

## Bootstrapping Social-Systemic Evolution

### BOOTSTRAPPING SOCIAL-SYSTEMIC EVOLUTION

**Dino Karabeg**

Institute for Informatics, University of Oslo  
POB 1080 Blindern  
0316 Oslo  
Norway

#### ABSTRACT

An anomaly that underlies sustainability-related and other contemporary issues is that remedial information is created but not heeded, and not turned into action. We point to a paradigm within which this anomaly can be remedied, and submit it as a natural and up-to-date continuation of the meta-scientific impulse that was the origin of the ISSS. A call to action that follows is to render results and insights not only as printed text, but also as systemic prototypes, and most importantly—as changes to real-world systems. We propose *bootstrapping social-systemic evolution* as a suitable method and strategy, and illustrate it by a collection of design *prototypes* and *patterns*, already in implementation. The Appendix is an anecdotal rendering of our call to action, which weaves together the life histories and visionary ideas of Erich Jantsch and Douglas Engelbart.

Keywords: systemic innovation, collective intelligence, global issues, knowledge federation

Our mistake is the same which many cultures have made before us, namely to force a rigid model upon a fluid reality.

(Eric Jantsch)

Many years ago I dreamed that people were [...] harnessing a technological and social nervous system to improve the IQ of our various organizations.

(Douglas Engelbart)

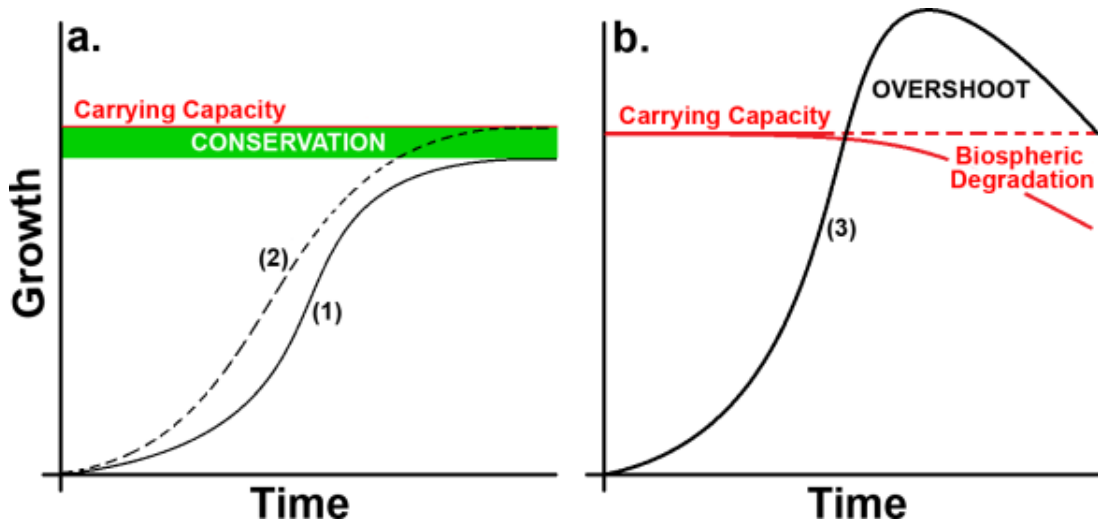
Acknowledgements: I am grateful to Sam Hahn, David Price and other Knowledge Federation colleagues for creative contributions. The “we” in the text reflects all of us; the errors are mine.

#### INTRODUCTION

At the Limits to Growth 40th anniversary conference at the Smithsonian, Dennis Meadows gave a lecture titled “It Is Too Late for Sustainable Development” (Meadows, 2012). Since the call to make the growth sustainable was issued in 1972, Meadows explained, we have been following the overshoot dynamics (see Figure 1), and we have already crossed the red line<sup>1</sup>. What we must focus on now is securing resilience, i.e. avoiding the collapse of our vital societal systems. When asked “How can we secure resilience?” later in the panel, the panelists answered by pointing to the need to work with specific vulnerable points, such as imported gas for Austria and social inequality for the United States.

---

<sup>1</sup> We rely only on the fact that these claims were made, not on their veracity.



**Figure 1. (a) Sustainable and (b) non-sustainable growth** (Image credit: WK Smith, 2012)

We invite the reader to pause and reflect about what those three future scenarios (sustainable development and overshoot with or without systemic collapse) might mean in terms of human lives and suffering.

Notice that the scenarios presented in Figure 1 are based only on the fact of accelerated growth (Pharand, 2011) and the trivial observation that our planet is finite. (Computer simulations might only add the details of the time scale).

In what follows we refer to those scenarios as *our future scenarios* and use them to concretize our discussion and point to the intended effects of our proposals.

The question taken up in this article is—What should we do?

In a nutshell, our proposed action—which we are calling *bootstrapping social-systemic evolution*—responds to *our future scenarios* in a different and complementary way than what the panelists at the Smithsonian were recommending: Our vitally important systems (democracy, governance, finance, public informing, education, science...) can be made resilient—and supportive of the resilience of other systems—by enabling them to evolve as the changing environmental conditions might require, i.e. by adapting their structure and ways of functioning to the roles that need to be served in the changing circumstances. Intuitively, we may understand the approach proposed by Meadows et al. as making the systems stronger or firmer, and hence resilient to stress. We may think of our proposed strategy as making the systems pliable, and hence capable of reshaping themselves as the circumstances change; and in that way eliminating the very sources of stress (which can often be traced to the structure of those systems, and their way of evolving).

## Bootstrapping Social-Systemic Evolution

*Bootstrapping social-systemic evolution* treats the global and other ‘problems’ as symptoms of systemic malfunction; by repairing the underlying systemic defects, it enables further societal and cultural evolution—and makes headway toward universal thriving.

