, not membership. To address these circumstances, some individuals try to move outside disciplines to dwell in a land of possibilities. The present work aims to explore another possible movement that is to connect diverse disciplines together.

If we can foster dialogue with different disciplines we are also dwelling in a land of no disciplines. Moreover, we might be fostering collaboration and sustainable relationships through a basic principle of systems thinking: connection.

A Treatise of Entirety is both a stance and a method. As a stance, it ignites opening ourselves to the other (new, different, contrary, non-related) and to inspire us to be willing to coexist and create together. As a method, it calls for multiple partners to voice their contribution in order for a system to meet its *entirety*. In other words, a Treatise of Entirety requires an internal and external action towards others perspectives. It is a journey of weaving different threads together, with the intention of fully accepting other perspectives, so that a system can become more knowledgeable about itself.

¹ i.e. www.liberatingstructures.com, social media platforms addressing social problems, new ways to deliver education, transportation, eco-villages, etc.

² This paper is written in the first plural person ‘we’ because it is including the researcher in the tessitura and it is nested in a collection of voices and contributions that blended together and made this content emerge.

³ i.e. Syria crisis.

As an attempt to define what an *entirety* stance might be, Figure 1 also illustrates the method⁴ of connecting different bodies of knowledge. This figure offers one possibility, though many other connections can be created to foster its singular effect to participants. The illustration portrays what happens while individuals interact with the method, but does not define predictable outcomes (Morin, 2005).

As shown in the illustration the basis of an *entirety* stance are: Transdisciplinarity (Nicolescu, 2002) Dialogue (Buber, 2010), Affection (Spinoza in Deleuze, 2002), and Alterity (Levinas, 2008). The concept of Love as a way of being (Fromm, 2013) exists at the heart of this stance, while the three concepts of Complexity (Morin, 2005) – dialogic, hologrammic and organizational recursion – operate for all concepts.

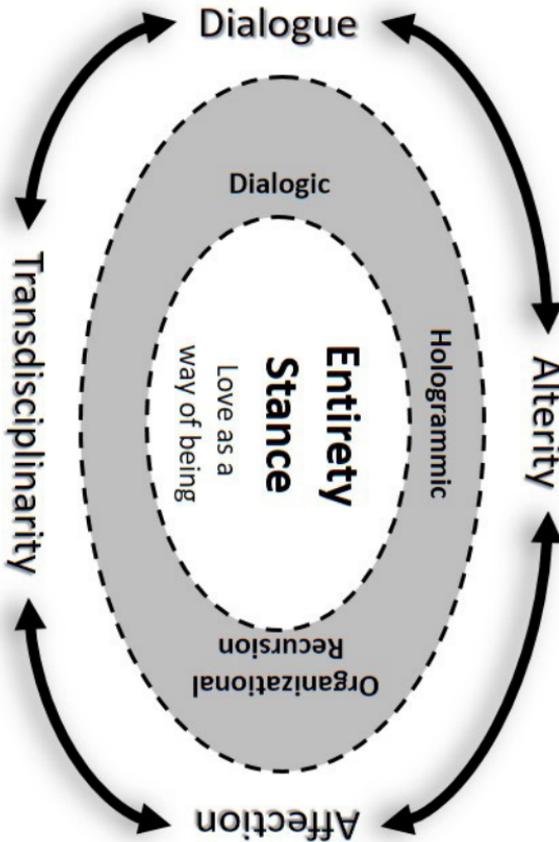


Figure 1
An Entirety Stance

Entirety differs from wholeness in that entirety relates more the internal quality of a system; it inspires a state of perception like poetry, involving how much a whole accesses itself; it is about subjective extension and depth. Entirety encompasses the process of a system being actively cognizant of itself, including its meanings, impacts it receives and causes, and its fears and aspirations. Likewise entirety provides the awareness of subjective constitution and flow, as well as being mindful of the genuine human condition as an individual and member of multiple groups from family to society, in transgenerational and planetary perspectives.

Without a call for a treatise, if we do not consider opening ourselves to the relational, the context, the continuum within which each of us lives, we will never access our *entirety*.

Further, this work is based on the premise that one or a few perspectives do not nurture entirety. Rather, only the encounter and communion with others will inspire a system (individual, team at work, in communities, or family) to exercise its entirety. Ultimately, the acceptance of the different is the acceptance of itself - our society can use the available knowledge of all times to foster the collaboration, genuine life-work connection that is Entirety.

The ultimate desire for workplaces, is to find ways where we might experience Entirety. Because we invest so much of our life energy there by expressing our identity and experience belonging, our workspaces provide the ultimate opportunity to practice Entirety as way to realize deep gladness as unique human beings.

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Governance from below in times of crisis: A participatory turn

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The EU system suffers from an unexpected political, economic and social crisis. Some nation states (such as Greece, Spain, Portugal) are facing not only harsh austerity measures, increase of taxes, lowering of wages, rise in poverty and unemployment rates, but also a loss of sovereignty and a rise in social inequalities and injustices, which endanger the integrity and social cohesion of the Union. Under these circumstances the regulatory powers of nation states are limited and the level of citizens' trust in governmental institutions is significantly decreased. European leaders have taken steps to foster trust in the European project and increase the participation of citizens in policy-making. A typical example is the European Commission's "White Paper on European Governance" (2001) aiming at creating "a transnational 'space' where citizens from different countries can discuss what they perceive as being the important challenges for the Union". This attempt intended to include citizens' voice in public policy, enhance democratic participation and improve the relations between the people and the policy-makers.

The "European Citizens' Initiative" (ECI) is a recent effort introduced by the European Commission with the intention to encourage citizens' participation in the democratic life of the Union. This initiative would give the opportunity to directly influence EU policy by proposing laws and legislation. Despite the efforts to involve civil society in decision-making, the EU governance from above seems to be disconnected and distanced from its people.

In the current crisis, the necessity for a powerful civil society is more than imperative. The emergence of bottom-up (voluntary) initiatives and social movements aims at forming a system that differs in quality from the system before. Thus, marginalised and disadvantaged groups of citizens create new communicative spaces for resistance and representation in order to make their actions visible to the community and question the existing governing structures.



The Express Tribune with the International New York Times, Retrieved from:
<http://tribune.com.pk/story/608689/true-democracy-experts-debate-best-form-of-governance-for-pakistan/>

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This work emphasises on the *governance from below* that has emerged in Greece, Spain, Germany, Romania and the UK during the economic crisis. In particular, it discusses the Greek “we don’t pay movement” (initially against the highway tolls), “without middlemen movement” (against the market intermediaries) and the “anti-gold mining movement-Skouries movement” (against ore mining for the protection of the environment) in parallel with the Spanish “stop desahancios platform” (against eviction), the British “NHS social movement” (against the privatization of health system) and the Romanian “Save Rosia Montana movement” (against the Rosia Montana mining project) in order to analyse the rise of transnational dialogue in the European continent. Apart from that, it is explored how active citizens create networks via the use of Internet technologies, mobilise others, search for new ways of managing resources, create solidarity networks, support education and knowledge exchange, campaign for a better and sustainable

environment, provide health facilities, form identities and organise their actions towards a deeper form of democracy. Even though social movements consist of various groups that have different conflicting interests, they have managed to cope with their diversity.

Governance from below provides alternative and innovative ways for social organisation something that Europe needs today. The rationale of this work is that *governance from below* can serve as a model for the participatory design of the whole society, it can serve as an ideal example for governance from above to cope with its deficits and promote cooperation and social relations across all societal levels.

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Informal social space in an urban heterotopia. The social reality of the outrooted.

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After the end of the Greco-Turkish war in 1922 and the reciprocal population exchange between the two countries, stipulated by the Treaty of Lausanne, Greece confronted a major refugee influx whose aftermath was deeply engraved in the country's social and urban reality. One of the settlements established, in order to host the population fleeing from the cities of Anatolia, was Nea Kokkinia. Thousands of poverty-stricken refugees were sent in a muddy region in the west of Piraeus, outside the urban fabric, in a former garbage collection area. Their utopia-which they struggled to reach, escaping from the hostile reality of war and persecution- was actually found on the other side of a *heterotopia of deviation* (Foucault, 2008); a space, outside all spaces-located in the margins of urban and social normality- that disrupted the usual order of things. They settled there, in small, shanty lodgings, in a district with no proper water supply system, electricity, drainage or transportation network. The settlement was formed as a ghetto. Refugees were not welcome by the natives and the State's objective was to ensure that the separation between the two would remain intact. Thereafter, the area could have rapidly become uninhabitable. However, it did not. This can be attributed, to a large extent, to the social life flourishing within its slummy urban surroundings.

In Nea Kokkinia, refugees were sent in a dreadful location but they were allowed to settle there, to root. From that point onwards, they were not stateless anymore and thus they were not rightless (Arendt, 1995). Unlike the camps that are currently developed in Europe, to host the refugees from Syria and Afghanistan-like the one in Elaionas district in western Athens, operating since 2015- in Nea Kokkinia the continuous ephemerality of the refugee settlement, that purposely renders its occupants as lasting pariahs, was abolished. The heterotopia of deviation acquired a permanent position in the urban environment. It was still a space outside all spaces nevertheless its occupants obtained not only a shelter, but a place in the world, a home; the primary condition and commencement of human activity itself (Levinas, 1979:152). It was at that point that their state altered from refugees to expatriates. Their trauma remained, but their exclusion from *bios* (Agamben, 1998) and thus from social and political life, began to fade. Through the established permanency of the settlement the refugees were allowed to re-establish their being in the world; their rights to dwell, to work- and thus improve their urban environment- as well as the right to conceive, perceive and experience social reality and therefore, to produce space (Lefèbvre, 1991).



View of the current condition in a neighborhood of Nea Kokkinia. The samples of the refugee settlements and the initial urban layout are still preserved.

© Kanelia Koutsandrea

The urban layout of the district- following the Hippodamian city plan- the buildings' arrangement in each block, around a spacious, shared yard, the narrow pedestrian streets interjecting the main street network, the small scale of the houses and their typology, favoured the emergence of an interesting crisscross framework of private, public and semi-public spaces. The living room appeared on the street, and the street moved inside, in the living room. Courtyards, side streets, balconies, shared staircases, roofs; they were all used as areas of social habitation.

They were cores of encounter, play and festivities; informal theatres, dancing rooms, football courts and plazas. The top-down planning process of the State provided, only, low quality shelters for the refugees. The bottom-up initiative developed the informal framework for social engagement and cultural advance. Via the development of social space the refugees in Nea Kokkinia, being violently deprived of their place of origin, instilled their experiences and desires in that new space and reflected their cultural, collective identity upon the social reality they produced. Thus the displaced were implaced anew.

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fluxum mirum

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Cities are such *complex structures*, as if they would be alive. Everything is interconnected, but we still believe that we – as part of cities – own the power to plan and predict them by focusing just on their parts instead of embracing the whole.

Living organisms are made of cells as smaller structural and functional units. Scaling down - cells are encoded in a DNA string which carries the important information, encoded by only 4 nitrogen-based molecules or nucleotides. Any change in their order causes changes of the whole organism in total. Difference between two genes is not in elements from which they are created but in their *arrangement*. This means that only studying relationships between parts of the gene and their sequencing tells us about its characteristics, to study one single nucleotid isolated makes no sense.

If a city would be a non-biological but still living organism, it could have a special *dual character* from the human perspective. As a space for living, as an ambient it is *external* to people, but at the same time a city without people would never exist - people form an *internal* part, a city is part of ourselves.

By describing the city as external, using a grid reference system according to several criterions concerning e.g. heterogeneity of buildings usage, accessibility by public transportation, green spaces or social interaction points, we create a certain overall frame of information or initial spatial arrangements.

As working with the premise that nothing stands alone, not only the same systems are interacting with each other horizontally, but there is also interaction between different analysed systems e.g. what influence would a change in accessibility cause on green spaces. Changing relationships among elements and their neighbours, effects and spreads through feedback loops further. Even if situation in one quadrant remains apparently stable, its descriptive value can still change affected by events happening in adjacent parts.

Internal parts of the city as an organism are dealing with knowledge generated by everyday life praxis of city-practitioners as explained by Salvatore Iaconesi, Oriana Persico, emotions, connections to the space through which will be space covered by different amplification layers. No citizen lives without causing or dealing with impact on/from his/her surrounding. By detecting the possibility of *having impact*, we are already experiencing it.

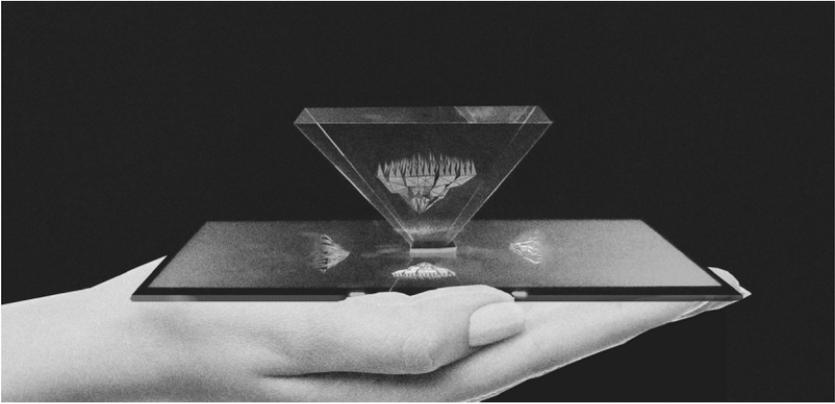


Image 2
Hologram

Creating a *3D hologram*, published in the internet, by downloading it in your cell phone could provide a new way of reading or even writing the urban surrounding. City would be presented as an organism, a not yet known or discovered specie, levitating in the small prism.

Envisioned would be the ability to communicate with such organisms, how they feel you and feel the rest, see how you are part of it, what change could you bring.

A dynamic understanding of systems is the future as only constantly changing and developing *fluid concepts* can answer to the complexity of reality that we are dealing with. *Soft interventions* should be re-evaluated and seen as an equally powerful medium of change or as a tool to keep city organisms in *homeostasis* – in a state of relatively stable conditions.

