

Chapter 1

2008 – 2011 World Economic Crisis, New Paradigms, Science Methodology, Information Systems, and Decision Systems

Orhan Güvenen

Bilkent University, Turkey & University of Paris – Pantheon, France

ABSTRACT

The human society and market structures need a “regulatory framework,” new paradigms which endogenize ethics, efficiency, rights, and minimize risks in decision systems, which can converge in peace and human sustainability. Ethics is a necessary condition for any system at the individual, institutional, corporation, national, and international levels. Globalization with automation transformed global market parameters. Information distortion in information systems may create high alternative costs such as problems of quantification of socio-economic phenomena and negative impacts on quantitative and qualitative distortions in decision-making structures. In the 21st century, it became a necessary condition to transform power driven systems to science and culture and endogenize ecology, ethics, which aims “human optimal” welfare decision systems at the world level.

2008 – 2011 WORLD ECONOMIC CRISIS

In the context of the 2008 world economic crisis, we observe that the world GDP was \$ 60 trillion at that time. However, the amount of financial operations in investment banking and markets were over \$ 600 trillion. Concerning this huge amount, we observe that there was no, and today there is no any legal, economic regulatory frame-

work concerning these operations and markets. It can be considered that it is appropriate to call it a “crisis of ethics.” The human society and market structures need definitely a “regulatory framework” which endogenize ethics, efficiency, rights and minimizing risks in decision systems which can converge to peace, environmental, nature and human sustainability.

Financial and economic crisis requires urgently the establishment of a more realistic set of basic

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concepts and the promotion of tools for managing complex, dynamic, economic problems (Smith, 2010).

Theorem 1998: System Optimal = $\alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \dots + \varepsilon$ (Güvenen, 1998, 2011)

“ α_0 ” is necessary condition which represents ethics whether at individual, corporate, institutional, nation state, transnational corporations, international organizations and international sphere levels.

In the realization of any system optimal all explanatory variables ($x_1, x_2, x_3, \dots, x_i$) may change through time and space dynamics. The necessary condition is that ethics (α_0) must remain constant. If this condition is not satisfied, the system will be under optimal.

Computerization with automation transformed substantially global market parameters (Volle, 2011). As a remarkable tool which contributes a lot to research, decision and daily life at the same time, we observe an abuse of this remarkable tool. This misuse can be considered also as another explanatory variable of the 2008 World Economic Crisis.

The actual European Union economic crisis is structurally different. EU does have very heterogeneous structures concerning financial, economic, technological, political issues. In practical and mathematical sense, EU optimal becomes purely an ambiguous concept. Given the substantial heterogeneity between 27 nation states, the practice of decision-making and its realization in terms of financial, economic, technological, political decision systems are highly exogenous to the realization of European Union optimality and complementarity. We observed these facts in the failure of “2000 – 2010 Lisbon Criteria” which aimed to reach at least the level of USA in terms of technology, research, competitiveness. Equally, the achievement of homogenous and complementary decision systems concerning financial markets,

economics, politics, and governance represents non-negligible problems.

The below mentioned theorem summarize this observation:

Theorem: Set Optimal $\neq \Sigma$ subsets’ optima

EU Optimal $\neq \sum_1^{27}$ Individual EU country optimal (Güvenen, 2011a)

These factors can be considered as the main explanatory variables of the actual EU economic and financial crisis.

WORLD DYNAMICS AND NEW PARADIGMS

The individuals’ basic instinct converges to survival and search for a “power driven system” behavior. In the search of power, humans created institutions and various strategies throughout the history. In terms of decision systems, the following decision making actors can be considered as the most influential ones: international sphere, nation states, international organizations, transnational corporations and enterprises, non-governmental organizations and the individual which represents the core of socio-economic systems. The individual remains the core and the “initial signal” provider of the system in normative approach. Welfare conditions of the whole world are determined by the mutual complex interactions of the above-mentioned institutions through competition, cooperation and complementarity.

In 2011, we live in a world driven by power and power of money imposed socio-economic systems (System 2). The mentioned approach cannot create a sustainable world system. We need to move to a normative system (System 1) driven by science, education, technology, innovation, ethics, values systems, culture and global consciousness which

should be the input of decision systems (Figure 1). In the realization of this System 2, which is of normative structure, the humanity will have non-negligible difficulties and constraints to move from System 2 to System 1.

The above mentioned analysis concerning world dynamics in order to move to System 1 requires the realization of new paradigms in science, economy, decision systems, politics and socio-economic structures (OECD, 2011).

Dreyden (2011) refers to 6 paradigm sections:

- Paradigms in science and economics
- The economic crisis and a new paradigm
- Developing new sources of growth through innovation
- The OECD Innovation Strategy and the role of science
- The ICT revolution and a possible trajectory
- Shaping a new economic paradigm

Aiming new paradigms and thinking about the interactions of fuzzy systems, information systems, econometrics, statistics, theory, data production, data mining, measurement, applications in the context of decision systems requires the analysis and endogenization of the complexity at the individual, corporation, institution, sector, nation states, and world dynamics level (Güvenen, 2009b).