We motivate our action plan by applying a template that Erich Jantsch called *rational creative action* (Jantsch, 1970) to *our future scenarios*; Jantsch’s ideas were based on (Ozbekhan, 1969).

The Appendix presents an alternative, anecdotal motivation.

### RATIONAL CREATIVE ACTION

*Rational creative action* begins with forecasting, which explores different future scenario; it ends with an action selected to enhance the likelihood of the *desired* scenarios. A key role (a ‘difference that makes a difference’) is played by an unorthodox approach to planning, drafted in “Bellagio Declaration on Planning” (Jantsch et al., 1969):

“[T]he pursuance of orthodox planning is quite insufficient, in that it seldom does more than touch a system through changes of the variables. Planning must be concerned with the structural design of the system itself and involved in the formation of policy.”

Policies, which are the objective of *planning* (as the authors of the Bellagio Declaration envisioned it) specify both the *institutional changes* and the *norms and value changes* that might be necessary to make our goal-oriented action in a true sense rational and creative (Jantsch, 1970):

“Policies are the first expressions and guiding images of normative thinking and action. In other words, they are the spiritual agents of change—change not only in the ways and means by which bureaucracies and technocracies operate, but change in the very institutions and norms which form their homes and castles.”

We now improvise in a most concise way two applications of the *rational creative action* template: First to the world system, to determine what needs be done in general; then to systems sciences, to determine what *we* may need to do.

*Our future scenarios* allow us to treat the initial step, forecasting, as already completed.

### APPLICATION TO THE WORLD SYSTEM

We readily recognize that the world system is not structured in a way that would enable it to handle the kind of nonlinear dynamics that is represented by *our future scenarios*. The focus of business and of governance is notoriously short-term and reactive. The evolution of the world system subsequent to 1972 (the globalization) has exacerbated the problem—via electronic transactions, financial resources move instantly there where the profits are largest. A bit more thorough analysis of the system’s structure will suffice to see what the historical evidence might

## Bootstrapping Social-Systemic Evolution

already suggest—effective responses to the calls to sustainable development are all but impossible within the existing systemic constraints<sup>2</sup>.

Social-systemic evolution emerges from this discussion as *rational creative action*.

### APPLICATION TO THE SYSTEMS SCIENCES

Focusing now on the part of the world system within which Meadows and his colleagues were working (academic knowledge work, and more specifically the systems sciences), we realize that their 1972 appeal fell on deaf ears—indeed, there were no systemic ‘ears’ that might hear their appeal and take corresponding action.

Shall we expect that the 2012 appeal will fare better?

This analysis can be generalized: In present circumstances, telling the society how systems need to be structured is self-contradictory, because our social systems are not structured in a way that would enable them to comply. How many published results and insights in systems sciences would make a difference, if only they could be heeded and acted on?

The following *rational creative action* suggests itself: Instead of only *prescribing* systemic change, let us initiate the systemic action ourselves, by evolving remedial systems and bringing them, through strategic moves, into real-world practice.

Douglas Engelbart called this way of working (where the researchers creating socio-technical systemic solutions enact and test and evolve those solutions among themselves) *bootstrapping* (Engelbart, 2008).

### HOW TO INCLUDE ‘SYSTEMS DOING’

Our situation calls for complementing ‘systems thinking’ with ‘systems doing.’

Having understood that this systemic update of the systems sciences is already well on its way, and that it would be one of the focal points of this year’s ISSS conference in Vietnam, we applaud this initiative, and offer help and collaboration; in two ways.

Knowledge Federation, on behalf of which we are speaking, has been developing the practice of *bootstrapping social-systemic evolution* through a series of systemic *prototypes*. Imagine Knowledge Federation as a sandbox created to *bootstrap* this practice. We want to offer our experiences, and invite you to ‘play in this sandbox’ together.

---

<sup>2</sup> Aurelio Peccei (co-founder and President of The Club of Rome), having been a leader of Fiat during the Second World War (and a member of Italian Resistance), saw in 1972 that a restructuring similar to the change to the war economy was called for. This was in principle of course possible, and Peccei did whatever he could to realize it in practice (Pauli, 1987). He did not succeed. While our governments and societies had age-old sensibilities and procedures for dealing with the risks of war, no sensibilities and procedures were in place for handling those *new*, sustainability-related risks. This suggests that Jantsch’s intuition (that applying reason and creativity to social-systemic evolution was the key) was correct.

## Bootstrapping Social-Systemic Evolution

A salient characteristic of *bootstrapping* is that new information technology is used as an enabler to systemic change (more concretely, as ‘social nervous systems’ enabling the development of new, ‘collectively intelligent’ patterns of organizations). Conversely, systemic change is used to open up new markets to information technology. Hence *bootstrapping* as a strategy for enabling social-systemic evolution does not need to struggle against the rigidity of the existing social-systemic structures; it is sufficient to redirect the already existing interests, in research, IT innovation and business.

Our value proposition is to streamline the development of ‘systems doing’ by combining suitably directed research in the systems sciences with suitably directed research and development in knowledge media (information technology). In this *transdisciplinary* design research the systems sciences would provide the know-how for evolving or designing systems, while the knowledge media R&D would provide the tools and the materials.

Our second offering may logically come first.

“As we survey the evolution of modern science, we find the remarkable phenomenon that similar general conceptions and viewpoints have evolved independently in the various branches of science,” wrote Ludwig von Bertalanffy (Bertalanffy, 1950). The International Society for the Systems Sciences originated from a meta-scientific and transdisciplinary impulse; the idea was to create a common language and a mathematical formalism for analyzing and understanding systems in all sciences. Bertalanffy’s intention was to create a science *par excellence*.