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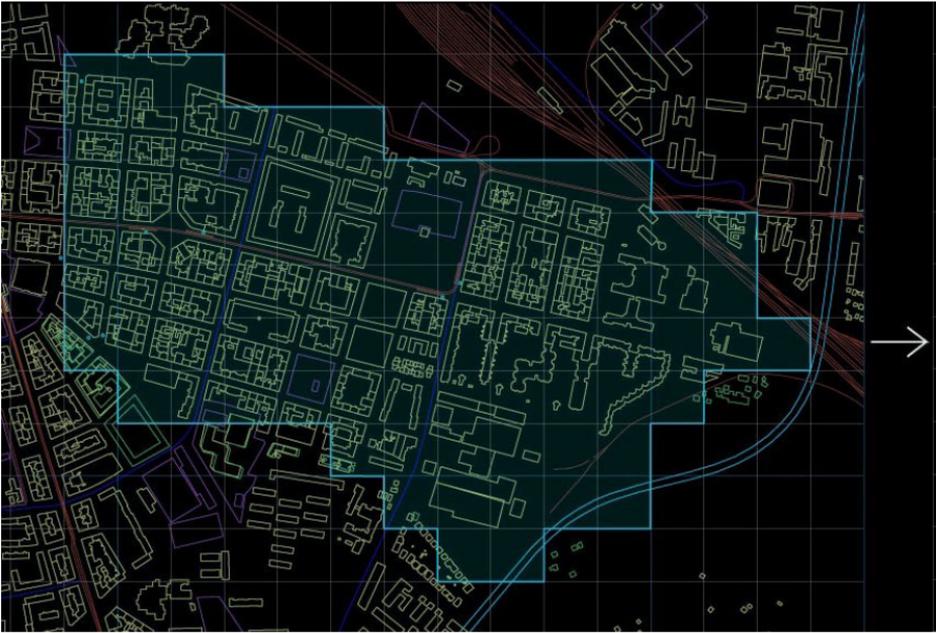
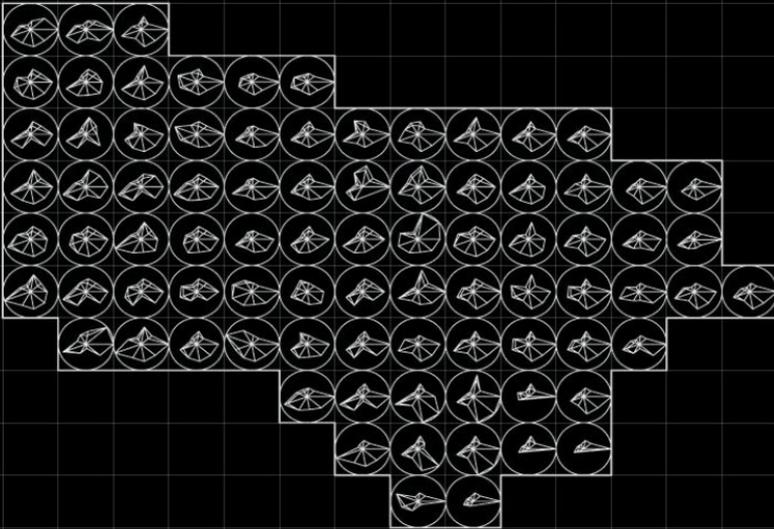


Image 1
City grid turns into system

By combining the internal and the external part or relations between inhabitants and their cities - a city organism will come alive as a *hybrid*, visualise invisible impacts, linking together unlinked parts and recognizing patterns that have not been seen before.



The city conceived as organism belongs to everyone or is part of everyone, it should be accessible and general *understandable*. Complex systems as cities are often too overwhelming by their size and plurality, so we get drowned in information, assuming that it is just much bigger than us.

A Robotics of Trivial Mechanisms: The Pirouetting Picket Fence

From Trivial Embodiment to Complex Behaviours

Abdulbari Kutbi

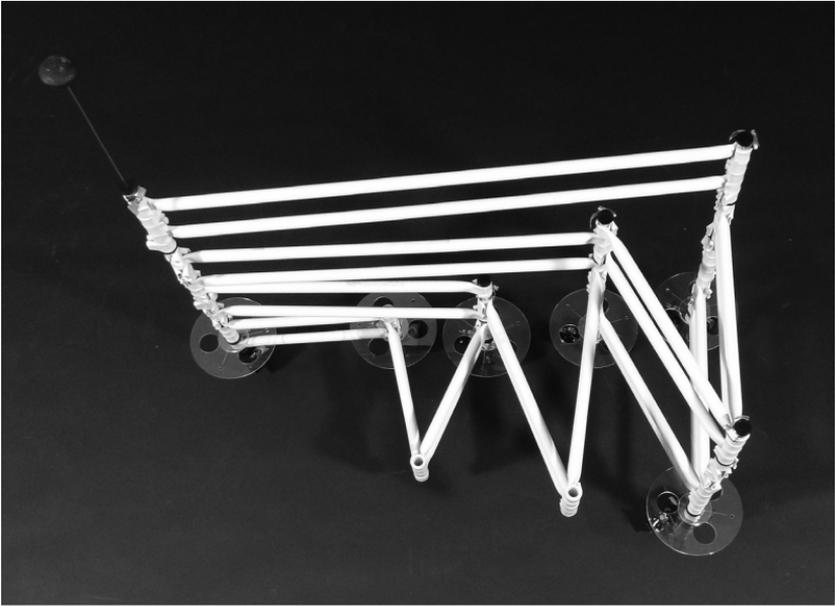
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After the tradition of Brooks in behaviour based robotics, research into embodiment has developed through virtual models more than experimental devices, focusing on hybrid models of embodied components and virtual control. Maturana & Varela (1991) first proposed the concept of 'structural coupling' as a description for the dynamic information relationship between agent and environment. Since then other works sought to define and explore the possible contributions of embodiment to robotics in the real world. However, little has been done to explore the potential of embodiment through experimental devices, specifically through a combinatorial approach concerned with expanding the grammar of embodiment and intelligence through environment-agent coupling. On the other hand there is an abundance of research on embodiment and distributed computation conducted through virtual models.

Distributed computation emerged as a theme in robotics since the work of Brooks (1999) concerning alternative methods for organising sensing and actuation in robots, dubbed 'behaviour based robotics.' Such methods utilize digital sensing and actuation to recall behavioural decisions often organised as layers of control in variously distributed manners (almost always in a virtual way).

The following paper presents an application of distributed computation through reactive, non-digital, physically embodied behaviours. Such reactions are utilized to generate meaningful actions on and in the real world. The work addresses Rodney Brooks' behaviour-based robotics (1999) and Chandana Paul's 'Latent Morphological Computation' (2004); both having previously emphasized the capability of response data to generate computation through actions rather than virtual processes. The approach outlined achieves such aims purely by means of 'trivially' embodied mechanisms, designed as computational elements that, in combination, output navigational decisions within a simple, structured environment.

An experimental robot was built that links embodied sensing and reacting within an adaptive skeletal morphology (composed of radial arms linked to each other through a pivot). A series of experimental trials are recounted as having produced observable behaviours including changing configurative choreographies and navigational choices in relation to the environment.



The decision capacity of the robot includes turning corners, tracing the outlines of basic shapes, and adapting its form to a constrained space, furthermore, the collective actions of the robot implied a character of inquisitiveness and curiosity about its surroundings. An analysis of these behaviours is used to argue that basic mechanical systems can be organised into colonies of computation generating nodes to accomplish direct behaviours.

During this paper, the author offers possible insights by extension of the work into the potential for and application of embodied intelligence and distributed computation in the design of complex systems, including those of an architectural nature.

Film: <https://vimeo.com/153281505>

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Virtuous cycle of respect - solving Europe's social capital crisis

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The Western world is still recovering from the 2008 financial crisis. Tragically, large refugee inflows, together with lingering income inequality effects from the financial crisis have triggered a yet another crisis, this time around social capital. Populism and xenophobia have divided societies, often around class boundaries while many struggle to find work and stability. Social capital decreases, causing societal unrest, violence and self-centred mind-sets.

It is this paper's goal to outline a conceptual strategy for addressing the social capital crisis taking place especially in Europe. We hope to restore social capital through reviving peoples' respect for one another. We use methods from sociology, philosophy and systems theory to operationalize social sustainability.

Social capital is understood in this paper as an informal social safety net a person can rely on. First, people have their personal relationships with close acquaintances, such as family and friends. Second, there are non-profits and public entities people rely on for help. Social capital is mostly created through collective belief. We acknowledge that social capital can also be understood as relationships between people and places or things. However, as described above, the current social capital crisis is mostly driven by the deterioration of interpersonal social capital (Putnam, 1995).

We reason the following hierarchy between different levels of relating to others. Respect is at the base of the hierarchy, it is the lowest level of relating to others above which are understanding and on the third level empathy. Respect is a necessary precondition for understanding, which in turn is a precondition for empathy. Following Immanuel Kant's ethical theory, we consider respect to be the moral obligation and mind-set to treat the other as an end to itself. Respecting others means, for example, putting aside prejudice when interacting with other people and in general treating them as you would treat yourself (Stanford Philosophical Dictionary, 2003).

We argue that systemic change towards increase in social capital can be achieved via developing a mind-set of mutual respect. The smallest thing a person can do for another is to respect them as an equal, another human being. This small gesture of interest allows the other person an opportunity to express their values and interests. This in turn helps the person who initiated to understand the other a bit better and invites respect towards the initiator as well.

We note that this is a virtuous cycle that generates social capital. Respect strengthens social ties, makes people more likely to cooperate and interact and might even result in empathy. Therefore, respect should be the basis for any behavioural engineering policy that aims to solve the prevailing social capital crisis.

We do not promote empathy as a goal since empathy seems to be much harder for adults to learn than the simple mind-set of respect (Davis, 1990).

Respect, however, can be learned and promoted by responsible actors in society at large. Its role in school curricula also needs to be strengthened via local democracy, role play and other applicable didactic methods (Weissbourd et al., 2014).

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Das Kapitalismustribunal

Haus Bartleby

Das Kapitalismustribunal geht systematisch einer anthropologischen Konstante der letzten 300 Jahre nach: Der Gefährdung der Lebensgrundlagen auf dem Planeten sowie dem Verhältnis der Menschen untereinander im ökonomischen System.

Die Ausgangsfrage, die ergebnisoffen gestellt wird und beantwortet werden wird, ist die folgende: »Ist der Kapitalismus ein Verbrechen?»

Um die Antwort auf diese Frage nicht nur Wissenschaftler*innen zu überlassen, haben wir die Seite kapitalismustribunal.org entwickelt, programmiert und in vier Sprachen online gestellt. Auf der Seite ist jeder Mensch kostenlos anklageberechtigt und dazu aufgefordert, von seinen eigenen Erfahrungen und Erkenntnissen im Leben im Kapitalismus zu berichten. Für sich betrachtet bereits eine konzeptionelle und technische Novität.

Um die Sache bekannt zu machen und das kulturgeschichtliche Feld des Prozesses aufzufächern, haben wir im Juni, Juli und September 2015 drei Vorverhandlungen mit Expert*innen und Wissenschaftlern in Berlin-Neukölln zu den Themenkreisen durchgeführt und dokumentiert.

Das Theater Heimathafen Neukölln war jeweils bis auf den letzten Platz besetzt (d.h. jeweils 425 anwesende und frage- und statement-berechtigte Menschen).

Am 01. und 02. Dezember 2015 fand im Berliner Haus der Kulturen der Welt die Konferenz zur Prozessordnung des Kapitalismustribunals statt. Die Prozessordnung regelt das faire und dialektische Verfahren in 92 Paragraphen. - Zu den jeweiligen Kooperationspartnern und beteiligten Wissenschaftler*innen lesen Sie unter diesem Text eine übersichtliche Aufstellung!

Am 25. April 2016 erscheint die Anthologie zum rechtshistorischen und kulturwissenschaftlichen Hintergrund des Kapitalismustribunals. Hierin legen Wissenschaftler*innen, Schriftsteller*innen und Künstler*innen aus Europa und aller Welt zu einem herausgeberisch umrissenen Themenfeld ihren eigenen Zugang zum Kapitalismustribunal dar.

Im weiteren Verfahren wird nun jede eingegangene Anklage verhandelt. Die erste Gerichtswoche (Prozesseröffnung) findet statt von 01. Mai 2016 bis 12. Mai 2016.

Hier wird unter den sieben Themenfeldern des Tribunals jeder einzelne Fall eröffnet durch Verlesung der Anklageschrift, erster Gegenrede der Verteidigung, unter Anwesenheit einer Jury als Teil der Versammlung, sowie unter Moderation der Richter*innen.



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Teilnehmerinnen des Kapitalismustribunals sind u.a. Saskia Sassen, Alon Harel, Louis Klein, Wolfgang Nesko-
vic, Srecko Horvat, Hans-Peter Müller
(Humboldt-Universität), Volker Lösch,
Batseba Ndiyaie u.v.a.

Es wird entwickelt und durchgeführt
vom Haus Bartleby - Zentrum für
Karriereverweigerung, Berlin.

In Kooperation mit:
The Club of Rome, brut Wien, WerkX,
FluxFM agora42.

Förderung:
Fondation Charles Léopold Mayer,
Heinrich-Böll-Stiftung, Rosa-Luxem-
burg-Stiftung, Friedrich-Ebert-Stiftung.

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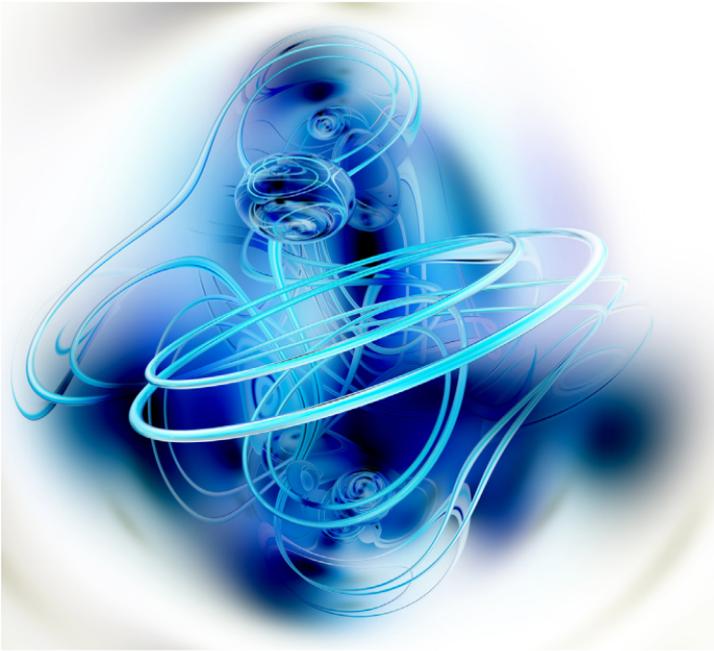
Using a Viable System Model in the Design of the Communication System at Zagreb University of Applied Science

Sergej Lugović, Predrag Valožić

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In academic organizations, vertical and horizontal feedback loops can control functions. The institution's structure creates and enforces the vertical ones, and the horizontal ones are embedded in the institutional social systems. They could be understood as two kinds of control systems. The first system (vertical) consists of explicit controls manifested in organizational rules, regulations, and structures. The second system (horizontal) includes implicit controls developed through group interactions resulting in shared attitudes and group cohesion. These two systems are doing two things. First, they make minor adjustments in the ongoing organization process to keep it functioning within acceptable limits (such as signaling budget excesses). But, if these minor adjustments are not enough to keep a system working within agreed limits, then there's information that something is wrong. Something similar happened with the communication system in Zagreb University of Applied Science (ZUAS). In the process of ISO standard implementation, issues related to internal and external communications emerged. There were no clearly defined channels for communication related to external stakeholders. Internal communication procedures were also weak, sporadic, and informal.

As the weakness became clear and visible, the authorities formed a task force to tackle them. For the beginning, the task force sent open-ended questions to the employees and students to explore the state of the communication system and to locate where it needed improvement. After the task force received the results, using the ground theory approach, it clarified more detailed communication-related weaknesses. One of the main findings was that there was no formal communication system in place at the organization level. But then, the question was how to design a communication system and where to start. The task force decided to evaluate different available system frameworks in terms of their applicability to the institution. Since the institution is primarily focused on engineering education and cybernetics principles, the task force selected Stafford Beer's Viable System Model (VSM) as an analytical framework. In this particular research, use of the VSM showed multiple benefits. First, it was an analytical framework to support development of research questions; second, it helped to map organizational functions and how they're structured according to the VSM; and third, it analyzed communication channels and identified communication "bottlenecks."



Fractal
© Predrag Valozić

Also, the VSM was useful in the system's understanding of the focus along sub- and super-systems, and principles of recursion, embedded in the VSM, became useful. The VSM also provided a stable point of reference in the iterative process of a communication system design. Along with the process of data collection and analysis, the VSM received the findings continuously. The next step of the project planning reflected the VSM outputs. After the first round of interviews, the team made major changes to the initial map of the organization's functional structure using the VSM. After the workshop conducted with the core project team, different systems received new organizational functions proposed by the VSM.