We need to debate some necessary changes in our practice, diagnosis, and basic paradigms. We

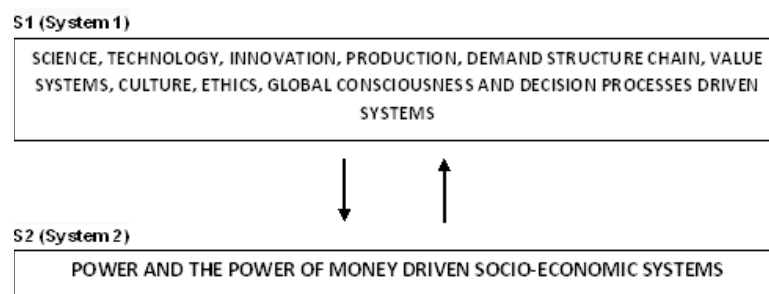
need to find answers and solutions to: what can be the contributions of transdisciplinarity, nanotechnology, informatics and new economic paradigms to the society, to economics, scientific analysis and their applications in 2010 and the in the coming decades?, What needs to be corrected?, What are the initial signals, the driving structures of the decision systems concerning the society in this context? 20th century gave remarkable scientists, but a limited number of polymaths. What is the difference between a polymath and a scientist? A polymath is a scientist, plus having the capacity through the transdisciplinary methodology to link her or his subject to other disciplines, in science but at the same time to culture, art, ethics, life, decision systems. This approach needs also to be reflected in our education system. In 21st century, it became a necessary condition to transform power driven systems to science, culture and endogenize ecology, ethics, which aims “human optimal”, peace, welfare decision systems at the world level (Güvenen, 2011b).

SCIENCE METHODOLOGY

Science methodologies in the 20th and 21st centuries, especially social science methodologies, dominantly used subset and partial analysis approach.

Along with providing short-term solutions in the analysis of social and economic phenomena, subset approach and partial analysis approach

Figure 1. World dynamics in its actual state (S2) and normative approach (S1) (Güvenen, 2008)



creates, especially in the medium-long term; mechanistic, short-termist approaches and non-negligible alternative costs.

Subset analysis without consideration of the general system interaction may yield alternative costs.

Especially in the social sciences, such approaches are vulnerable to short-term mechanistic incentives. Partial analysis can be applicable, but understanding general system interaction, set structure is required in order to apply scientific knowledge to decision making.

A monetary model, as an example, which is found to be suitable theoretically may fail because of the effect of social and cultural variables of the society to where it is going to be applied. Another vulnerability is the rapid development of information sciences and technologies without consideration of possible information distortion and measurement.

Transdisciplinarity in science methodology is targeted to complex phenomena; it has iterative approach and covers various sciences and disciplines (Güvenen, 2010).

It endogenizes the following factors:

- Methodological capacity to create interactions with various disciplines in science, art, culture and life in order to understand, solve interpret and act on complex problems.
- Understanding and analysis of observable, iterative, probabilistic phenomena.
- Iterative and continuous learning processes between theory and applications.

“Imagination is more important than knowledge,” Albert Einstein. Einstein’s sentence endogenizes perfectly the transdisciplinarity in science (Güvenen, 2009c).

Socio economic systems do have the following characteristics: being mathematically complex, mathematically chaotic, fuzziness, and limited predictability (Güvenen, 2010).

INFORMATION SYSTEMS

“Information Technologies” creates a base for “Decision Support Systems”. The effectiveness and reliability of the decisions depend on: quantity, accuracy, timing, quality, credibility of the information that prevails in the system (Volle, 2008).

With the help of data mining tools, meaningful representations are drawn from huge data warehouses but generally the reliability of data is not considered enough. That makes the conclusions distorted. Therefore, a filtering mechanism that eliminates data with a certain minimum error margin is needed.

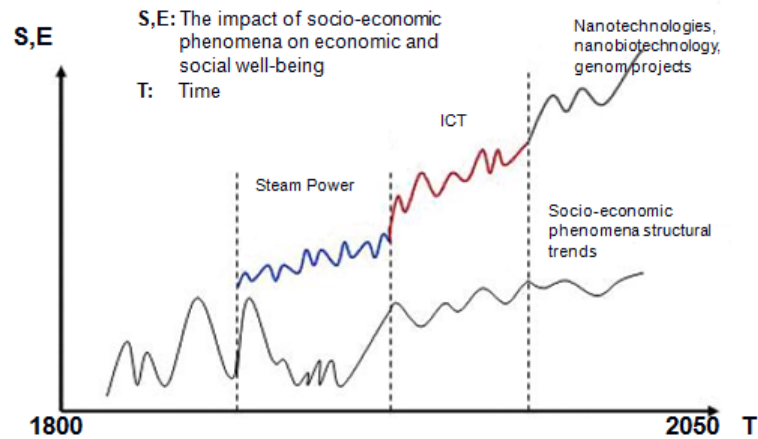
Data Analysis tools can be very useful in minimizing error margins. The Information and Communication Technologies (ICT) did not only affect the individuals’ lives but also opened new levels of awareness for public, corporate decision makers in terms of governance, and for academicians in terms of proposing new areas of research.