A key question is—How can we include ‘systems doing’ without compromising this original intention, and academic excellence?

A clue has been given by Stephen Toulmin in his last book, *Return to Reason* (Toulmin, 2001; Karabeg, 2010): Our present understanding of academic excellence has historical roots; it has *reasonableness* as alternative. Based on it, we can develop new standards of excellence—and use them to evolve new academic directions, and ways of working.

Can social-systemic re-evolution—and the social and cultural revival that may naturally followed from it—begin at the university?

We believe that it can, and that it needs to; and we begin *bootstrapping* this re-evolution from the foundations up—by proposing an *epistemology*.

### ARTICLE PLAN

It is best to consider the remainder of the article as offering potential elements of an action plan, each augmenting its likelihood of success. We structure our discussion around four social-systemic *leverage points*, where relatively small i.e. humanly feasible action can lead to sweeping systemic outcomes:

- *Epistemology* (assumptions that underlie the creation and use of information) is due to change both for extrinsic (or pragmatic) and intrinsic (or fundamental) reasons. We present an *episte-*

## Bootstrapping Social-Systemic Evolution

*mology* that empowers us to be *designers* of our social and cultural reality, also within an academic organizational context.

- *Worldview*—the technical word is *gestalt*; it is a way in which we see the world and our situation in it, which points to suitable action. We present a *gestalt* that points to social-systemic change as the next, most needed, and most fertile, political and creative frontier.
- *Knowledge work* can, and needs to, re-create itself. From our *epistemology* considerations, the re-evolution of knowledge work emerges as an up-to-date notion of ‘basic research’. From our *worldview* considerations, it emerges as a systemic *leverage point* par excellence, because suitable knowledge-work can illuminate the way to all other social-systemic evolution.
- *Innovation and entrepreneurship* can extend conventional IT innovation to bear upon basic societal systems such as governance, informing, education and research; conversely, social-systemic innovation can foster large new opportunities for invention and entrepreneurship.

For each of these *leverage points* we outline several systemic *prototypes* where *bootstrapping social-systemic evolution* has been or is being applied.

For each of the *prototypes* we describe several *design patterns* that resulted from it; think of them as discoveries by which systemic change may be enabled.

The Conclusion reassembles the described pieces as elements of a new *paradigm* (a way to organize a domain of knowledge, which opens new creative frontiers) in knowledge work at large—and summarizes our call to action in corresponding terms.

### 1. EPISTEMOLOGY

“Today we are at the crossroads of societal evolution. We have a choice to make. We can continue our journey on the well-traveled road of unguided evolution and continue to be the spectators—and often the victims—of relentless undirected evolutionary change. Or, we can choose the less-traveled road, become the players on the evolutionary scene and guide the second crucial metamorphosis of the evolution of our species. If we elect the road less traveled, **we have the enormous task of developing the evolutionary epistemology of guided evolution.**” (Banathy, 2010).

It is not an accident that Banathy chose to emphasize in this way the relevance of epistemology to “guided evolution of society”.

*Epistemology* (understood in this text as ‘the assumptions that underly the creation and use of information’) determines what we are able to elevate to the status of ‘truth’, and hence to think and to express; in this way *epistemology* determines also our reality picture, *zeitgeist* and culture.

Our conventional *epistemology* focuses our creative efforts on updating a *given* reality picture—and hence hinders us from creating a new reality.

Our conventional *epistemology* is ripe for change also for intrinsic reasons, because some of its premises have been proven wrong (Heisenberg, 1958; Karabeg, 2011a and 2013c).

### **Design Epistemology**

The *design epistemology* has been proposed as an evolutionary epistemology *prototype* (Karabeg, 2012c). *Information* and *informing* (the creation and use of *information*) are not considered or conceived as pieces in a reality puzzle, but as nerve impulses and nervous systems in our social organisms. We use ‘knowledge work’ and *informing* interchangeably, and as synonyms.

The *design epistemology* introduces the following *patterns*.

#### *Design Ethics*

*Design epistemology* makes us responsible for creative evolution by changing our understanding of our social role from ‘objective observers’ to *designers* (Karabeg, 2009b).

#### *Assigning Priority to Knowledge Work*

When knowledge work is conceived as reality mapping, all pieces of information have similar value, because without any of them the reality picture could not be completed; the pieces that don’t fit in tend to be neglected. When we act as *designers*, we prioritize the tasks that make the largest positive difference in our present condition.

A story definition of *design epistemology* is that it is characterized by the attitude one manifests when stopping the car one is driving to change a wheel that has a flat tire. Applied to world system, and to the condition of the systems sciences in it, this points to the need to first take care of those systemic issues that now hinder our conventional work from having effect. (The conventional focus on publishing might be compared to pressing the gas pedal.)

#### *Prototypes as Results*

A characteristic result in the *design* approach to knowledge is a *prototype*. A *prototype* is placed into reality, allowed to act upon reality, and indicate what works and what needs to be improved. *Prototypes* are to *design epistemology*-based research as experiments are to conventional science.

### **Polyscopy**

*Design epistemology* invites us to design and continuously improve—rather than inherit—our knowledge work practices and methods. Polyscopic Modeling has been designed as a *prototype methodology* (Karabeg, 2003, 2004b, 2009a). *Polyscopy* is the practice that results from its application; it is a *prototype* of an *informing* that suits our contemporary needs.

*Polyscopy* distinguishes itself by the following *patterns*.

#### *Methodology as Convention*

As a written convention (which may be read and accepted as a basis for communication), Polyscopic Modeling has no hidden assumptions. By basing the method and its underlying *epistemology* on a written convention, both are turned into *prototypes* subject to conscious design and continued improvement—and to inclusion into ‘the social contract’.