After the agreement about how to structure the institution's functions according to the VSM, one unexpected thing happened. Functions that were missing or were very weak in terms of information and resources capacity apparently started to emerge by themselves without any particular formal, top-down intervention.

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Noise: A Philosophical Investigation from the epistemological question to the problem of normativity

Dr. Cecile Malaspina

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The following abstract is based on a recently defended doctoral thesis, in part developed during my participation in the EMCSR gatherings in 2012 and 2014. This paper addresses the place 'noise' occupies with ever rising prominence in technological and scientific discourse. When we talk about 'noise' in the financial markets, in molecular biology or more generally in statistics, it no longer appears to have any relation with 'unwanted sound', but instead designates aspects of statistical variability, physical perturbation or error in signal transmission. As a result of cybernetics and information theory 'noise' increasingly denotes unpredictability and uncertainty in information systems and has now become a term that generally refers to *complexity* in systems.

Immediately related to this conceptual transformation of 'noise' is the *movement* that underlies this conceptual transformation of 'noise' itself: namely the fact that the notion of 'noise' changes as *it moves* from one theoretical context to another - historically speaking today's understanding of 'noise' comes to us from the merging of the pure calculus of probability and statistics, from where the idea of unpredictability entered astronomy with the 'law of errors', before moving onto thermodynamics where it subends the notion of 'entropy'.

From 'entropy' we then derive the concept of 'noise' in information theory and cybernetics, which has not ceased to proliferate onwards toward other fields (from molecular biology to complexity theory etc.) In other words there is an inter-disciplinary *transfer* of the notion of 'noise' that implies a *distortion* of the common-sense notion of 'noise', but also a continuous *mutation* of its conceptualizations.

Even the commonsense notion of 'noise' is far from constant, having been shaped by 'noise abatement' campaigns that started with industrialization and culminate in today's notion of 'noise pollution', and having moved through various frames of debate, from political conceptions of subversive 'noise' to Avant-Garde conceptions of 'noise' in music and art. Could it be that 'noise' is not only what we are talking about with regards to an increasingly varied set of phenomena, but also what *happens to the clarity of the notion of 'noise' itself, when it is transferred between theoretical contexts?*



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The objective of this paper is to analyse these conceptual transformations of 'noise'. However, at stake is more than a mere generalization of unwanted sound to other forms of perturbation. Instead 'noise' leads toward new and deeper understandings of contingency. These new ways of approaching contingency fuel the continual mutation of the concepts of 'noise' into new fields of knowledge. The dissemination of 'noise', in turn, implies that there may be a *complexifying* movement that drives toward pluralism in the sciences - and it is not certain to what extent this pluralism can be recuperated by a paradigmatic use of the notion of noise, cybernetic or otherwise, if the notion of 'noise' itself is no longer unified. What is certain is that this development toward a plurality of fields of knowledge implies a significant transformation of *the field of knowledge as a whole*: 'noise' therefore becomes an *epistemological* concept when its new and multiple understandings of contingency challenge the modern, Cartesian Method of eliminating uncertainty. Perhaps surprisingly, we will find that despite the increasing abstraction as purely mathematical measures of contingency, the new concepts of 'noise' nevertheless retain an aspect of the cultural value judgements they first implied, when 'noise' referred to the aesthetic aspect of unwanted sound. Just how much this cultural aspect intervenes in the objective definition of 'noise' as a scientific concept, becomes apparent when we ask:

On what grounds do we judge what counts as information and what can be discounted as 'noise'?

The heart of the argument presented is thus the ground upon which we judge the complexity of experience in order to distinguish information from 'noise'. This is how the *epistemological* question of 'noise' necessarily becomes an ethical problem of *normativity*. *Normativity* must not be understood here as merely indicating the validity and force of *existing* norms of thinking. The question of ground instead leads us to interrogate the very origin of the norms of thinking, according to which we judge what can be discounted as 'noise'.

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Life in the Age of digital reproduction

The urge to share and the architectural collapse

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The link to the digital world we hold on to reveals a very interesting feature that we should not miss. We have proved, by unveiling our private lives on the Internet that we were ready to share. From tiny facts to intimate information we feed the digital world because it's captivating and we want to be part of it. One could argue that what is shared often lacks quality, that may be true, but the desire to share is there. Through online communities people share information and knowledge, initiatives such as open-source and DIY movement or crowd funding have proven that we can work together to achieve great things.

A huge question remains though, how to find the right balance, the right interaction between the digital world and the physical one. They are two very different systems. The digital one requires a huge quantity of resources, and the physical one need us to stay focused, to care and love.

Architects use space, light and materials to create stories and atmospheres. We build environments promoting life in many ways. Though, digital technologies have been corrupting those intentions. Today we see people walking nervously, their phone or tablet in hand, looking for the best place to get access to wireless networks.

Sometimes you see someone in the most awkward position or place, just to plug his or her device into an outlet, even if this means spending hours in a broom closet. Space isn't use for itself, but for its ability to provide an access to technology. At some point, the digital world has become more interesting that the physical one.

Our digital avatars are consuming our time. We are missing the *hic et nunc* (Walter Benjamin), the here and now that makes life digitally irreproducible. Objects failed to protect us from falling into the digital world and even promoted it, but architecture can succeed. A while ago modernist architects built glass walls to look at nature and then high-tech architecture meant to undress buildings to show structure and networks. Architecture is now about icons, symbols when it should focus on life and stories. We need to undress buildings to show life and people. For instance, Japanese architecture is full of this transparency, houses are built in which you can see from the street what happens inside. The Internet allows us to be aware of what's happening all over the world, but do we know what happens right next to us?



House NA / Sou Fujimoto Architects, Tokyo, Japan, 2011
© Iwan Baan

Constant Nieuwenhuys, a situationist, raised a crucial question in his article *Another city for another life (1958)* *how can we build on top of the established forms and behaviors?* The new should not try to overcome the old too fast, and we must be careful about the steps we take. We are facing a massive neomania, everything must be stamped as new and the society only deal with very short term issues as Douglas Rushkoff says it, we are in the state of *Present Shock*.

There is something everyone should be excited about right now, we need to re-think and redesign our environments of life and the systems behind it. Though it needs to be done by building a new society on top of what is already there, not by throwing everything away.

We want to ask ourselves the right questions. The way information spread today as a never stopping flow prevents us from taking time to think and choose a path wisely. As Rushkoff mentions, technology was a dream for many as it was supposed to provide us with more time, as machines and computers would take care of our labor and work. Technological improvement is doubtlessly here, but where is our time?

The future we want is the one in which we have time to enjoy the present.

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Biomimicry as approach to sustainability-oriented Innovation in Multinational Corporations

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It's been said that sustainability is boring (Braungart, 2016). But do you know what's really boring? Corporate sustainability. Corporate sustainability is really boring. Talk about lack of vision.

But you know what's not boring? Learning from nature to be responsive, regenerative participants in the biosphere. That's not boring.

We have an immense opportunity to learn the deep lessons of living systems to guide our future vision. We are literally co-creating the future of humanity with the other 100 million organisms that live around and within us (Maturana & Varela, 1992; Capra & Luisi, 2014). And our every action is an opportunity to participate in the biosphere in a regenerative way (Braungart & Mc Donough, 2002). These other organisms provide humans with a model of how sustainable development could be and how the private sector can be a leading force in "creating conditions conducive to life" (Benyus, 1997).

Recently, more and more organizations are motivated by this vision (Benyus, 1997; Anderson, 1998; Harman, 2013). Some corporate managers and innovators are applying the principles of living systems to their business operations to have a regenerative impact. These pioneers fascinate me.

I'm particularly fascinated by the big multinationals that collectively influence every socioecological system on earth. Many corporate managers, in search of the next big thing for the market place and for their organizational contribution to sustainability, have become bio-curious.

Through my research, I explore the conditions and outcomes of innovation activities in which corporate managers are learning from nature in their sustainability-oriented innovation activities. (For simplicity, I use the term *biomimicry*, but refer to a broad range of biologically-inspired innovation including industrial ecology (Frosch & Gallopoulos, 1989), bio-inspired design (Benyus, 1997), biomimetics, bionics (Vincent et al., 2006), cradle-to-cradle design (Braungart & Mc Donough, 2002) and circular economy (NacArthur, 2013). This approach has become increasingly popular in recent decades as a private sector approach to sustainability-oriented innovation (Gleich et al., 2014). My research analyzes the use of biomimicry in multinational companies and synthesizes a framework of systemic corporate sustainability in which socioecological regeneration is the primary driver for innovation activities.

My research in innovation management has created an interesting narrative of corporate socioecological participation via bio-inspired approaches to product, process, organizational and systems-building challenges. The seven in-depth cases, with varying degrees of success, paint a relatively clear picture of why biomimicry works in some settings and not in others.

I'm particularly keen to understand the outcomes of these innovation efforts and if they contribute to corporate sustainability (Mead, 2014).



And yet, my research approach has been limited to qualitative data collection and analysis, and the ecologist in me craves more data derived from a quantitative epistemology and systems approach to better understand the phenomena in biophysical terms. The corporate sustainability agenda is ready for a system of ecological performance standards that extend beyond metaphor to understand how these large economic forces are actually socioecological forces. Although related tools such as ecosystem service valuation make a substantial contribution to incorporate living systems into economic measures of corporate sustainability, there remains a gap of holistically and quantitatively incorporating living systems into ecological measures of corporate sustainability (Winn, 2013).

When complemented by the principles of living systems, the planetary boundaries framework (Rockström et al., 2009) offers the potential to reduce this gap in understanding (Whiteman et al., 2013). The research project of my wildest dreams would be a transdisciplinary approach to the quantification of corporate socioecological participation using analysis tools of systems science to combine the principles of living systems with the data of planetary boundaries, perhaps in collaboration with an organization such as the Santa Fe Institute or the Stockholm Resilience Centre.

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Bridging/Bonding

A Networked Artefact

ludwig technique a.k.a. Johannes Payr

The Project Bridging/Bonding was commissioned 2015 by the Association for the promotion of The Economy for the Common Good

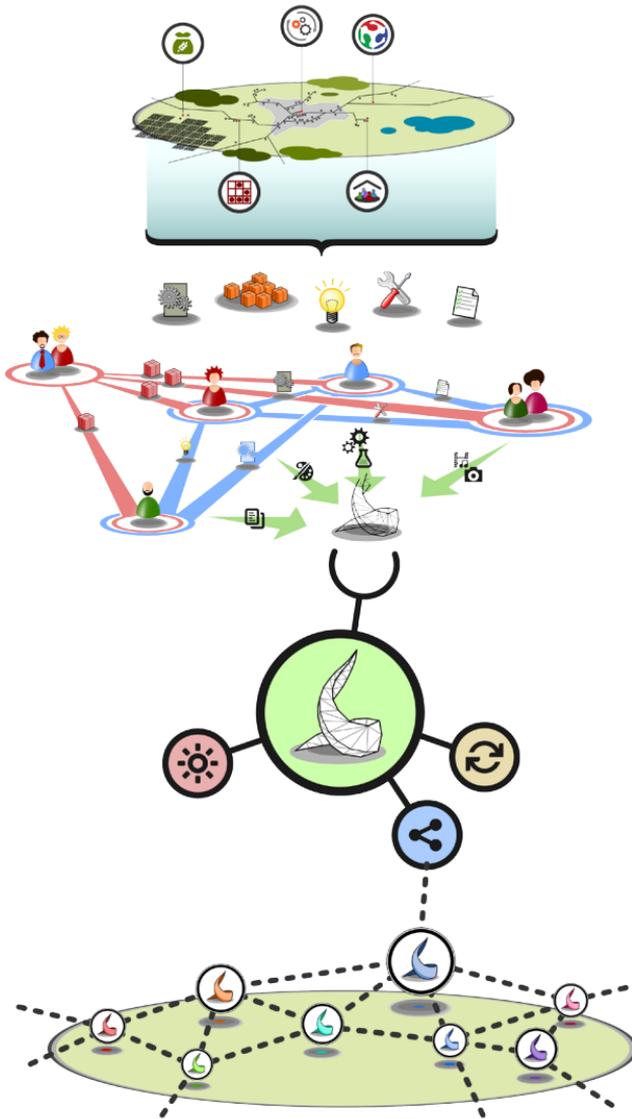
An economic model for the future

In a possible future, geographically separated communities which share core cultural values (a new culture) form a social fabric of pan-regional phyles which are connected by a networked infrastructure of Beacons. These Beacons are structures which share a common architecture, erected in central spaces or social hubs in their local communities. As churches and market places were the epicenter of social life in former times, Beacons fulfill multiple functions in the cultural entity they serve. Through their recognizable appearance, they are a symbolic representation of the common values shared by the phyle. Being physically connected, they also facilitate the exchange of information, and provide a virtual registry which enables communication and decision making processes within phyles.

Based on this utopian (or dystopian) vision of the future, *Bridging/Bonding* is an artistic project which - as many works of science fiction - aims to draw attention to a current phenomenon: The development of “global” communication and economy has given rise to a growing number of *global cultural entities* (extrapolated as phyles), which share certain common values and/or occupational similarities.

Precursors of such entities can be traced back to various art avant-gardes (e.g. Dadaism) in the early 20th century (and possibly earlier), but also to the beginnings of workers unions. A contemporary example of such an entity could be the so-called *hacking community*, albeit the question whether or not Hackers constitute a distinguishable or even *global culture* is widely disputed.

Imagining the development of these “new” social entities along the trajectories of former and existing cultures, we want to explore the nature of such *communities*. How open or restricted is the access to shared knowledge, infrastructure or communal means of production in reality? Do groups providing infrastructure or knowledge for communities see themselves as *political* entities? What implications may arise when a community grows into a social structure which resembles a *phyle*? And why do attempts to “unify” such communities globally rarely succeed?



Bridging/Bonding is an open source and crowd-built artwork which consists of many distributed interconnected objects. These *Beacons* are both representational *artifacts* (objects of identification) and evolving *sources of information* for the communities which utilize them.

The (re-)production and assembly of the objects is intended to be a collaborative activity which brings people and groups together, both on a regional (Bonding) and on a global (Bridging) level.

In the first iteration, computational units in the Beacons are fed with information about affiliated organizations in their vicinity (e.g. maker spaces, co-ops, community production centers etc.) which is displayed as an animated media collage. As the project evolves, more objects will be built by like-minded people in other regions and together share their local information over the network. The compiled registry containing the collective knowledge and capabilities of all participating communities will be accessible on the internet and directly via the Beacons. The first prototype, *Beacon 0*, is currently being developed with local organizations and individuals in Tyrol (Austria).

Once the basic functionality is implemented, assembly instructions will be shared with communities of friendly testers in other regions.

The prototyping team will provide support in form of workshops. With feedback from the “early adopters”, online tutorials will be created which provide all information necessary to reproduce a Beacon. At this point, the idea should hopefully be adopted by a growing number of regions, and begin to evolve. From there on, everything is open...