At the same time, the intensification of information and communication technologies made it harder to control the quality, authenticity, and reliability of the information that is available. The inconvenient truth is; the information can be distorted, manipulated, distracted, or influenced in order to mislead the user of the information for a specific purpose. There are several examples to these phenomena from all disciplines which created very high social and economic alternative costs.

“Our civilization, our quality of life and our standard of living are built on understanding the world around us. Understanding something means we can predict how it will behave, and perhaps even influence and control it. It means we can reduce the uncertainty and doubt which surrounds us. Such understanding and such ability to intervene and control come from facts, information, and observations: they come from data about the world around us” (Hand, 2007).

Figure 2 explains, in a global approach, the impact of technologies in time of dynamics on

Figure 2. The impact of technologies on socio-economic structures in time dynamics (Güvenen, 2009b)



socio-economic structures from 1800 to 2050. We observe that each technology like steam power, ICT, nanotechnology creates a mathematical chaos and moves to upper strata, the socio-economic structure evolution.

In the society, it can be considered as fair approximation that 3% of total information flow can be considered as scientific. It is expected that scientific information also contains error margins.

Some parts of these errors are caused by the unbiased and honest experiments of researchers. Another part of these errors can be categorized as information distortion.

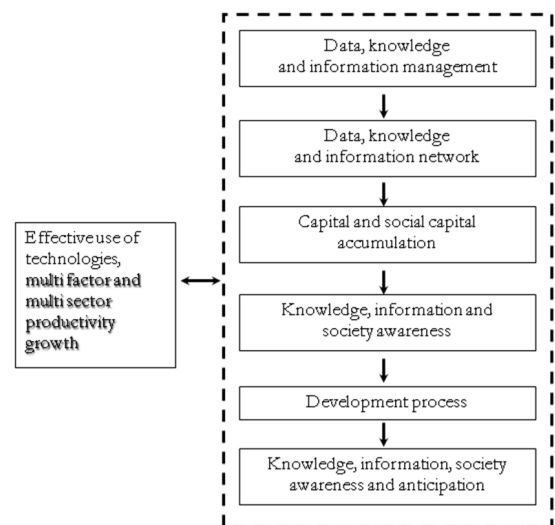
The major proportion of the information that is out of 3% of the total information flow is demand driven, power and power of money driven information system which endogenize a non negligible ratio of information distortion.

In research and decision systems, in a non-negligible way, data, information level, statistics are used without a systematic evaluation of information distortions and error margins. The alternative costs and misunderstanding that is caused, is an important fact that has to be considered carefully in the national and global scope.

Ethics should be also considered as a necessary condition in Information Systems (IS), research, teaching, and practice (Mingers, 2010).

“Hermeneutics” is a fundamental rule in science methodology (Gadamer, 1976). The initial source, the initial signals may avoid in the time and space dynamics, high negative impacts and alternative costs that may occur.

Figure 3. The interaction between decision process and technologies (Güvenen, 2009a)



“Information pollution” is an important topic as environmental pollution, and it has to be considered and resolved sensibly.

Information distortion in information systems may create alternative costs: quantification problems of socio-economic phenomena and negative impacts of quantitative and qualitative distortions on decision making structures.

DECISION SYSTEMS

Knowledge generates opportunity and power. It requires “ethics,” “responsibility,” and “accountability” for optimal decision systems. Making “ethics and value systems” endogenous to the decision systems is a necessary condition. Discrepancies created by access to knowledge and technology, information distortions create high alternative costs in research and decision-making.

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Globalization is one of the most important socio-economic phenomena of the recent decades. Information and Communication Technologies (ICT) are the explanatory variables of the globalization. ICT made it possible to make in real time financial transactions in the world financial markets. The amount of money daily processed in the global financial markets, on the average, is 3 trillion U.S. dollars. However, the system is not

fully protected against the effects of information distortion. That is why financial scandals based on information distortion are observed. Neither an effective nor economic legal regulatory system does exist at the global level.

Decision systems must endogenize the convergence of factors which determine the S1 (System 1). In other terms, these factors must converge to decision systems.

Figure 3 represents the interaction between decision process and technologies.

Innovation can be considered as a very important factor in global and social challenges leading to decision making (OECD, 2010). Other factors which are equally important to be considered by the decision systems are: for whom we realize the growth and development and the possible equity in income distribution (Groff, 2011).

CONCLUSION

“Information Technologies” creates a base for “Decision Support Systems”. The effectiveness and reliability of the decisions depend on: quantity, accuracy, timing, quality, credibility of the information that prevails in the system.

In research and decision systems, in a non-negligible way, data, information level, statistics are used without a systematic evaluation of information distortions and error margins. The alternative costs and misunderstanding that is caused, is an important fact that has to be considered carefully on the national and global scope.

Endogenization of “ethics and value systems” to decision making is a necessary condition. Besides the negative observations concerning the “observable real world” issues; technological, scientific, and value systems development in the human history may provide us some hope and insight for a feasible future in moving to different socio-economical, behavioral, ethical, cultural strata.

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