## Bootstrapping Social-Systemic Evolution

### *Information as We May Need It*

A core purpose of *information* is to make us informed; but what does ‘being informed’ mean? In *polyscopy*, ‘having a correct *gestalt*’ (the interpretation of a situation, which points to correct action) means ‘being informed’ by convention. “Our car has a flat tire” is a textbook example of a *gestalt*. *Our future scenarios* point to a practical *gestalt*; and to a systemic problem—the absence of a socially sanctioned way of creating a shared *gestalt* and acting on it.

### *Generalized Scientific Method*

*Polyscopy* adapts the conventional scientific method to the task of proving or *justifying gestalts* (Karabeg, 2009a).

### *Designed Ways of Looking*

The essence of *polyscopy* is free and conscious *design* of new ways of looking at issues and situations (*scope design*). A textbook example is the *power structure* model of power and power holder i.e. of our ‘political enemy’ (Karabeg, 2004a). A *power structure* is not necessarily an organized clique; most often it is a spontaneously evolving societal structure, whose protagonists—and victims—are unaware of its existence. *Scope design*, and *bootstrapping social-systemic evolution*, emerge as necessary forms of political action (Karabeg, 2009a).

## 2. WORLDVIEW

Our worldview, or more precisely our *gestalt*, determines our priorities. The Limits to Growth project was an attempt to initiate an urgent global community-wide *gestalt* change; its failure to do so is an indication that the world system is lacking a suitable mechanism.

The key questions, which we take up next, are:

- What worldview might mobilize the public and enable social-systemic transformation?
- In what way could this worldview be created and widely shared?

### **Key Point**

A *key point* is an insight capable of redirecting the efforts and priorities in a community. The Key Point is an insight capable of inciting a similar effect in the global community.

### *Scientific Treatment and Understanding of Problems*

“When we see red spots appearing all over our skin, we don’t try to get rid of them by rubbing them off or painting them over; we base our understanding and treatment on the underlying anatomy and physiology.” Our current Key Point *prototype* points to social-systemic evolution as a “scientific” approach to problems; and as a political strategy par excellence (Karabeg, 2013b)

### *It’s the Systems, Stupid!*

In the light of the provided view of our aging and ailing societal systems, we see ourselves as parts in spectacularly misconstructured societal structures. We see our daily work, and our best efforts wasted, or misdirected. Directing social systemic evolution emerges as a task of highest



priority. Our paraphrase of Bill Clinton's 1992 winning political slogan ("It's the economy, stupid!") points to a winning political vision for the future.

### **Key Point Dialog**

A purpose of a *key point dialog* is to help a community reach a *key point*. A purpose of Key Point Dialog is to help the global community reach a global turning point. Several *key point dialog prototypes* have been designed and tested in practice (Karabeg, 2007 and 2008).

#### *Energizing the Bohmian Dialog*

The Key Point Dialog Zagreb 2008 experimented with energizing the conventional David Bohm's dialog circle (Bohm, 2004), by turning it into a cyclotron-like structure (Karabeg, 2008).

#### *Growing Knowledge Upward*

When the dialog circle begins to resonate with a Key Point, its waves are transmitted through the informing media to the general public, where the dialog continues online. The Key Point Dialog Wiki called WiKeyPoDia is a systemic *prototype* under development, which undertakes to enable a community to co-create information in a *vertical* direction (toward a single, overarching insight). This is intended to extend and complement the approach practiced by Wikipedia, and in general, where information grows *horizontally* i.e. by growing in 'breadth' or volume.

### **Politics Game-Changing Game**

We arranged a meeting with leaders of a small and progressive political party in Norway, and discussed the possibility to develop a campaign based on the insight that problems and solutions tend to be systemic, and that social-systemic evolution is a necessary form of political action.

## **3. KNOWLEDGE WORK**

It follows from *our future scenarios* that the task of giving our social organism the ability to respond to signals from its various sensory and thinking organs (or in Engelbart's terms, to "harness a technological and social nervous system to improve the IQ of our various organizations") must be given a highest priority.

From the point of view of strategy, knowledge work seems a natural place to begin *bootstrapping social-systemic evolution* for at least three reasons: (1) A functional knowledge work (public informing, research...) is needed to illuminate the way for, and to empower, all other *social-systemic evolution*; (2) given the Web and other available technology, and the privileged (sponsored) status of us academics, systemic changes in knowledge work should be relatively easy to *bootstrap*; (3) relative to our *epistemological* considerations, self-organization in knowledge work appears as an up-to-date notion of 'basic research'.

### **Knowledge Federation**

The Knowledge Federation community has self-organized to respond to this call (Knowledge Federation, 2013).

### *Bootstrapping Systemic Evolution in Knowledge Work*

Knowledge Federation may be understood as an organ added to our social organism, whose function is to *bootstrap* the evolution of its brain, nervous system and other organs.

### **Transdiscipline**

Knowledge Federation *bootstraps* the *transdiscipline* organizational model by creating itself (Karabeg, 2011b).

### *Refocusing Human and Other Resources*

In a discipline, experts in a single domain of interest gather to improve the knowledge in that domain. In a *transdiscipline*, experts and other stakeholders representing a suitable combination of backgrounds and interests gather to work on a question or design task of contemporary interest.

### **Tesla and the Nature of Creativity (TNC) Knowledge Federation Prototype**

The TNC Prototype (Karabeg and Rakovic, 2011), created following the Knowledge Federation workshop “Self-Organizing Collective Mind” in 2010, is a *prototype* of knowledge federation. Quantum physicist Dejan Raković appears in the role of a scientist who has developed a result that has potential to significantly impact other fields, and our society at large. The *prototype* shows how this result may be *federated* (notice the relevance to *our future scenarios*).