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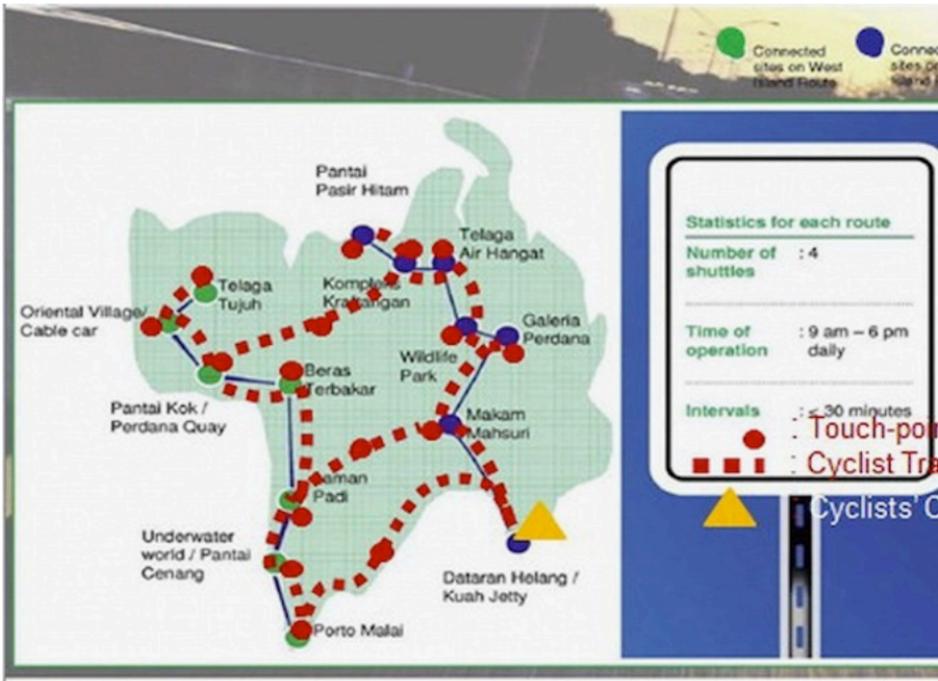
Eco-conscious Island Informatique via Mobile Technologies for Langkawi

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The interdependence of natural-social-technological systems is addressed through a proposed architectural development, The Cyclists' Centrifuge. The proposed system will have an impact on the greater framework of Langkawi, a major tourist destination in Malaysia. It generated RM3.8 billion in 2015. The Langkawi Development Authority (LADA) is the primary developer and guardian. The Langkawi Archipelago, with more than 550 million years of natural history was designated UNESCO's Geopark since 2007. Conserving the natural eco-system is thus imperative. Tourist arrival was more than 3.6 million in 2014 whereas the local population is 155,262. The LADA Tourism Blueprint 2011-2015 stipulated that only 30% of the island would be developed. On average, visitors stay for 5-6 days per visit. During this short duration, the visitor-density is 447 per acre of the developed land. Averaged over 52 weeks of the year, the density is much lower. Nonetheless, an increasing tourist figure challenges the eco-system's carrying capacity. Since 2013, motor-vehicles have been allowed onto this Duty Free Island, posing threat to the carbon emission level. An alternative approach to tourist movement is explored through a design-based research that promotes the use of bicycles, i.e. the 'Copenhagen Wheel'.

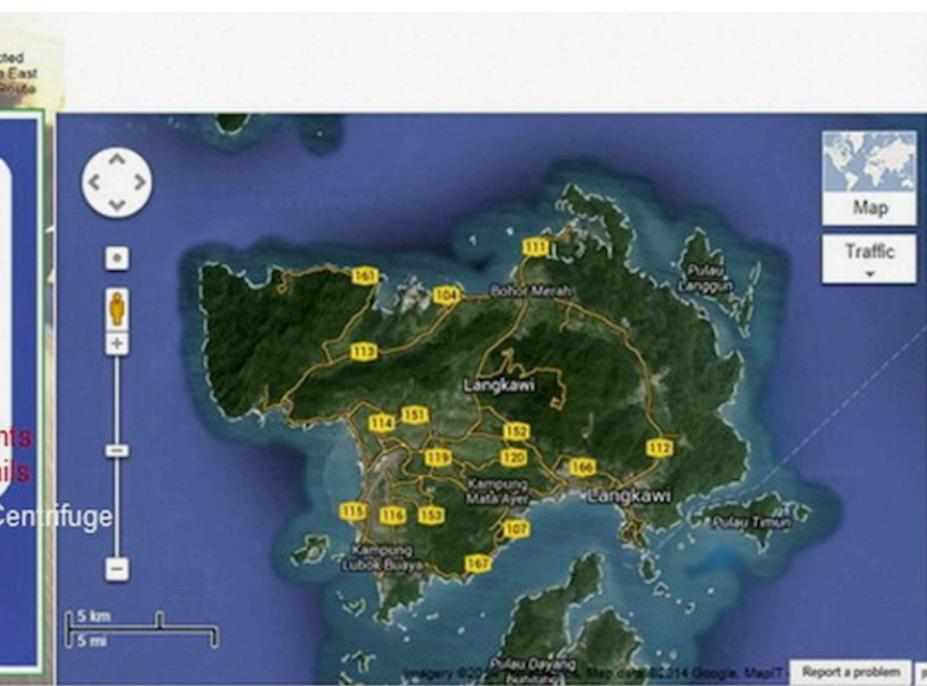
It is a normal bicycle created by the MIT Senseable City Lab, equipped with a packaged hub that turns it into an electric version. The sensor hub could record environmental data, road condition, etc. This choice of transportation considers the leisure nature of visitors on holiday. Riding less beaten tracks offers a fuller sensory experience and nature immersion. Crowd-sourcing opportunity arises relating to nature conservation, thus offering an alternative philosophy to eco-tourism. International sporting activities related to cycling on the island is also complimented. There is a close interdependence between the social aspect of the tourism industry and the natural ecology via mobile technologies. Mobile here refers to the cycling technology and the sensor technology. Four cycling-path categories pave the way for bike trail design by optimizing Langkawi's geography, geology, flora and fauna. Each trail may also include cultural and/or culinary exposure. All these will make up the island informatique. The two-tier data collection station comprises the Environmental Monitoring Centre (EMC) and the smaller transit stations. Every rider needs to register as a data-collector. Accumulated data will be relayed to the EMC for analysis. The data will be publicized on-site and online and promoted to related authorities and the public.



Proposed Cycling Trails and Touch-points Interweaving with LADA Shuttle Network

This increases environmental impact awareness. The cycling tourists may serve as the eye and ear for nature protection by noting poor environmental practices. The interdependent system has economic and educational implications. Its proposed location fronts the LADA Headquarters and is nearby the ferry terminal -- the key arrival point.

More than mere job opportunities the economic spectrum extends into knowledge-based industry. Collaboration between UiTM, LADA, MIT, etc. will integrate R & D with the business side. UiTM as host is a strategic decision. Environmental research is high priority.



As the biggest network of university in Malaysia, its comprehensive academic programme includes Business Management, Sports and Recreational Sciences, besides Science and Technology. UiTM's teaching hotels and training resorts may be replicated on Langkawi.

Botanist, naturalist and culinarian as new breeds of expert tour-guides could creatively be trained. Langkawi's rich bio-diversity may enable crowd-sourcing and prosocial nurturing. The mobile technologies is applicable beyond land travel.

This envisions a proactive approach to the island's urbanisation that parallels an optimistic eco-tourism growth.

Thriving ecologies and a flourishing planet need everybody's active participation and accountability as responsible citizens of humanity.

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Design as an Activity for Overcoming the Gap between Continuity and Discreteness

Institutional Transformation of the University as the Answer to Global Market Challenges

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This article has been inspired by many-sided activity of MIT professors N. Oxman and M. Yoon entitled “Design across Scales”. It is based on the works of Moscow Methodology Circle members and develops a set of ideas presented in the Krebs’s Cycle of Creativity diagram (KCC).

Simultaneous examination of multi-scale phenomena in a limit leads to the consideration of continuous and discrete phenomena in a combined logically consecutive row. The university institutional transformation process will be considered at the example of a similar row. Thus the authors suggest a hypothesis according to which the basic method of work with similar processes will be the design understood widely.

It is known that the traditional university for centuries carried out important functions of culture reproduction, its transfer to posterior generations and scientific research. It had a steady structure supporting the course of processes slightly changing with the time.

Having appeared in market conditions, the university gets additional functions and becomes specialized. In Europe this transformation had been implemented within centuries. The main part of external financing of new universities becomes project-oriented. The university of a developing country tries to pass the above way at an accelerated pace. Therefore it has to get transformed into a dynamic structure which generates convincing applications for grants or makes proposals to industrial partners.

The activity which provided the existence of universities until recent time had a laminar character. Now it is becoming organized on the basis of projects (discrete units). We try to form the university transformation process using Krebs’s Cycle of Creativity diagram (KCC).

We believe that in the mentioned circumstances one of the four basic kinds of activity of KCC – the design widely understood – can be the key factor.

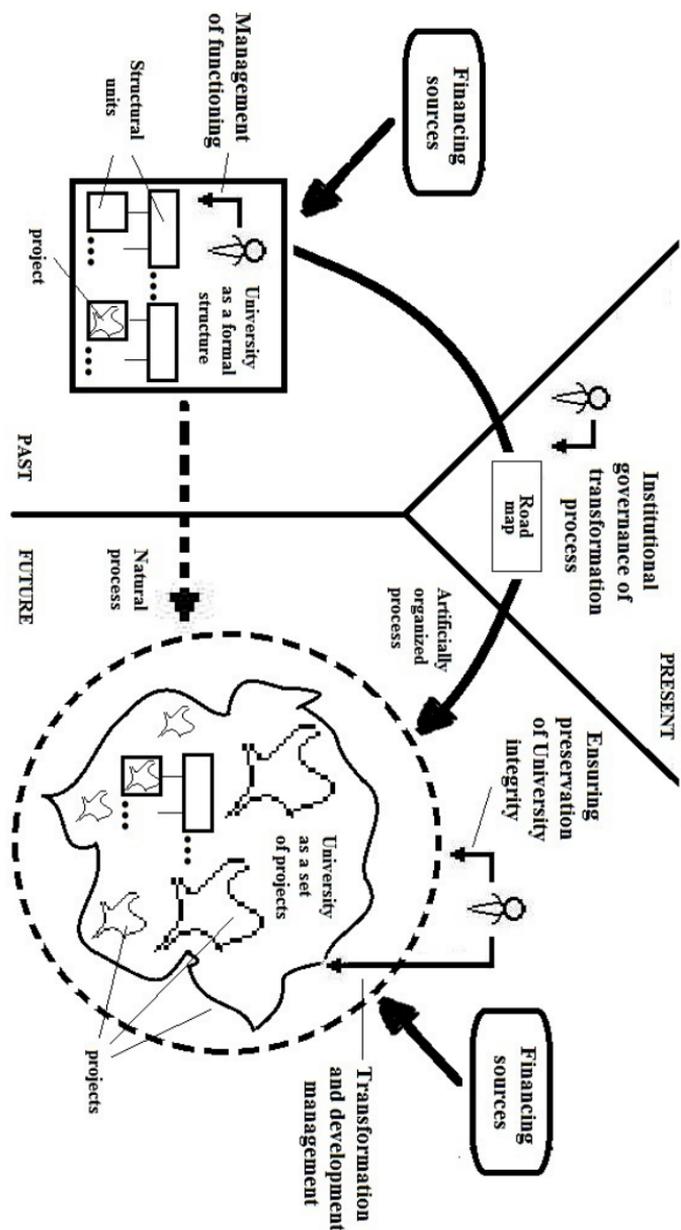


Figure 1
Process of the university institutional transformation under global market conditions

This diagram allows considering the areas of the past, the present and the future in a combined logically consecutive row.

In the past the university was a rigid structure. In the future it will become a dynamic set of projects.

This type of activity transforms “advantage”, “benefit” (“utility”) into “behavior”. The design can reveal itself as organizing and/or using of labor processes in social changes and other types of activity. The application of communicative methods is characteristic for design. It includes, in particular, communicative management and moderation of collective thinking-activity processes. Let us schematize the process using the logic of the diagram named “a step of development”, Figure 1.

The team performing the institutional transformation is conditionally represented on the diagram by the manager’s position of the institutional governance.

Functionally the team of actors includes representatives of four kinds of activity at the KCC diagram. They work in cooperation using tools corresponding to their specialization. Transformation and development management that is laying a claim to a success surely has to consider and provide a cycle of collective human activity transformations marked on the KCC diagram. The replacement of such full-blooded governance and management with ‘one-dimensional’ administration and control shall not bring success.

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Measuring Spatial Feedbacks in Urban Systems

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In recent decades urban systems have undergone rapid development. We have seen a transition in the population distribution from the population mostly dispersed in rural areas to a highly urbanized society, where population is concentrated inside the cities. Today more than 50% of people live in a city (UN, 2005) and this figure is likely only to grow in the future.

At the regional scale we observe territory expansion of the urbanized centers. The growth in territory is also accompanied with increasing economic activity and population densification inside the urban systems. However, urbanization process is not uniform across the perimeter of a city (or a smaller locality). Much of this development has occurred as dispersed, low density growth outside of the major centers but within their area of economic influence. This type of urban development is typically referred to as urban sprawl (Figure 1). While sprawling developments are not necessarily in themselves always undesirable (residents of sprawled settlements may enjoy higher living standards than occupants of high density inner city areas, for example), they bring a range of issues such as increased car use, associated highway development, soil sealing, landscape fragmentation, extended supply networks, inefficient resource use and others.

A process of rural-urban land conversion is interconnected with a set of economic, political and social factors and influenced by decision making at the local level. A large body of research is dedicated to analysis and prediction of urbanization spread using different techniques including cellular automata (Clarke et al., 1997), Markov chains (Lopez et al., 2001) and logistic regression (Cheng & Masser, 2003). Each of these studies involves a detailed level of spatial modeling of the land use change in the urban systems. Unlike aforementioned works, we do not examine in detail complex processes within the urban systems, which influence land use conversion. Our focus is on the dependence between spatial patterns in land use and population distribution.

Land use data is represented by the GIS maps. Our unit of measurement is a cell on the map, which contains information on the type of land use and the level of population densification. The key assumption of the model is that the types of land use in the neighboring cells are interconnected and density of the population can be described (even if partly) by land use characteristics in the cell neighborhood.



ISS026E012474

Figure 1
Urban sprawl in the metropolitan area (example of Montreal)
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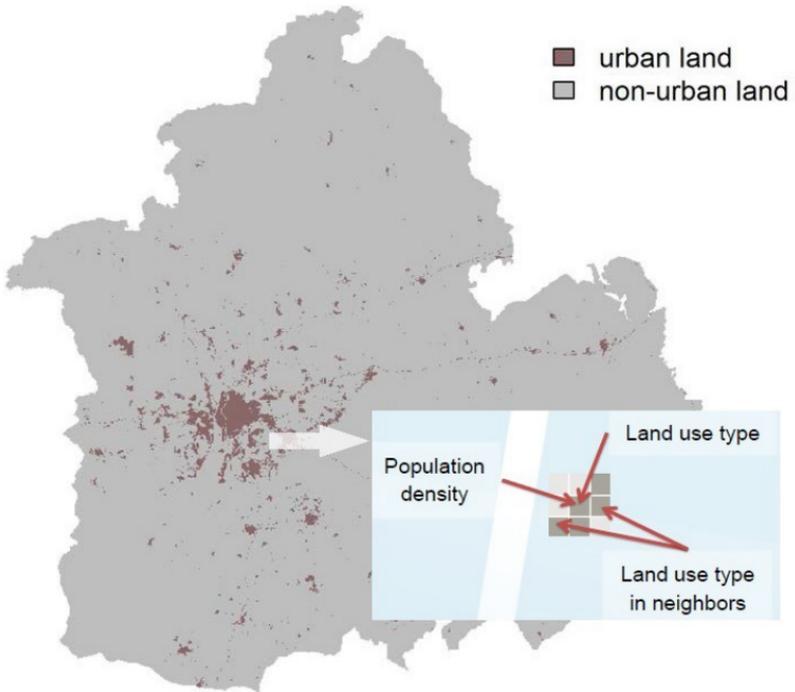


Figure 2
Modeling on the GIS-based map (Province of Seville, 2003)

Thus, this research aims to complement existing studies by substituting highly detailed modeling of transitions in the types of land use with a „black box“ approach on the available GIS data. We describe spatial feedbacks between population growth and urban expansion by a fixed effect model and simply measure the intensity of association between them. The approach is illustrated by a case study on the Province of Seville (Spain), which has experienced notable urban expansion in recent years.