### *Federating a Scientific Result*

It is shown how a technical result expressed largely in the language of quantum physics can be: made accessible in terms of visual metaphors; turned into a multimedia document, with explanatory interviews with the author, and with links between the technical material and corresponding high-level explanatory models (we used a graphical dialog mapping tool called Compendium); turned into a collection of general ideas, made available online, linked with other related ideas, and commented on (we used an online collaborative sensemaking tool called Cohere); transformed—together with related works and comments—into *gestalts*, which point at suitable action; made known (with related *gestalts*) to communities that may need them; made available (with related *gestalts* and suitable media material) to journalists for publication.

### **Knowledge Media for Collective Creativity University Education Prototype**

Education—as social-systemic autopoiesis—is a natural point to intervene into social-systemic evolution. It can be shown that education is now consistently conceived to reproduce the social systems as they are; and to create people, and systems, that resist change.

The Knowledge Media for Collective Creativity is a university course *prototype*, developed by Knowledge federation and offered through the Inter University Centre Dubrovnik, which consistently recreates the conventional educational paradigm to *enable* social-systemic evolution.

### *Teaching Social-Systemic Change*

The course teaches skills related to social-systemic *design*. At the beginning of each semester, the students and instructors co-create the course format and the curriculum, based on previous semester’s *prototype* and student and faculty recommendations.

### *Flexible Education*

Education in this course is flexible regarding both the time and form of learning, and what is learned. Conventional education, which has fixed format, makes people identify with—and depend on—the know-how they've received, and resist change.

### *Globally Federated Education*

This course is co-created by international experts and students, and offered to learners worldwide.

### *Practicing Co-Creation*

The course is conceived as a design project, where the students co-create the course and the learning materials for each other and for the next generation. This allows the students to develop relevant values and habits (collaboration, responsibility, creativity...)

## 4. INNOVATION AND ENTREPRENEURSHIP

Our challenge—and strategy—is to make innovation and entrepreneurship scale and include concerted changes to whole social or socio-technical systems (instead of producing only incremental changes which, to be feasible, need to fit into the existing order of things).

### **The Game-Changing Game**

The Game-Changing Game is a *prototype* answer to the above challenge. The current *prototype* (Karabeg, 2013a) has been completed at the Knowledge Federation Workshop Palo Alto 2012 and presented at the Bay Area Future Salon (Karabeg, 2012a).

### *Systemic Innovation*

The Game-Changing Game is a generic socio-technical procedure for *systemic innovation*, where innovation and entrepreneurship scale to bear upon entire societal systems (Karabeg, 2011b).

### *Ford Motor Company*

Think of the Ford Motor Company as a systemic change in transportation. It was only when Ford began to mass-produce automobiles that a broad variety of business ventures (in oil drilling, gasoline stations, automobile tires, car insurance...) became lucrative. Similar opportunities can be created through *systemic innovation* in any domain. By reorganizing innovation and entrepreneurship and their relationship with research, The Game-Changing Game undertakes to turn global risks into contribution and career opportunities.

### *Bootstrapping Systemic Change*

When not capitalized, a *game-changing game* is a venture to co-create a systemic model and strategically induce systemic change in a specific domain. The A-players (students, entrepreneurs...) embody the new systemic *prototype*; the Z-players (professors, patrons...) help them do that within the existing systemic constraints—and induce real-world systemic change. A *game-changing game* is normally conceived as a *transdiscipline* organized around a systemic *prototype*, to improve it continuously, and to strategically bring it into real-world practice. When a *game-changing game* succeeds to be game-changing, everyone prospers and benefits; risks are turned into opportunities.

### **Barcelona 2011 Good Journalism Prototype**

Drafted at the Knowledge Federation Workshop Barcelona 2011, the Barcelona 2011 Good Journalism Prototype is a *prototype* of the kind of public informing that might remedy the anomaly pointed at by *our use case*. This *prototype* is being implemented by the germinating ZIG Project.

#### *Giving a Voice to Public*

The loop in which news are created begins with citizen journalism, where the voice is given to the public directly to express concerns and grievances (a *prototype* had already been implemented within the Barcelona Wikidiario project).

#### *Fostering Systemic Insights*

Following an editorial phase where the recurrent or ‘burning’ issues are selected and highlighted, the loop enters its second, systemic phase, where experts and investigators are contacted as needed to point to systemic causes; other professionals (mathematicians, animation artists...) are challenged to explain the relevant relationships in accurate, clear and accessible terms. The loop is completed by pointing at suitable systemic action.

#### *Creating ‘Living’ Systems*

The Barcelona 2011 *prototype* is a ‘living’ system—capable of adapting to ‘environmental conditions’, and of autopoiesis. This *prototype* is created through collaboration of creative journalists and journalism experts with knowledge media researchers and developers, collective intelligence experts and other stakeholders (Knowledge Federation, 2011). A *transdiscipline* is organized around the journalism *prototype* to update it continuously, and keep it in syntony with social needs, technology changes and academic and other insights.

#### *Shifting Paradigms*

Comparing the Barcelona 2011 *prototype* with conventional journalism leaves a similar impression as seeing a modern train or a passenger jet side-by-side with a horse and carriage: It becomes instantly clear that the former and not the latter is a public informing that suits our contemporary condition (Karabeg, 2012b). This suggests similar possibilities in other domains.

## **CONCLUSION**

We submitted *bootstrapping social-systemic evolution* as a *rational creative action* that follows from our present condition and future prospects, as reflected by *our future scenarios*; we offered a collection of systemic *prototypes* and *design patterns* as building blocks for practical pursuit of this strategy.

What relevance may these ideas have to the systems sciences? In what way may *bootstrapping social-systemic evolution* be combined with the ethos of the ISSS, and with the intentions and sensibilities of its founding fathers?

We submit that our discussion points to a possibility for a new *paradigm* in systems sciences, where we attribute a similar meaning to the word *paradigm* as Thomas Kuhn (Kuhn, 1996). A new *paradigm* is: (1) a new way of conceiving a domain of knowledge (2) triggered by anomalies in the existing conception (3) which opens up new domains to research.

## Bootstrapping Social-Systemic Evolution

We have illustrated this new *paradigm* by presenting: (1) *design epistemology* as a new way of conceptualizing knowledge work and setting priorities (2) *our future scenario* and related events as anomalies (3) our *prototypes* and *design patterns* as examples of new directions in research. Stephen Toulmin's arguments in *Return to Reason* (Toulmin, 2001; Karabeg, 2010) may further be used to point to intrinsic or fundamental grounds for this *paradigm*.

In the systems sciences this new *paradigm* would of course not replace the conventional one—rather, the two *paradigms* would be, in Kuhn's usage of this word, *incommensurable* (each more suitable than other for its own purposes, and from its own point of view).

To do research under this new *design paradigm* will mean to consider information and *informing* or knowledge work as essential components in our various social systems, and to *design* them accordingly. We submit that this in a natural way extends—and complements—the original transdisciplinary and meta-scientific impulses from which the ISSS originated.

In the systems sciences this would mean before all creating the kind of information that can make a largest difference in practical reality. In the conventional research ethos, we seek results that are general, and technical. In the *design* ethos, we seek to enable as straight-forward as possible understanding of key social issues. And we seek to impact the structure of real-world systems—in communication, to begin with, by securing that its structure allows that our key insights be heeded and acted on. Our two *prototypes*—Tesla and the Nature of Creativity Prototype, and Barcelona 2011 Good Journalism Prototype—illustrate what this might mean in practice.

A 'discovery' under this new *paradigm*—quite unlike the conventional discoveries—can be a strategic move, which may augment the chances of accomplishing the mentioned real-world effects—as our presented examples may illustrate.

Two characteristics of the *design paradigm* are worth highlighting.

One is that the *design paradigm* reverses the conventional direction of development of information systems and technology. Under the *design paradigm*, priority is given to securing the desired characteristics of the system as a whole—and technological components are then tailored to this purpose. Information technology finds a new purpose as an enabler of social-systemic evolution.

Hence our call to action—to develop *transdisciplinary* research where *bootstrapping social-systemic evolution* is accomplished through collaboration between systems scientists and knowledge media researchers and developers. The former provide the systemic know-how, and the latter the tools and materials. In the Appendix we provide an anecdotal version of this call to action, by talking about the life and ideas of Erich Jantsch and Douglas Engelbart, who foresaw this possibility a half-century ago, and then worked diligently to realize it in practice.

The second characteristic of the *design paradigm* is that it puts us into the role of *designers* of our reality, rather than observers—in this time when concerted systemic action is called for. "The future will either be an inspired product of a great cultural revival, or there will be no future," claimed Aurelio Peccei, based on his experience with the 'world problematique' and a decade of research of The Club of Rome (Peccei, 1981). Can we co-create an academic space, and a movement, where the great cultural revival will become reality?

## REFERENCES

- Banathy, B. (2010). *Guided Evolution of Society*. Kluwer Academic / Plenum Publishers, Contemporary Systems Thinking Series, New York.
- Bertalanffy, L. (1950), An Outline of General System Theory, *The British Journal for the Philosophy of Science*, 1(2), pp. 134-165.
- Bohm, D. (2004). *On Dialogue*, Routledge Classics, New York.
- Engelbart, D. (2008). *About an Accelerated Bootstrapping Strategy*. Doug Engelbart Institute Web page, <http://www.dougenelbart.org/about/bootstrapping-strategy.html>
- Heisenberg, W. (1958). *Physics and Philosophy: The Revolution in Modern Science*, Harper and Row, New York.
- Jantsch, E. (1969). *Integrative Planning for the “Joining Systems” of Society and Technology—The Emerging Role of the University*. Report, MIT Sloan School of Management.
- Jantsch, E. (1970). From Forecasting and Planning to Policy Sciences. *Policy Sciences* 1(1), Elsevier.
- Jantsch et al. (1969) Bellagio Declaration on Planning. In E. Jantsch (Ed.) *Perspectives of Planning*, OECD, Paris, 1969.
- Karabeg, D. (2003). Designing Information Design. *Information Design Journal* 11(1), <http://DinoKarabeg.info/ID/Articles/DID.pdf>
- Karabeg, D. (2004a). Information for conscious choice. *Information Design Journal* 11(2/3), <http://DinoKarabeg.info/ID/Articles/ICC.pdf>
- Karabeg, D. (2004b). Polyscopic Modeling Definition, in *Changing the Tides*, (R. Griffin et al., eds.), IVLA Selected Readings. <http://heim.ifi.uio.no/~dino/ID/Articles/PMDef.pdf>
- Karabeg, D. (2005). Design Is an Alternative to Tradition, in *Design System Evolution* - Proceedings of the 6th International Conference of the European Academy of Design EAD06, Potsdam, Germany. <http://DinoKarabeg.info/ID/Articles/DIAT.pdf>
- Karabeg, D. (2007). How to Begin the Next Renaissance—Preliminary Version, in *Proceedings of the ALPIS07 Seminar*, Carisolo, Italy, <http://DinoKarabeg.info/ID/Articles/Renaissance.pdf>
- Karabeg, D. (2008). Cultural Revival Dialog Zagreb 2008, website [http://keypointdialog.wiki.ifi.uio.no/Main\\_Page](http://keypointdialog.wiki.ifi.uio.no/Main_Page)
- Karabeg, D. (2009a). *Informing Must be Designed*, book manuscript. Introduction at <http://DinoKarabeg.info/IDBook/Introduction.pdf>
- Karabeg, D. (2009b). Through the Mirror, blog post, <http://polyscopy.wordpress.com/2009/04/03/completing-the-information-design-portfolio/>
- Karabeg, D. (2010). Return to Reason, blog post, <http://polyscopy.wordpress.com/2010/02/07/return-to-reason/>
- Karabeg, D. (2011a). The Foundations Frontier, post in Dino Karabeg’s Blog, <http://polyscopy.wordpress.com/2011/09/08/the-foundations-frontier/>
- Karabeg, D. (2011b). KnowledgeFederation—An Enabler of Systemic Innovation. *Proceedings of the Triple Helix IX International Conference*, Stanford University, <http://polyscopy.wordpress.com/2011/06/20/knowledge-federation---an-enabler-of-systemic-innovation/>