Geographic data frequently shows spatial dependence, i.e., values at close distances are more similar than expected for independent observations. We use certain filtering techniques to spatial data in order to meet assumptions of standard linear regression and use conventional statistical methods to test and interpret results of spatial analysis.

Despite the fact that we cannot explain most of the variance of the population density inside the urban areas and for the whole territory in general), the results obtained suggest, that the land use neighborhood partly (around 50% of variation) captures the spatial pattern of the population distribution. This finding can help obtain new insights related to the phenomenon of urban sprawl, which occurs at the fringe of urban areas outside of the city centers with high population densification.

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Future Vision

Which kind of (urban) life do we want!

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“First we shape our cities and then the cities shape us”. We live in an urbanized world, a world full of amazing people, achievements, contradictions and. I want to focus on a specific achievement cum problem, urbanization. The quest of cities has been the quest for the betterment of life, from Rome and Greece to London and New York; cities have been the adobe of the humankind, agents of change and the engines of economy.

At the juncture, when the world is predominantly urban but several developing countries including India still remain largely rural, and studies have highlighted either falling or stagnant level of satisfaction with life among urban people, these together call for a closer and thorough discussion about future of cities, the nature of cities and the symbiosis between man, nature and space (cities). While the developing world is struggling in creating liveable cities, developed world is struggling with maintaining the status quo and creating coherent identities so that their residents find it inviting as home.

Cities are becoming more and more global, crowded and bigger. People from different backgrounds are packed together, often at the cost of nature and the larger wellbeing of residents.

This leads to the exploitation of resources and simultaneously (due to its rapid pace) precludes the gestation of social fabric that has been bidding societies together. In the quest of becoming independent from nature, we are pushing many natural ties into oblivion. This although allows West to retain its valuable social gain 'individuality', but also limits the avenues for an individual to become part of a new group.

The question rises, how we envisage and dream our cities to be in times to come. Considering the shifting demographics, changing ecology and developments in technology, it becomes very challenging yet crucial to foresee the (social) changes in the cities of future. Are we going to be lonelier or can we be happier than now? Are we going to be more individualistic yet satisfied with life or changes in the nature will force us to live quite differently from today! The impact of advancement in technologies such as self-driving cars and Hyperloop on the ways we live and interact with each other is going to be very significant but are we prepared for that or our cities will remain the stagnant pot of happiness?

I aim to analyse some of these issues and discuss tentative way forward using the concept of wellbeing and identity. My doctoral research focuses on understanding the notion of wellbeing in urban areas and how strengthening the identity of a city can be complementary to it. In the globalized world neo-liberal urbanisation is widely implored and cities are exploring alternative ways to enhance the wellbeing of their citizens; understanding urban identity can provide a complementary approach to wellbeing for cities of today and tomorrow. I am exploring broader spatial identities and how are they likely to change in times to come in this dynamic world.

The vision for future has a large spatial component and different stakeholders are dealing with it in different ways, from Ghost Cities to Smart Cities. A broader look at the role that cities of tomorrow as the centre of comprehensive wellbeing may have to play, will be an important addition to the debate on the future vision. I am a town planner and my approach is mixed between urban planning and urban sociology along with other supporting scientific disciplines. I believe that the discussions related to the vision for future would enhance my understanding of the cities and societies of tomorrow and my contribution would be a value addition to the entire debate.

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Public Space and Personal Life, Colmar, France, 2014
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Land Use Futures in Europe

How changes in diet, agricultural practices and forestlands could help reduce greenhouse gas emissions

Dr. Alexandre Strapasson, Dr. Jeremy Woods, Kofi Mbuk

Centre for Environmental Policy, Imperial College London, United Kingdom in partnership with UK Department of Energy and Climate Change (DECC), UK Foreign and Commonwealth Office (FCO)

- Land use change, such as afforestation, reforestation and multiuse of land resources, has the potential to contribute substantially to reducing Europe's greenhouse gas emissions.

- Changes in the types and quantities of food consumed per person and reduced food wastes would help the EU meet its climate change targets by 2050.

- EU greenhouse gas emissions are highly sensitive to the food trade balance, both within and outside the EU. Choices made about the EU's level of self-sufficiency in food and food security are key determinants of net EU and global greenhouse gas emissions.

- To assess complex land use dynamics, including multiple uses of varying intensities, combinations of empirical data, mapping tools and integrated systems models are needed.

- To achieve greenhouse gas emissions reduction through land use and dietary change, the right mix of short and long-term policies is needed. In the case of dietary changes and reduced food waste, success may depend on systemic behavioural changes which

would require a range of policy levers ranging from market regulations through to education and links with the health agenda.

Food consumption patterns and production methods have major implications for land use and greenhouse gas (GHG) emissions. Climate change mitigation policies are usually focused on energy, transport, buildings, infrastructure and industry. However, changes in our diet and associated land use for food production could substantially affect GHG emissions. This paper describes the relationships between land resources, land use futures and the related greenhouse gas emissions and mitigation strategies, in order to inform the climate change debate and encourage reflection on sustainable land use strategies in Europe. A range of variables such as diet, agricultural and forest productivity levels, demographics and societal demands, and the effectiveness of waste minimisation and re-use strategies drive the land use dynamics that we observe and project. These variables are interconnected and subject to complex dynamics and interactions (Figure 1).

Energy and carbon dynamics

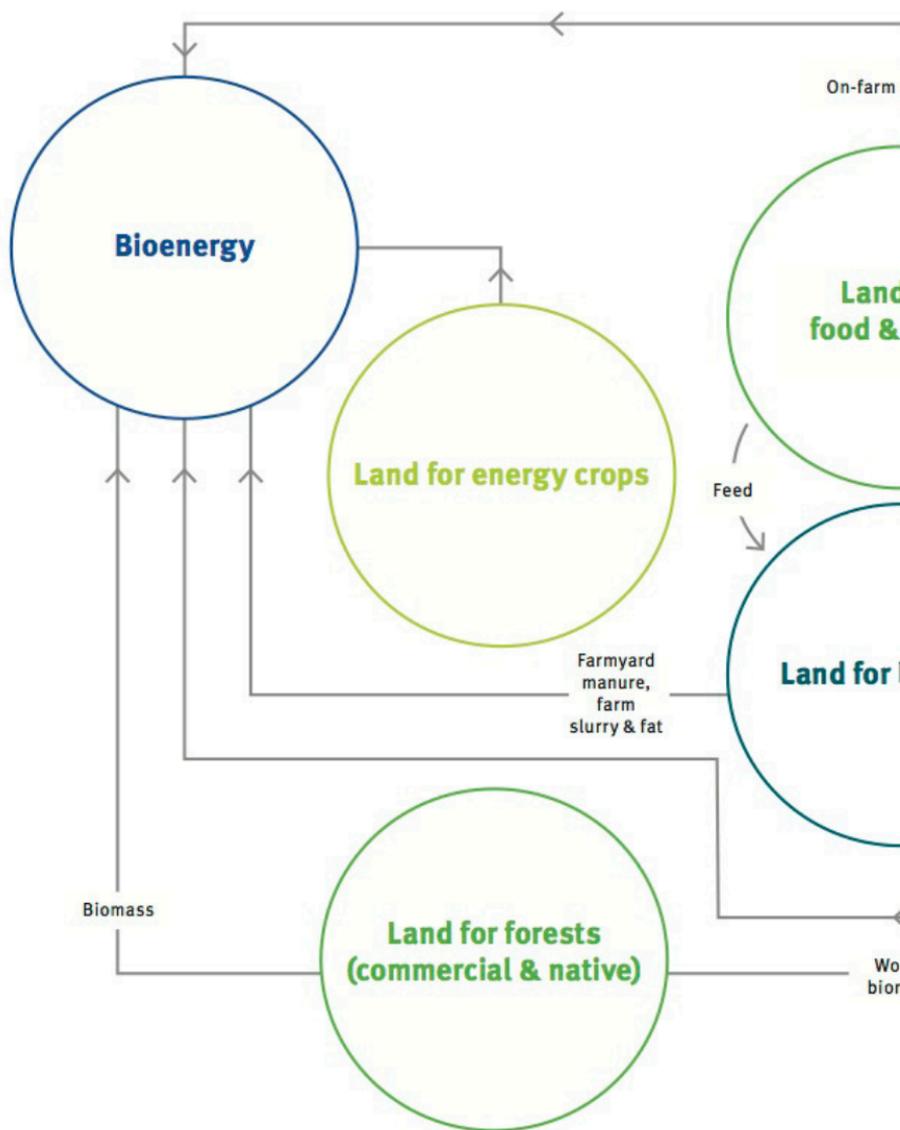


Figure 1
Energy and carbon dynamics

The paper shows that dedicated integrated models, such as the model described here, are needed to assess the systems dynamics of land use, diet and food security and are fundamental to helping us understand the dynamic interactions between food, land use, and greenhouse gas emissions from a wider perspective. However, with increasing complexity comes increasing uncertainty and our outcomes should be taken as illustrative of this controversial debate rather than considered to be conclusive.

A shift towards more vegetarian diets that are higher in pulses and vegetables, and lower in meat, particularly from ruminant animals, could substantially help mitigate climate change. In addition, an increase in crop and livestock yields and land multiuse, coupled with a reduction in food wastes could substantially reduce the impacts of diet and land use on climate and the associated need for additional productive land, either within or outside the European Union.

The next challenge for policy-makers and other stakeholders is to consider the most appropriate and effective public policies to stimulate sustainable land use transitions and behavioural changes for healthy diets and climate. This paper shows the importance of looking at the global picture of emissions as well as the local (e.g. the European Union), when developing land use and climate mitigation policies and approaches.

The full version of this paper is available at: www.imperial.ac.uk/grantham/publications

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FutureVision?! Which trajectories do we envision? How to develop the uprising avantgarde!

Stefan Blachfellner

Bertalanffy Center for the Study of Systems Science

Closing the emcsr avantgarde 2016 we invited all attendees of the *competitive award* in recognition of the most promising contribution to engage in a dialogue to start the co-creation of a future oriented community, *demonstrating the Bertalanffy principle of Unity through Diversity*.

In this session we shared our personal experiences. The experiment has been valued as successful and we have been encouraged to keep the spirit of the more than 40 years tradition, creating interfaces to diverse disciplines. Being recognized through the invitation by the selection process was highly appreciated as well as the horizontal non-hierarchical structures and the flexibility in setting up the pop up event.

We were further encouraged to create a platform for membership sharing attendees information and starting the conversations and interactions ahead of time, expanding the use of fast and highly interactive social media like Twitter prior and during the event.

Showcasing the relevance of academia to tackle the current global challenges we will thus co-elaborate a list of problems systems science is able to solve and organise clusters around these challenges, linking research fields through inquiries. Joint challenges can be identified, directing the event, and therefor tackled more in depth prior and during the meeting. The award then could be redesigned into a group award rather than individual recognition.

These requests highlighted the new culture of young researchers, their desire to contribute to solutions in a team effort.

The meeting itself should be further strengthened through more time in the workshops to explore, a conscious space for conversations and thinking, e.g. Global Cafés with triggering questions, providing guidelines for the audience how to present questions in support of the presenter. Paper sessions and problem solving should be balanced. The keynotes, which are already interactive, should be opened to young researchers too and hold the space of systems science theory in the purest sense. New formats like a Pecha Kucha Night or speed dating for project development have been proposed to explore.

As a paradigm changer the Bertalanffy Center for the Study of Systems Science (BCSSS) announced their upcoming *Ludwig von Bertalanffy scholarship programme* starting in 2017 and its strategy to develop the *Change the Game Innovation Lab @ BCSSS* into a web of international Innovation Labs with our present and future partner organizations to support the network of young researchers and their present evolving science and research culture, their desire, capabilities and Future Vision to work towards societal impactful inquiries, transformative projects and innovative solutions.

We invite you too, to mess with us with the rules of the existing paradigm, be one of those innovators who lead to significant change!

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Fusion Platform
for Science & Society

Inspiration

Knowledge

Luis Alberto Machado Tachiarolo	2011/5			
Dimitry Rauf	6/10/2022			
Sergiy Lazovic	4/10/2022			
Asmaia Louane	20/02/2023			
Michaela Bredl - Fallhammer	04/10/2023			
Hydra C Vasseny	5/10/2023			
Typh Lohman-Kocher	10/02/2023			
Alexandra Simpasova	02/02/2023			
Anna Shteyn-Horn	1/13/2023			
Manika Koultsakou	31/03/2023			
Eliot Kahn-Godwin	8/1/2023			
Hana Krizmarova	01/02/2023			
Hannah Slicher	20/11/2022			
Tarun Hood	20/10/2022			
Josanna Bonavent	20/10/2022			
Lena Hoffmann	1/02/2023			
Geirger Carolina I. Pires Vellho	20/04/2022			
Rosidela Ab. Rahman	1/03/2022			
Schwanz Berg aka. Ludwig Ludwig	1/03/2023			
Anna Bonifant	0/03/2023			
Carla Markopoulou	20/02/2022			
Zin B.	5/03/2023			
Arshad Kubi	20/02/2022			
Amel Gadhafi	04/03/2022			
Daniel Birk	20/11/2022			
Giulia Bogdanova-Carbu	00/01/2023			

Professional Systemics on-line, live from a distance

Nikitas Assimakopoulos

Dimitrios Varsos

Workshop Leaders

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The Symposium's aim is to stimulate an energetic exchange of systems approach perspectives in the area of Professional Systemics applied effectively in organizations and enterprises across a wide spectrum of both service and production industry sectors. The traditional organization is designed along a hierarchical structure in which activities are organized along common areas of responsibility. Key processes are defined and controlled within strict functional boundaries, with minimum attention given to systemic interaction. Business decisions are derived through analytical methods which involve the determination of the meaning of what is studied in the context of a reductionist approach: reducing the whole into its constituent elements, understanding each element separately and aggregating understanding of the individual elements into an understanding of the whole. Given the dynamic complexity of the today's business environment and the continual exchange of its constituent elements, application of the reductionist method typically results in the loss of the essential properties of both the system studied as well as of its parts. Hence, business decisions lack cohesion, and management, the ability to align activities to effectively achieve the company's long-term strategic objectives.

Systems thinking is fundamentally different from the reductionist method in that it focuses on the understanding of how and why various elements affect one another within a defined unified whole. A systemic approach concentrates on the understanding of the interactions of the constituent elements of a system that produce a behaviour rather than the segregated parts of the system, studied in isolation. The need for a systemic approach has never been more imperative, given the realities of the new economic climate impelled by the current credit crisis and the need for organizations to challenge existing paradigms, core values and business assumptions against the dynamic complexity of a volatile economic environment. Professional Systemics is the practical application of systems thinking to everyday situations. It is a means through which to handle complexity in a manner which has achievable, measurable and realistic results. Professional Systemics bridges the gap between theory and practice and promotes the use of effective systemic Methodologies and Multi-Methodologies in managing today's dynamic organizational complexity.

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A systems modeling approach based on DCSYM

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The growing complexity of organizations and the volatility of their environment require new management approaches such as the so-called Sociotechnical Systems. The systems approach provides alternatives to conventional organizational structures and processes leading to new perspectives of organizational issues.

Modeling as a problem-solving method, has always been an essential tool for both Organizational Design and for Development Information Systems and graphical modeling is considered to be a particularly useful tool in developing techniques when communicating with both users and developers.

The Design and Control Systemic Methodology (DCSYM) is the basis for a new Modeling Approach in the area of Organizational Planning, which takes into account Systemic and Cybernetic aspects required in Systemic Modeling and Organizational Design.

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System of Systems: Ethical dilemmas in the era of information technology

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Nowadays, we are in the brink of the third wave of Information Technology competition with key characteristic the improvement of the product itself. The internet of things is developing and their cloud data is stored and analyzed to improve product functionality and performance. An example of a System of Systems concerning vehicles will clarify the third wave's characteristics.

On the contrary, the safety of this new technology is questionable. The greatest benefits and drawbacks from Big Data will be on a population that has not yet been born (Berman, 2013).

Nobody will be able to feel safe because internet accounts are accessible by people with high computing knowledge and the New Deal on data is the rebalancing of data in favor of each individual person (Berinato, 2014). Hence, imagine another System of Systems in which each and every person will be the "product", a world of fool people and the distance we have to cover, to live in such a world.

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Applying systemic methodologies to “IT ecosystems” in order to harmonize business operations and information systems within the organization

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Software ecosystems and IT ecosystems are modern terms used to describe complex networks of IT applications. The idea comes from the perspective that IT systems are made by people, serve people in the context of socio-technical systems and, finally, they affect the lives of more people. All that stuff live and evolve together, each having its own properties and dynamics. All together form a kind of ecosystem which exposes its own emergent behavior.

It is a perfect field to apply systemic approach in order to create a holistic approach, to reveal the underlying dynamic structure, to cope with complexity and to extract order out of the mess. The final objective is to bridge the gap between business and IT helping the organization to serve its purpose.

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Cognitive Considerations in the Design of a Maritime Software Application

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According to R. Schank human memory is organized around goals and memory operating packages that are equivalent to processes which may involve expectation failure. Conventional software models sometimes involve goals but primarily they involve entities and attributes of entities. It is not impossible to model the importance of changes in enterprise circumstances as manifested in changing data or content attributes, using entity modelling.

It is however more labor intensive and error prone and significantly more difficult to maintain such systems. For this reason we developed Overlay, a more appropriate model of processes connected by cause and effect.

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System Dynamics for a Pharmaceutical Company with the use of Business Model Canvas, Systemic Methodologies and their relevant software: DCSYM, Vensim and Forio

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The business plan can be a projection of the future of a business.

In this project we have approached the business plan of a pharmaceutical company, Power Health Hellas, through the structure of the Business Model Canvas. With the help of Vensim Software, we have model the plan in a dynamic system to be able to simultaneously control the variables of the business. In addition we have implemented Forio simulation platform to the system dynamic model that we created.

The goal is to have a systemic business tool in our hands, to help us go further. Imagine a new approach of all business procedures. Through a simple device, we will be able to control all business fields, to simulate/test other possible options and to dynamically reproduce all business wise data in a “Go-live” environment. As a result, all business future decision making will be more efficient/target oriented, as far as time and quality is concerned.

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Strategic Cultural Change: A Real World Application example in the public sector

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Spyros Kallimanis

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Ioannis Lentas

HR Development

The goal of GSPR OPEX project is to create the framework for bringing about strategic culture change in the operations of the GSPR.

Project is still on-going. *Cultural Change*, *Accountability* and process *Performance* are considered as Systemic Enablers. A three tier model approach is utilized focusing on new capabilities development. Process Excellence is set as a basis (new employee-centric value-chain development). *Cultural Change* (Attitude & Leadership development) is set as a second tier (Core Tier). *Accountability* is set as a third tier (360 evaluation on Systemic Strategic Outcomes).

Added value diagnosis is driven by Employee Satisfaction Surveys, Root Cause analysis, and *Brainstorming workshops*. *OpEx incubator cells* have been created and are developing innovative 'horizontal change' initiatives (Peer to peer Centers of Excellence). Future activities are under development to increase employees' engagement & citizens' participation in key improvement areas.

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A Systemic approach to Good Manufacturing Practice (GMP) Inspections: Part I, Cleaning Validation in Pharmaceutical Manufacturing Sites

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In the present study the importance of systemic approach of process cohesion in order to achieve the intended goal is demonstrated using the field of Pharmaceutical Products production.

During production Pharmaceutical Products and active pharmaceutical ingredients (APIs) can be contaminated. Additionally, in many cases, the same equipment may be used for processing different products. To avoid contamination of the following pharmaceutical product, adequate cleaning procedures are essential.

Cleaning Validation is documented evidence that an approved cleaning process will provide equipment that is suitable for processing of pharmaceutical products or active pharmaceutical ingredients (APIs). Different manufacturing processes should be streamlined using systemic approach in order to ensure that cleaning validation is accurate and it is fulfilling its aim to ensure that cleaning process is performed efficiently and effectively.

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A High-school student's perspective towards understanding the dynamics of bullying, using archetypes.

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Maria E. Giannakaki

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This work will address the pattern of behavior that lead to bullying from a systems perspective in order to gain a clear insight relative to the underlying system structure from which this phenomena emerge. The various patterns can be approached from a variety of viewpoints that are dependent on the pluralistic differences in people's perception of reality, the varied believes, attitudes and values which drive their complex motivations, and issues associated with culture, politics and power structures:

i.e. society in general or more specifically family, workplace, teachers, students, etc. The primary objective of this work is to develop a framework using System Dynamics, to model the dynamic behavior of bullying from the view point of a student.

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Developing a systems approach for the enhancement of entrepreneurial capabilities of European Medicinal Agencies through structured bench-learning schemes Sites

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In the present study, the implementation of a structured bench-learning scheme based on professional systemic concepts, is suggested, in order to support European Medicinal Products' Authorities (EMPA) in achieving the goals and objectives set out in European and National pharmaceutical policy and strategy and to enhance their entrepreneurial capabilities. Through this approach, all relative European systems and processes could be designed to ensure that the EMPA are on track relative to their ability to achieve their objectives and targets, and to provide a basis for continual improvement, through the sharing of best practices.

To this end, the deployment of bench-learning scheme will allow the EMPA to better manage the complexity associated with their core processes within their policy boundary and will contribute to the development of a world class medicines regulatory system for medicinal products based on a network of EMPA operating to best practice standards.

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Total Quality Management (TQM) practices from Greek SMEs under an economic crisis environment

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The American College of Greece

George Haritos

University of Hertfordshire

Thanos Kriemadis

University of Peloponnese

Moyra Fowler

University of Hertfordshire

TQM value has marked the beginning of a movement that considers it more as a philosophy in the field of management. Due to the economic crisis, Greece is facing, uncertainty characterizes the environment that companies, especially SMEs operate. The study's aim is to recognize the role of TQM to Greek SMEs. It supports SME entrepreneurs in identifying and recognizing the quality elements needed in becoming a quality structured company. It recognizes if quality elements adopted, like Quality Tools, Quality Culture, Quality Processes and Org. Performance, implement TQM practices effectively, revealing also any inter-relationships among them in composing a "unit" that will "travel" SMEs at a higher level(s) of quality.

Conclusions support the belief that Greek SMEs continue their quality journey giving greater emphasis on its cultural dimensions though need to invest in developing more their quality tools and techniques supporting further the achievement of their L/T strategic goals.

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Design and implementation of an efficient Energy Management System in a Logistic Distribution Center

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The implementation of an effective and efficient Energy Management is essential in a Warehouse Distribution Center (DC) due to limited resources, rising energy costs as well as increased environmental requirements. Using the DCSYM methodology and the VSM tools we will analyze the current situation of the energy consumption in the Warehouse Center, we will show the communication flow between the Energy department and the other departments in the Warehouse.

Moreover, it will be analysed the relationship between the Energy department and external suppliers, sub-contractors as well as external partners. According to the results of the DCSYM Methodology and the VSM Model we are going to design an efficient Energy Management System (EMS).

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Effects of Corporate Governance Models and Management Control Systems upon Organizational Performance: A Theoretical Framework

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Corporate Governance Models (CGM) are classified by literature, with the variable being the separation between ownership and control. Accordingly, recent experience allows for distinct typologies of CGMs to be derived. This categorization is depicted at a Management Control System (MCS) which is applied within the context of businesses in order to achieve organizational objectives.

Consequently, an Organizational Citizenship Behaviour (OCB), emerges. The finally exhibited employee behaviour is controlled – via behavioural auditing-versus the previously described OCB in order to assess the performance of the organizational system as a whole.

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A kick-start workshop

Assessing the Impacts of Performance Assessment

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Policies that aim at quality and performance improvement by setting quantitative targets and assessing the corresponding outcomes have become the well-accepted and institutionalised management tool in almost all domains of human endeavour throughout the modern world since a few decades. These policies differ from their earlier versions mainly by the fact that the human subject is left alone in the evaluation process, since outcome-assessment is either carried out automatically or is based on declaration. The absence of a human inspector/evaluator with whom one can interact and from whom can obtain qualitative feedback gives the whole mechanism the aura of an autonomous evaluation set-up. From this perspective such methods can be considered as social implementations of automatic control, which operates on basis of the cybernetic feedback principle and is renowned in the technical domain for its success in achieving targets. However, in human systems this method is usually accompanied by problems that have no technological counterpart. These problems seem to be correlated with the adverse interactions between the external evaluation mechanism and the internal evaluation system of human beings.

Although subjects who are exposed to such methods of evaluation mostly perceive it as a very annoying experience, the establishment of these policies is helplessly accepted as an inevitable and irreversible process.

The purpose of this workshop is to scrutinise *outcome-assessment-based policies* with regards to their impact on human subjects, particularly focusing on some critical aspects of their psychology like motivation, confidence, autonomous thinking, creativity, and ability to withstand failure and criticism. *The intended concrete outcome* of the workshop is the first *draft of a cognitive experiment* that can assess at least some of the physiological, psychological and behavioural components of these impacts. The theoretical and technical details of the experiment are expected to emerge out of the interdisciplinary brainstorming sessions during the workshop. We hope this draft to constitute the first step towards a project where the experiment will be implemented possibly by a multinational team including some of the participants of the workshop.



'A man can't fly anymore' by Tetsuya Ishida

The workshop consists of three 90-minute sessions, which are tentatively planned as follows:

1st day

Introductory presentation and two focus presentations followed by free brainstorming session

2nd day

Collective session focusing on the development of a cognitive experiment

3rd day

Refinement of the draft of the cognitive experiment and improvement of its feasibility

We invite not only researchers and students from different disciplines (including, but not limited to, computer engineering, systems engineering, control engineering, cognitive science, psychology and sociology) to contribute to the discussions and experiment development, but everybody who has personally been subject to outcome-assessment-based policies.

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Behaviourist Manipulations on Intrinsic Joy

Kübra Eren

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The dominating approach in the scientific literature on motivation regards motivation as a process of associating certain actions with contingencies of extrinsic rewards, and regulating one's behaviour accordingly. Admittedly, this approach has an implicit assumption with behaviourist connotations: Manipulating the extrinsic parameters with reinforcement and punishment, it is possible to observe, measure, and control motivation.

The prevalence of extrinsic reward mechanisms in scientific experiments is not surprising, since they promise 'objective' measurement.

Yet, some exceptional research implies that extrinsic rewards, which do not support autonomy, can undermine the intrinsic motivation and can even have long-term developmental consequences. I would like to contribute to the experiment design in this workshop by proposing ways of assessing intrinsic motivation and the effects of 'objective' performance measurement on it.

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In the Long-Run

Serdar Metin

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The cult of well-ordered individuals within well-defined hierarchies mainly rely on the assumption that the performance of an individual on a given task is not subject to change in time. Learning is fixed and structured, and the outcome is immediate. Without this assumption, quantitative measurement of performance is not meaningful, since it lacks *reliability*.

Competition, which is situated as the driving factor for development objectives, is conceived to dwell upon the short-term outcomes of a structured *performance* (typically as score points in some predefined metric), assuming they will serve as true identifiers of the *competence* of individuals on a given matter.

Nevertheless, the learning and production processes may take indirect routes to reach at valuable outcomes, only with time. In fact, mastering any trade is unexceptionally in long term, and short-term indicators are seldom observable. I would like to propose elaborating on the discrepancy, dissonance or even contradiction between the short-term and middle-to-long-term evaluation of performance

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Workshop

Systems of Systems

Does the concept contribute to systems thinking and understanding?

Wolfgang Hofkirchner

Hans-Jörg Kreowski

Rainer E. Zimmermann

Workshop Leaders

BCSSS Research Group/LS Arbeitskreis/ISIS Special Interest Group

Emergent Systems, Information and Society

“Systems of Systems” is a research area in which loosely-coupled heterogeneous systems and their emergent behaviour are studied. The concept is applied in several fields like the military sector, systems engineering, or organisational learning.

The aim of the workshop is to critically discuss the theoretical foundations of the concept and to analyse implications it might have for different fields of application.

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Front of a department store in Osaka

© Christian Stary

Systems of Systems vs. nested systems A comparison

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John H. Holland considered in his book *Emergence* from 1998 hierarchical organisation of systems that are coupled from level to level through strictly deterministic mechanisms as able to produce emergent effects. Albert-László Barabási's network analysis tries to capture hierarchies as special case of modularity by which groups of linked nodes realise a function on their own. Also here, as any node to whatever other node, the modules are linked in a deterministic way.

However, it is important to devise an ontology of systems of systems such that they are related in a less-than-strict determinacy, because otherwise emergent effects are not possible.

Ludwig von Bertalanffy's General System Theory was an approach that paved the way for such an ontology. The role model is the levels within one system – the execution of a causal power from the organising relations down to the elements of the system. Since elements themselves are systems too, the model is generalised to the nestedness of systems along a hierarchy of levels of reality in the sense of Arthur Koestler. Between two levels, there is emergence.

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Can one improve the understanding of cyber-physical systems as systems of systems?

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Cyber-Physical Systems are networks linking physical entities and computational elements to model their interaction. The topic is considered as a key area of research for ten years now. It is closely related to the Internet of Things and Industry 4.0. The goal is to model interoperating physical and computational units in such a way that they are adaptable to changing requirements that they act decentralized and autonomously, that they communicate and cooperate properly, and that they function efficiently and reliably. While the aims are somewhat clear, the methods and tools to achieve them are not yet far developed or commonly accepted.

Therefore, one may look for help. In this respect, it may be of interest that cyber-physical systems are obviously systems of systems. The research discipline of Systems of Systems has reached a certain stage of development and offers a body of insights so that it may provide some helpful means to a better understanding of cyber-physical systems. But as systems of systems are mainly studied in the military sector, one may be barking up the wrong tree.