- Karabeg, D. (2012a). The 10th Trintab (Welcome to The Game-Changing Game), lecture at the *Bay Area Future Salon*. Announcement retrieved February 1, 2013, from <http://www.futuresalon.org/2012/07/future-salon-10th-trintab-with-dino-karabeg-july-16-s-ap-palo-alto.html>; Prezi <http://prezi.com/rxyggyvlepks/thecgforfs/>
- Karabeg, D. (2012b). Recreating Journalism— An Instance of a Paradigm, lecture at *New Political Communication and EU* workshop, IUC Dubrovnik. Audio recording <https://soundcloud.com/dinokarabeg/newmediaeutalk> and Prezi [http://prezi.com/b\\_2fircozq-p/recreating-journalism-an-instance-of-a-paradigm/](http://prezi.com/b_2fircozq-p/recreating-journalism-an-instance-of-a-paradigm/)
- Karabeg, D. (2012c). Design Epistemology. *Information* 3 (4): 621-634. Retrieved February 1, 2013, from <http://www.mdpi.com/2078-2489/3/4/621>
- Karabeg, D. (2012d). *Information Age Coming of Age*, blog post, <http://polyscopy.wordpress.com/2012/09/25/information-age-coming-of-age/>
- Karabeg, D. (2013a). The Game-Changing Game— A Practical Way to Craft the Future, in *Crafting the Future*, the Proceedings of the 10th International Conference of the European Academy of Design EAD10, Gothenburg, Sweden, <http://knowledgefederation.net/Articles/GCGforEAD10.pdf>
- Karabeg, D. (2013b). Toward a Scientific Understanding and Treatment of Problems, lecture at *Information Technology and Journalism* workshop, IUC Dubrovnik. Summary in <http://polyscopy.wordpress.com/2013/06/05/toward-a-scientific-understanding-and-treatment-of-problems/>
- Karabeg, D. (2013c). Science and Religion, blog post, <http://polyscopy.wordpress.com/2013/04/24/science-and-religion/>
- Karabeg, D. (2013d). Dino Karabeg's Blog, <http://polyscopy.wordpress.com>
- Karabeg, D., and Rakovic, D. (2011). Knowledge Federation Prototype: Tesla and the Nature of Creativity (TNC), in Proceedings of the Round Table Knowledge Federation 2011, Belgrade, Serbia, <http://knowledgefederation.net/Articles/TNC-QIM2011.pdf>
- Knowledge Federation (2011). Knowledge Federation Workshop Barcelona 2011, webpage, Knowledge Federation Wiki. Retrieved February 1, 2013, from [http://www.knowledgefederation.org/Knowledge\\_Federation\\_Workshop\\_Barcelona\\_2011](http://www.knowledgefederation.org/Knowledge_Federation_Workshop_Barcelona_2011)
- Knowledge Federation (2013). Knowledge Federation website, retrieved July 15, 2013, <http://www.KnowledgeFederation.org>
- Kuhn, T. (1996) *The Structure of Scientific Revolutions*, University of Chicago Press.
- Meadows, D. (2012). It Is Too Late for Sustainable Development, lecture at *Perspectives on the Limits to Growth* conference, Smithsonian, Washington D.C. Video recording <http://www.youtube.com/watch?v=f2oyU0RusiA>
- Ozbekhan, H. (1969). Toward a General Theory of Planning. In E. Jantsch (Ed.) *Perspectives of Planning*, OECD, Paris, 1969.
- Pauli, G. (1987). *Crusader for the Future: A Portrait of Aurelio Peccei, Founder of the Club of Rome*. Pergamon Press, Oxford, GB.
- Peccei, A. (1981). *One Hundred Pages for the Future*. Pergamon Press, Oxford, GB.
- Pharand, P. (2011). *The Great Acceleration*, graphs, Anthropocene Journal Dec. 22, 2011, <http://anthropocenejournal.com/2011/12/22/the-great-acceleration/>
- Toulmin, S. (2001) *Return to Reason*. Harvard University Press.

APPENDIX

JANTSCH AND ENGELBART BETWEEN TWO GLOBAL BIFURCATIONS

We complement the above call to action by presenting a story version. The final version will be told as a series of vignettes in a blog post (Karabeg, 2013d) and possibly in a book. Here we only draft, and highlight, some of the points.

Our story begins in 1968, “the year of a global bifurcation”, when global change seemed imminent. Erich Jantsch appears in the story as “a man who clearly saw what needed to be done”. We see him having “endless conversations” with demonstrating students in Paris; we see him deliver a keynote speech at the opening of The Club of Rome; we watch him organize the Bellagio conference where *rational creative action* as a general way of responding to ‘the predicament of mankind’ was drafted.