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Systems of Systems as represented by categories

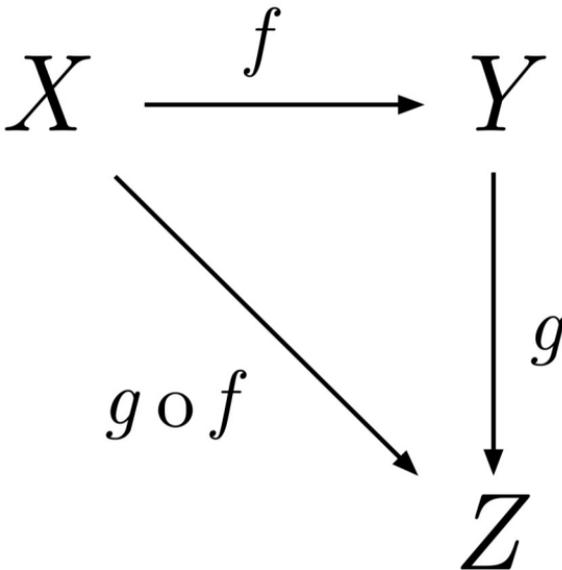
Rainer E. Zimmermann

University of Applied Sciences Munich

The structural isomorphism between interactive networks and mathematical graphs on the one hand, and categories and graphs on the other are discussed.

Referring back to the definition of systems as given in my 2015 book on the topic, it can be illustrated that there is a generic analogy between systems of systems and categories of categories. The immediate consequences are also discussed.

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Computing and Capitalism: Dynamics of Systemic Change

Hamid Ekbia

Director of the Centre for Research on Mediated Interaction,
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The computerization of the economy has shifted the landscape in terms of the relations of human persons and digital machinery, systematically moving a large majority of people toward economically essential but marginal roles. In this new division of labor, which I call “heteromation,” much of the work undertaken by humans is hidden, uncompensated or poorly compensated, and naturalized as part of what it means to be a “user” of digital technology.

As a new logic of capital accumulation, heteromation represents the most recent phase in the co-evolution of computing and capitalism, each with its own dynamics of change. In this talk, I will discuss three related issues: (i) the mechanisms that drive these changes at the micro- and macro-levels; (ii) the socio-economic processes of value extraction; and (iii) the outcomes of these processes for individuals and societies.

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Systems of Systems' attitude

Tomáš Sigmund

University of Economics, Prague

I'd like to focus on the status of the system of systems attitude in terms of its relation to theory and practice. The concept of system of systems presupposes considering both the systems and a higher system that incorporates them. They needn't be in conflict, nevertheless we consider two perspectives or levels at the same time. What approach is appropriate for such a situation? I'd like to contrast the everyday practical perspective with the theoretical one to see how we grasp the world in each of them. After that I will find the position for the systems of systems.

The practical perspective has its accepted status, people do something in order to get something else, see the world through their practical perspective. In the theoretical perspective we don't live in individual systems any more, we are not governed by practical interests, but transcend them towards a higher perspective. The theoretical perspective is actually not a perspective, but pure observation that expands the horizon.

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Applying systems thinking for the design of socio-technical Systems-of-Systems

Christian Stary

University of Linz

In a digitized society socio-technical systems increasingly form critical infrastructures that enable viable activity through transferring information between locations or actors. When taking a System of Systems (SoS) perspective and applying Systems Thinking to understand, engineer, analyze, and govern socio-technical systems, we consider them as a federation of interdependent systems and could design them in a more effective and efficient way. Techniques, such as Systemigramming, allow studying both, essential properties of each (constituent) system, such as adaptability, and resulting SoS referring to emergence capabilities.

Thereby, revealing systemic interrelationships seems to be crucial for understanding socio-technical SoS design. Based on systemic findings engineering models promoting structured development of socio-technical SoS could be revisited and enriched with context information. In this way, stakeholders can tackle interdependencies and interconnections among the (constituent) systems of socio-technical Systems of Systems explicitly. In the presentation a backbone infrastructure of our society, socio-cognitive learning support systems, is discussed from a systemic SoS perspective.

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Using System Methodologies and Tools to support coping with complex demographic issues with a special focus on population aging and migration. Applications, Potentialities and Synergies

Maria Lenzi

Workshop Leader

Consulting, Modelling & Simulation

You are wondering what this picture is about and what it has to do with the main issue of our workshop - coping with complexity of demographic issues?

A lot! - this picture is about people : people watching systems which are everywhere - plenty of dynamic inter-dependent spheres, bounded by their own rationality, connected through accelerating flow of information and keeping us far away from equilibria.

We believe that people like those on the picture can step out of the systems in order to observe them and to learn from them to keep pace with the changing world around.

The intention of our workshop is to demonstrate the results that evolve from observation of systems - methodologies and tools we call “systemic” and use to cope with dynamic complexity – with focus on demographic issues like aging and migration.

The methodologies, which are going to be presented, have their origin in different areas of science: biology, chemistry, physics, mathematics, information science and studying of human brain - but system perspective ties them all together.

We are going to observe, how ‘interconnected thinking’ learned from nature can support development of intelligent regional and urban environments (Sensitivity Model after F. Vester).

We will have an opportunity to see, how human nervous system delivers pattern of viability that can be applied to design effective structures for integration of migrating population (Viable System Model by Stafford Beer).

Our experts will show, how modeling of feedback between aging, migration and transportation helps to cope with complexity of urban systems (System Dynamics).



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New approaches in research of network resilience and opinion dynamics will be introduced, which tie together qualitative and quantitative methods like soft system mapping and agent-based-modeling (Advanced System Analysis).

And we are going to observe hybridisation of various methods including social network analysis to support risk assessment in a migration scenario (Strategic Foresight Knowledge Development Framework).

The following discussion will try to identify potentialities and limitations of demonstrated applications and facilitate synergies between different methods and between praxis and research. “Only variety absorbs variety” - our workshop is about creating variety to keep pace with complexity of the human world.

Our future vision is a European-wide network of enthusiastic people, wanting to further develop, combine and use different system methodologies for coping with complexity of societal issues.

You are welcome!

Let’s start!

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Hybridisation of Social Network Analysis in Context with other Models and Methods of the Strategic Foresight Knowledge Development Framework – Case study ‘Migration Analysis’

Johannes Goellner

Head of the Section Knowledge Management
Department of Central Documentation and Information Service

The hybridisation of these methods with Social Network Analysis methods and tools delivered a scenario based risk analysis concept and has been the basis for the developed Strategic Foresight Knowledge Development Framework (2011-2015) - including a Knowledge Performance Monitoring System and the logic of a Knowledge Logistics Framework, called Knowledge Development Mechanism for Horizon Scanning Centre.

In a case study dealing with the analysis of migration this concept is used in order to identify key risk indicators for migration contributing to a risk management process.

The methodology includes the generation of scenarios which can also be used for the identification of required capabilities of an organisation and may have an impact on its strategy. In the actual emcsr Satellite Workshop we are presenting and discussing the Framework in relation to the use case ‘Migration’, supported by co-presenter and expert for migration: Mr. Armin VOGL (Colonel) of Austrian Ministry of Internal Affairs, Border and Migration Police Department.

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Interconnected Thinking

New ways of thinking for future proof management and planning approaches

Gabriele Harrer-Puchner

Independent Consultant & Expert in Sensitivity Analysis
Freelance, Malik Management Zentrum St. Gallen AG

Why do we ignore interdependencies, effects, and feedback cycles? We have created omnipresent interconnection, high speed communication, global transport, trade, financials, organisations, urban systems. But still our way of thinking is based on linear thinking instead of an interconnected approach.

Frederic Vester, pioneer in “Interconnected Thinking”, developed parallel to books, exhibitions, films, computer based tools like the planning and management instrument of the “Sensitivity Model®Prof.Vester”. Having been part of his team for many years, we applied its interactive and recursive working steps in many concrete regional or urban developments, in organisational and educational projects.

After the description of the system, definition of variables and effects, visualization of interconnections, analysis of feedback and scenarios, the Sensitivity Model proposes “eight biocybernetic rules” as an orientation model, guiding the user to keep the interconnected perspective in order to design future proof developments.

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POSIWID – The Purpose of a System Is What It Does

The VSM as part of a solution to cope with migration and demographic change

Mark Lambertz

Institute for Acceleration

The Viable System Model from Stafford Beer (Management and Cybernetics, 1959) could be seen as the metaplan for an information network, which supports coping with complex issues.

The model offers a unique visualization of structure and processes within a viable system. Especially for visually oriented people the schematics of the VSM are a very good tool to understand the dynamics and interconnections of complex organizations which have to deal with complex environments.

It makes it clear, why every viable system needs the collective intelligence of all members of the system and what responsibility actually means.

The session will not only introduce the Viable System Model, but also extrapolate pragmatic strategic advices on how to handle related issues like integration of migrating people.

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Using System Dynamics to cope with demographic issues in spatial and transport planning

Dr. Paul C. Pfaffenbichler

Institute of Transportation, Vienna University of Technology

The Institute of Transportation, TU Wien, has a long tradition using System Dynamics to analyse mobility and complex spatial systems. Applications range from simple qualitative models using Causal-Loop-Diagrams to complex quantitative models using Stock-Flow-Modelling techniques. The main models are the integrated land use and transport interaction model MARS and the long distance travel model LUNA. MARS simulates the interaction between transport and location choices of households and companies in case study areas on urban, regional or national level.

MARS is able to assess the effects of policy instruments and to identify best performing strategies. LUNA addresses long distance holiday and business trips. LUNA models the population in 18 age groups in 5 year time steps, 10 different household types and 3 income groups. LUNA was explicitly designed to assess effects of population ageing and migration. LUNA can act as add on to MARS to include air travel into environmental assessment.

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Network resilience and systemic risk

Methodological approaches to address network resilience

**Matthias Wildemeersch, Nikita Strelkovsky
Sebastian Poledna, Matt Leduc**

Advanced Systems Analysis (ASA) Program – International Institute
for Applied Systems Analysis (IIASA), Laxenburg, Austria

In the context of social systems, diffusion processes are used to model opinion dynamics in large-scale networks. We focus on a scenario where a set of agents has constant opinion, so-called stubborn agents, and show their impact on the final opinion formation. In the context of natural-social systems, several examples will be presented to give an overview of the range of tools used in the analysis of network resilience. For instance, the resilience of national

and regional economies will be explored by analyzing the impact of extreme, low-probability and high-impact scenarios of external shocks. The behavior of the considered interconnected systems is too complex to be modeled by traditional tools, and therefore, several examples with qualitative (e.g., soft systems mapping) and quantitative (e.g., agent-based modeling) methods and approaches will be presented.

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Workshop

How to project the organizations in the future thanks the utopia?

Andrée Piecq

Workshop Leader

Scientific Director of G.I.R.O.S. Honour President of S&O

General Secretary of EUS

Starting from 4 points of view, we aim to question the functioning of the organizations about their change in the future.

The observation shows that they are increasingly places where appear sufferings. This sufferings of members of the organizations are symptoms of their ineffective functioning which creates very difficult situations to manage. This requires a new look at the way to work with them.

In addition, our workshop aims to create a co-construction of new strategies at a time when the world organization is evolving towards new forms. This new forms hope to better meet the needs and aspirations of the new generations as well as the urgent constraints of the environment.

The paradigm of the 21st and 22nd century remain to be built.

Let's go to navigate to Utopia!

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And if the burnout was a symptom of our societies?

Andrée Piecq

Scientific director of G.I.R.O.S., Honour President of S&O
General Secretary of EUS

Generally the burnout is studied by considering the symptoms of physical and mental suffering. The systemic analysis of the organizations show that in certain conditions, the burnout is a symptom of dysfunction of the organization. The purpose of this reflection is to examine it in the perspective of logic levels (macro-meso-micro) used in the “Giroscope” model.

The micro level studies the behavioral symptoms of member of the organizations.

The meso level: the behavior of members leads to make assumptions about the organization. *The macro* level: hypothesis about the structure of our society. The diagnostic of organizations where the burnout emerge is: ‘in-operative’ organizations. The strategy to change the structure of our society.

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Organizational resilience: a resource for the future

Guy Koninckx

Namastis - Human Resources & Change Management
Consultant G.I.R.O.S., Initiator of C.I.R.E.R.O.

- Resilience or rather resiliencies are resolutely to consider as a resource.
- Resilience can be found at different levels within the organization: the micro, meso and macro levels.
- Resilience appears as a resource based on multiple contexts, not only stabilization but also evolution and bifurcation contexts.
- Unknown, unexplored, misunderstood, resilience emerges as a resource to cope with turbulences and crisis situations.

- Resiliency is a resource to confront contexts where equilibrium becomes to cope with a rupture.
- Is resilience an unexpected share capital or not used efficiently until now?
- Does development of resilience not contribute to a paradigm shift for the future of our organization?

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With C. S. Peirce, a pragmatic approach to situations experienced in teams

Claude Lambert

IT Consultant, President of S&O, Vice-President of EUS,
Trainer at G.I.R.O.S.

The hypothesis that defends this contribution is to propose to enlighten the manager roles in his relationship with his team, based on the philosophy of C. S. Peirce. More specifically, the aim is to provide a team approach through a semiotic and triadic analysis.

This analysis claims to allow the observer-actor in situation to orient oneself in his choices, his observations, analysis of situations, actions to be undertaken, the management's tools to deploy, and to ease the interpretation of common management theories.

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Impact of globalization in the socio-cultural sphere: Towards a new paradigm?

Mariella Zara

Master in Psychology, Student Organizations Discussant
to the Independent Institute of Systemic Organizations, G.I.R.O.S.

The difference between the globalization of the past and today: is visibility and speed. Define along 2 dimensions economic and financial, it includes the social and cultural sphere. The structure of the socio-cultural service are confronted with the family failures, social insecurity, job loss... At the systemic level they are a symptom of a malaise of security internal family. How can emergency services still meet their purpose? It is as if their borders are closed and they become centripetal services: non-operating system.

How reach a new purpose, change its structure, change its system state not operating to finally (re) find new rules, values, and beliefs and become operating systems? The systems must make a logical jump, a mutation to change the structure. If no deviation is possible no different structure may emerge. This mutation will be utopia or reality?

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Workshop

Systems Decatalogue

A satellite workshop using a generative systems dialogue for humanity learning

Will Varey

Workshop Leader

Apithology Center for Humanity Learning

Joshua Floyd

Workshop Leader

The Understandascope

Our support to emcsr~avantgarde 2016 is the hosting of a satellite workshop in Melbourne, Australia. To reflect an antipodean focus, the satellite workshop is titled 'FutureThought! What life do we wish', responding to the main event theme and adopting a modestly different premise. Instead of taking what we do know and looking forward to a FutureVision to select between known futures, our approach is to locate our conversation in FutureThought! And, in looking backwards, envisage the life affirming choices that humanity (in 2016) selected.

This approach approach is based in the premise and practice of apithology. Apithology is the systems field that provides the counterpart to the field of pathology (Varey, 2008). As pathology is defined as the systemic analysis of the causes of disease and dysfunction, so apithology is the systemic analysis of the causes of generative health and wellbeing. Its content is equal in scale to the field of pathology, only its view commences from an entirely different horizon of inquiry.

To make this contribution the satellite workshop has adopted an existing generative inquiry modality called an apithologue. To understand this modality is easy. In presentation there is a one-way exchange of information enabling conversation (Pask, 1975). In discussion there is a necessity to understand others for mutual communication and debate (Bánáthy and Jenlink, 2005). In dialogue there is a shared appreciation of different contributions in a mutual discourse (Bohm, 1990). In metalogue we proceed in a shared inquiry into new understanding as explicit learning occasions (Bateson, 1972). An apithologue is a 'generative metalogue' and begins where knowing ends. It uses generative dynamics and abductive constraint conditions to develop new meaning as a form of humanity-inquiry (Varey, 2013).