We ponder with him over the key question: “Who (i.e. what institution) might spearhead *rational creative action* in real-world systemic practice?” We conclude together with him that the university will need to play this key role; and that university will need to change to adapt to this role:

“[T]he university should make structural changes within itself toward a new purpose of enhancing the society’s capacity for continuous self-renewal. It may have to become a political institution, interacting with government and industry in the planning and designing of society’s systems, and controlling the outcomes of the introduction of technology into those systems. This new leadership role of the university should provide an integrated approach to world systems, particularly the ‘joint systems’ of society and technology.” (Jantsch, 1969)

In 1969 we are with Jantsch for a semester at the MIT, where he is talking to the administration and the faculty at the MIT, where, he believed, the “structural changes” could naturally begin, and where the above excerpt was written as part of his report and proposal.

Hence we see Jantsch not only advocating *bootstrapping social-systemic change* to a leading university; we see him engaged in this *bootstrapping*, to his best ability.

Jantsch’s initiative did not succeed.

Not only did he not succeed in engaging the MIT administration in a conversation about his ideas; also The Club of Rome took a subtly but significantly different direction from the one he and his co-authors of The Club of Rome’s statement of purpose (Ozbekhan and Christakis) were proposing—a year later, and at the very department where Jantsch made his proposal for academic re-evolution.

During the 1970s we are with this “man who clearly saw what needed to be done” in Berkeley, having occasional courses but no steady affiliation with the UC Berkeley, living with minimal means and with no steady income. Yet working tirelessly on his agenda. We sit with him in his seminar at UC Berkeley, as he listens for the first time to Ilya Prigogine. We look over his shoulder as he writes “Design for Evolution—Self-Organization and Planning in the Life of Human Systems”.



## Bootstrapping Social-Systemic Evolution

We follow Doug Engelbart's story in parallel to Jantsch's: Having anticipated—already in 1951(!)—the potential for networked computer technology to enable collectively intelligent human systems, and in that way solutions to increasingly complex human problems, Engelbart undertook to do what he could to realize this possibility. In 1968, “the year of a global bifurcation”, we see him demonstrating the personal and networked computing technology as we know it today, all developed in his SRI-based laboratory. Although widely celebrated for his inventions, Engelbart too did not succeed in his project to change real-world systems; his technology solutions were adapted to habitual ways of doing things (the desktop, the filing cabinet...) and turned into some of the most successful business ventures (Karabeg, 2012d).

During the 1970s Jantsch and Engelbart lived and worked across the San Francisco Bay from each other—Jantsch at UC Berkeley, Engelbart at Stanford Research Institute. Yet (as far as our investigations could probe) they did not meet and did not know about each other.

What would have happened if these two men met and collaborated?

A key element of Jantsch's 1969 MIT proposal was to create “system laboratories for integrative system planning and design”; at that time Engelbart already had one.

Engelbart couldn't convince his sponsors, his co-workers and most importantly the Silicon Valley entrepreneurs that the information technology's most valuable potential is to *change* the existing systemic solutions, in knowledge work and beyond; that those can be made incomparably more effective, and better serving us in these demanding times. Erich Jantsch, and more broadly the systems sciences, owned this message, with compelling, scientific arguments.

In the 1980 Erich Jantsch organized a conference and published two books, all about the “evolutionary paradigm”; and passed away, at the age of 51. Ronald Reagan became the 40th US President. Stating, famously, that “government is not the solution to our problem; government *is* the problem”, Reagan championed an entirely different course of systemic evolution than what Erich Jantsch had in mind. Notably, this was more than three decades after Norbert Wiener presented a passionate argument, in *Cybernetics*, why reliance on the market as regulatory mechanism cannot work:

There is a belief, current in many countries, which has been elevated to the rank of an official article of faith in the United States, that free competition is itself a homeostatic process: that in a free market, the individual selfishness of the bargainers, each seeking to sell as high and buy as low as possible, will result in the end of a stable dynamics of prices, and with redound to the greatest common good. This is associated with the very comforting view that the individual entrepreneur, in seeking to forward his own interest, is in some manner a public benefactor, and has thus earned the great reward with which society has showered him. Unfortunately, the evidence, such as it is, is against this simple-minded theory. (...)

We spend some illuminating moments looking at this situation together, discovering a paradox and an anomaly—in the social system of science, including the systems sciences: By limiting our stance to ‘objective observers’, we have dramatically limited our impact in the social realities where our presence is urgently needed. Imagine (as an extreme scenario, suitable for a thought

## Bootstrapping Social-Systemic Evolution

experiment) if instead of continuing to research and publish and deepen our understanding of systems (i.e. instead of pursuing our usual academic work) we chose around 1968 to team up and self-organize around the task to strategically bring a single key insight to public awareness—such as the one shared by Wiener, and Jantsch, and so many other systems scientists at that time, that social-systemic evolution *must* be consciously, and democratically, guided.

The world could have been a different place today!

The experiment in social-systemic evolution that began in the 1980 was concluded in 2008. In our story the 2008 emerges as another “year of a global bifurcation”, where the financial crisis revealed the fallacies and the risks related to our society’s current way of evolving. The question remains—Can we do better this time? Can we learn from history?

Our call to action is to create a virtual ‘space’ where a contemporary Jantsch may meet a contemporary Engelbart, and collaborate, and receive all the support needed for realizing their shared vision.

In 2008 we follow Doug Engelbart to Stanford University, to a festive 40th anniversary conference honoring his 1968 demo. We hear Alan Key say that he didn't know what Silicon Valley would do when it runs out of Doug's ideas. We hear Sam Hahn ask Doug how much of his ideas had been implemented; we hear Doug answer “3.2%”. We see a parallel event and community being created, called Program for the Future, to help realize the rest. When asked the same question at the second Program for the Future conference in 2010, Doug would answer “3.6%”.

Doug Engelbart passed away a week ago, while this article was being completed.