'Burke and Wills Monument' by Charles Summers, 1865
© Will Varey

While there are different forms of apithologie, on this occasion our satellite aimed to curate a 'decathalogue'. A decathalogue is a generative meta-logue with ten individuals, representing ten perspectives, from ten disciplines, contributing into one inquiry. Instead of the delivery of content and difference, each participant contributes to the container in reflective enrichment. When all disciplinary perspectives are spoken to, the dialogue potentially moves into and towards a pan-disciplinary and a perspectival inquiry. This satellite event brings together systems avantgarde innovators to contribute the benefits of their insightfulness across disciplinary domains and to gain insights from their contributive imaginations.

To enable this we gratefully acknowledge the support of CERES Environment Park for providing our satellite's conducive venue.

What are the benefits hoped for? The primary benefit is that the participating innovators, being leaders in their fields potentially operating beyond usual contexts, will find the opportunity to appreciate other perspectives of benefit to enrich their own work. The secondary benefit is to imagine and potentially experience a systems discipline that is design generative, foundationally-collaborative, epistemologically-open, future-reflective, and humanity contributive.

We invite you into this exploration in FutureThought!

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Energy Transition and the Interdependence of Supply and Demand

Joshua Floyd

Director, The Understandascope

Josh works in the area of sustainable futures, bringing systems perspectives to the relationship between energy and society. His original disciplinary background is in mechanical engineering, working in metallurgical technology development and commercialisation.

He holds a Master of Science in Strategic Foresight and a Bachelor of Engineering (Mechanical, Honors). He is Director at the Understandascope and Founding Partner with the Centre for Australian Foresight.

The Apithology of Humanity Sustainability

Will Varey

Apithology Center for Humanity Learning

Dr. Will Varey is an ethicist in the field of apithology theory and practice. Apithology is the systems discipline that examines the generative dynamics of health and wellness in living systems.

Will's specialist field of expertise is in the analysis and modelling of the generative potentials of ecologies of thought at humanity scales of inquiry. He is a systems researcher, the founder of the Centre for Humanity Learning, and a Fellow of the Australian Institute of Management.

Model of the Five Stages of Grief and the Social Change Cycle

James Tonson

James is a social change facilitator, educator, and advocate. He's interested in the group dynamics of social change and how to build collaborative communities and organizations that will sustain social change movements.

He works as a facilitator and educator with the Understandascope to foster understanding of the structures, systems and stories that will sustain life on earth.

Development of Local Infrastructure and Services for Sustainable Communities

Emily Ballantyne-Brodie

Emily works in design of sustainable places and lifestyles. Her background is history and geography. She holds a Master of Environment and Sustainability from Monash University and a Bachelor of Arts.

She is Director at Sustainable Everyday Design Studio and currently completing a PhD in design with a focus on food and everyday life.

When Will Startups Win and When Will They Lose in the Innovation Battle?

Robinson Roe

Rob has held global executive positions managing teams in Europe, Asia and North America. As per the anthropology term "inside-outsider" Rob has been on the inside observing behavior, structures, culture, but with an outsider's perspective.

His executive experience and academic training provides Rob with a unique platform to provide organizational observations.

Interactions and Interdependent Actions in Human Systems

Caroline Farmer

Caroline is a consultant working in private practice. She specializes in organizational role analysis, executive coaching (individuals and teams), cultural change, strategy and action research learning.

Prior to life as a consultant she worked as a senior manager and innovative leader in the creative industries in Australia for almost 20 years. She has a MAppSc Organization Dynamics and a BA (Hons) Fine Arts.

Systems in Systems, a Formal Axiological Approach to Global Design

Ron Laurie

Ron is a highly regarded facilitator who has a proven ability to unlock new perspectives in leadership. He takes real world global conditions and designs gamified experiential events

with the intention of cognitive and emotional enhancement of participants. The systems-in-systems approach is a principle design template used in this work.

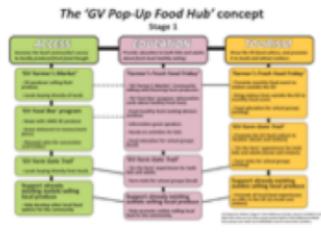
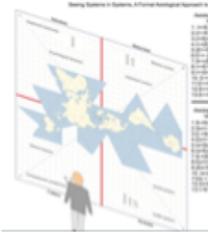
Thrivable Systems Dynamics & the Design-To-Thrive Method

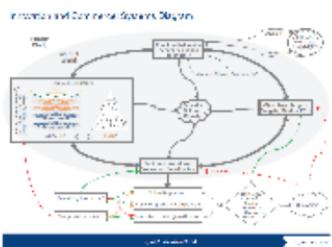
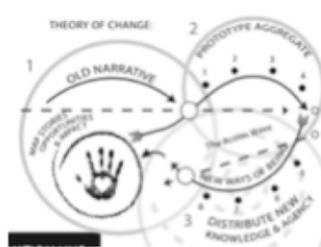
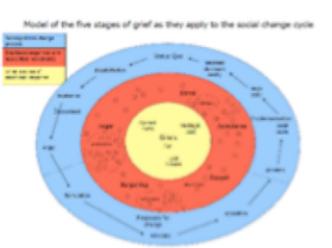
Kathryn Ananda

Kathryn is a multi-disciplinary Innovator, Strategist, Futurist, Team Leader, Technologist, Community Builder and Systems/Design Thinker in the developing field of thrivable systems dynamics.

In practice, her work explores leading edge technologies for collaborative communities, including process & software environments.

She has coached teams, built tools & platforms for innovation hubs, co-design & rapid prototyping, action learning communities, participatory decision making & democracy (loomio), enabling non-hierarchical co-operatives (crowd-funding, co-budgeting), network mapping and knowledge management. Her background spans education, technology, business, design, psychology & social sciences.

<p>Apithology and Pathology</p>	<p>Science and Research</p>	<p>Sociology Philanth</p>
		
<p>Psychology and Development</p>	<p>Engineering and Construction</p>	<p>Design Planni</p>
	<p>The 'GV Pop-Up Food Hub' concept Stage 2</p> 	

<p>y and ropy</p>	<p>Economy and Innovation</p>	<p>Art and Performance</p>
		
<p>and ng</p>	<p>Policy and Representation</p>	<p>Philosophy and Spirituality</p>
		

Note: As the diagrams themselves are only to be a 'mosaic', it's not necessary for every word on them to be readable, or fill a whole page. Being only to give an idea of the diversity of the group.

Communicative Spaces of Free Play

Urban Design as a Game of Agents

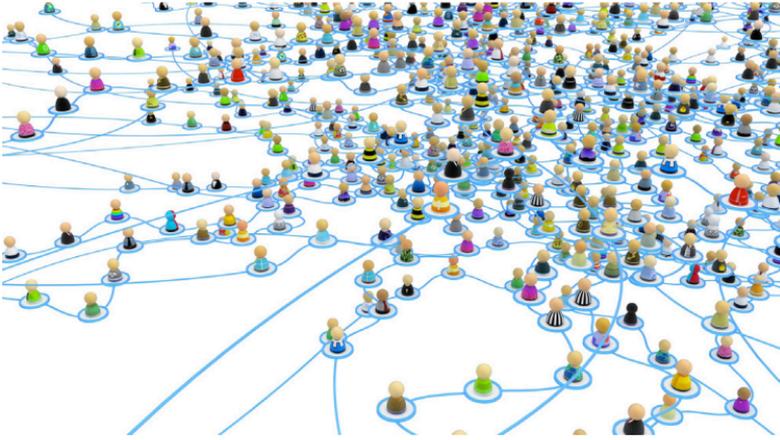
Rainer E. Zimmermann

Workshop Leader

University of Applied Science Munich

Dating back as far as to a conference at the Humboldt university in Berlin in 2010 (Zimmermann, 2012a), the basic idea of this ongoing research project (which is actually a part of the larger project “language and space” at the Munich institute for design science¹) is to re-construct the explicit interaction between the ruling discourse of a given social space on the one hand, and the topological structure of this same social space on the other hand. In particular, if concentrating on social spaces of urban type - with a view to the fact that nowadays the majority of humans on this planet settles in cities rather than on the countryside - each settlement of this type follows an urban logic which is equivalent to a topology of communication (Zimmermann, 2003; Zimmermann, 2013; Zimmermann & Soci & Colacchio, 2001). This idea follows the tradition of research work done by Richard Sennett some time ago². His line of argument was mainly based on the re-construction of ancient Greek polis structures. And this is a line, we continue here in more detail (Cf. Zimmermann, 2013). Because this conception has emerged from recent discussions on complex systems (Zimmermann, 2004; Zimmermann, 2009; Zimmermann, 2012; Zimmermann & Díaz Nafría, 2012, Zimmermann & Mazzini, 2013), our approach is also deeply related to the theory of networks.

Within the framework of the more formal analysis dealing with the representation of systems in terms of mathematical categories, a topological criterion has then been derived as to the stable states of a social system (Zimmermann, 2014; Zimmermann, 2015). At the same time however, it was found that it is necessary to add a primarily hermeneutic rather than formal discussion to the mathematical apparatus involved, for eventually being able to appreciate the totality of social interactions that characterize the specifically cultural features of social space. The central aspect of this is the actual staging of social behaviour (or its production rather) which is an important feature of bigger (metropolitan) cities from the beginning on (Zimmermann, 1986). Obviously, because social interaction is communication in the first place, the various modes of behaviour also depend on the technological development of the media that serve the transport of information and meaning (Zimmermann 2006; Zimmermann & Hofkirchner 2009; Zimmermann & Díaz Nafría, 2012a).



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In other words: Formal aspects of interpretation interact with hermeneutic aspects of interpretation that depend on the more emotional rather than rational attitude of humans with a view to their living quarters, but also on the field of technological possibilities that is explicitly available to the people. As to the staging of behaviour, it is important to notice the immediate relationship to the institution of theatre visualized as a technique of self-representation within the anonymity of any metropolitan city. Hence, theatre in this sense is always *social* theatre (and also *political* as to that). As such, it can be understood as an instrument (as a discursive technique) in order to define the interests and intentions of the multitude of different social groups that usually structure an urban living quarter.

If the formal analysis of urban spaces visualized as emergent complex systems uncovers the existence of a stable region in the behavioural space of social interactions³, then it is straightforward (and very much in the sense of Sennett's) to assume that a suitable design of the communication itself could be helpful in order to concentrate the social processes involved within the framework of the aforementioned stable region. This has to be done in an intrinsically dynamical way, and it has to be done by those agents themselves that are actually involved by living in the respective quarter: the concrete citizens. And it is the theatrical technique of staging one's own self-representation that would be helpful here.

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¹ Cf. www.designscience.de

² We follow in particular Richard Sennett: *The Spaces of Democracy*. In: Robert E. Beauregard, Sophie Body-Gendrot (eds.), *The Urban Moment*. Sage, Thousand Oaks, London, New Delhi, 1999, 273-285.

³ We talk here about the abstract space of possible interactions: A concurrent region of this space (defined in terms of the minimal region within which all agents can follow their own interests and objectives by performing their interactions such that the interests and objectives of all the others are minimally restricted) is called stable, if a spontaneous perturbation (by e.g. introducing new types of interaction) is damped out quickly within this region.

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Structurally Stable Regions of Communication

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The intrinsic polarity of (urban) social space is discussed in the sense of Richard Sennett. Some characteristic aspects of communication within social spaces are collected leading to the definition of a region which is structurally stable in the sense that it represents what is usually called “stoichiometric subspace” of that space which is relevant for social group interactions.

The “stirring principle” according to Heraclitos is recalled, referring explicit strategies in everyday communication to the concept of staging behaviour by means of one of the two components of tension: theatre.

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Informal social space in an urban heterotopia

The social reality of the outrooted

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Fleeing from a hostile reality a refugee aspires to obtain not only a shelter but the opportunity to reacquire a place in the world. However the heterotopia of the refugee settlement, via its perpetual ephemerality, purposely renders refugees lasting pariahs, preventing them from reaching the utopia of a new implacement. It is when this space, in the margins of urban and social normality ceases to operate as a top-down organized theatre of humanitarian aid that its occupants are allowed to actually dwell; to regain their being in the world as social and political entities.

Then they may conceive, perceive and experience social reality and thus produce space. It is via the production of social space that the refugees can preserve their cultural imprint and heal the severe collective trauma of displacement. Such was the case with the residents of Nea Kokkinia, in western Piraeus, a settlement established in 1923 in order to host refugees fleeing from the cities of Anatolia, after the end of the Greco-Turkish war.

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Citizen's Game – Playing Society

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The game developed is to be understood as a model of strategic behaviour in daily life: It is organised as to four essential elements which are *playing field*, *rules of the game*, *partners-competitors of the game*, and *play time (season)*. Each element will be discussed in turn as visualized in terms of system theoretical as well as design theoretical aspects. The chief objective is to further the understanding of the structure of a community which is thought of as being isomorphic to the communicative structure of the underlying social groups. By doing so, it is also hoped to develop explicit game strategies that improve the daily conscience of a social motion which is persistent and permanent leading thus forward to an improved concept of participation.

The paper is meant to illustrate the conceptual background which is necessary in order to create a “citizen’s game” that invites the players to recognize themselves in the first place, and then to involve them (to engage them) in society. (Zimmermann & Wiedemann, 2012) The explicitly innovative aspect of the concept involved here is that: At every time, everyone is a designer - primarily of the social environment and thus of society itself. (Aicher 2015; Hirdina 2008)

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Cycling between smart-cities and smart citizenship

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When we are approaching to 1000 million cars worldwide; when human life is significantly undermined by traffic accidents and pollution; when urban life is radically determined by automobile dynamics... we should give some steps backwards and ask ourselves how we arrived to this point and how can we go beyond. If we observe, on the one hand, the alliance of automobile and oil companies undermining the development of public transport systems; on the other, the top-down approach to plan and manage transportation infrastructures and systems, we get to see that citizens were put quite aside the decision-making involved.

In the current scenario of developing smart cities, we cannot do much without addressing smart citizenship. This is the case of a research framework, set up by a Latin American university network and their corresponding neighbourhoods, aimed to promote social engagement, transdisciplinary research and systems science around a bicycle loan and monitoring system.

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SYSTEMS OF SYSTEMS

DOES THE CONCEPT CONTRIBUTE TO SYSTEMS THINKING AND UNDERSTANDING?

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USING SYSTEM METHODOLOGIES AND TOOLS TO SUPPORT COPING WITH COMPLEX DEMOGRAPHIC ISSUES WITH A SPECIAL FOCUS ON POPULATION AGING AND MIGRATION. APPLICATIONS, POTENTIALITIES AND SYNERGIES

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**HOW TO PROJECT THE ORGANIZATIONS IN THE FUTURE
THANKS THE UTOPIA?**

Workshop Leader: Andrée Piccq, Scientific Director of G.I.R.O.S.

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SYSTEMS DECATHALOGUE

A SATELLITE WORKSHOP USING A GENERATIVE SYSTEMS DIALOGUE FOR HUMANITY LEARNING

Workshop Leaders: Joshua Floyd, The Understandascope
Will Varey, Centre For Humanity Learning

Joshua Floyd

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COMMUNICATIVE SPACE OF FREE PLAY URBAN DESIGN AS A GAME OF AGENTS

Workshop Leader: Rainer E. Zimmermann
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