AN AGENDA FOR SOCIOCYBERNETICS
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Abstract
We propose to adopt the complex systems approach as well as social practice and social analysis theories based on the interaction of the social systems elements, self-organization processes and social emergence as the new approach to Sociocybernetics. Based on these considerations in this paper an agenda for the Sociocybernetics is proposed in order to provide the basis for a meta-methodology of social complexity.

Keywords: Sociocybernetics, social practice, complex systems

Introduction
The solution of social problems is a function of taking the right methodological approach, as well as applying the most advanced theories and techniques of social analysis (Crone 2011). In fact, this is the only way to sustainable development, to distribute more equitably the social contributions and benefits to the population and to face the threats of globalization taking advantage of the opportunities.

Contemporary societies are in constant interaction with every kind of turbulent environments, both natural and social. Moreover they are affected by internal and external conditions whose impacts depend from the social structure and the decisions to be taken at the internal and external level. Some of these conditions are the vulnerability of the majority of countries in front of the interests of the dominating global powers, the lack of social, economic, regional and cultural internal integration of most countries, a polarization of the national and regional income and an unfair income distribution in terms of costs and social benefits producing a large excluded poor population.

For all this, our social, economic and political problems are difficult to solve with traditional reductionist approaches and its treatment by traditional theoretical analysis and the linear theories associated with planning and management is very limited (Wallerstein 1999).

In fact, social systems should no longer be regarded simply as reactive, linear systems, explainable and manageable by narratives and common sense but be approached as
dynamic, nonlinear, far from equilibrium, interactive systems, capable of adaptation, learning and innovation, with a tendency to auto organize themselves in complex networks (Byrne 1998).

This new approach has been introduced and developed by Sociocybernetics and expanded by the Complex Systems movement.

**First and second order cybernetics**

The term Cybernetics comes from the Greek KYBERNETOS, which means the control man, the pilot,

Antecedents of Cybernetics are found in the work of Köhler (1927). He presents a theory of regulation and control in inorganic systems, comparing them with the organic ones. Lotka (1925) introduces the general concept of system, not restricted to physical systems, but including both biological and social systems. Canon (1929) develops the concept of homeostasis and Von Bertalanffy starts working on a general systems theory, in the early 30's.

In 1943, Rosenblueth, Wiener and Bigelow suggested different ways to give machines purposes, i.e. to make them teleological. However, it was not until the end of the Second World War that emerges the cybernetic-systemic thinking with the birth of general systems theory (Von Bertalanffy 1968) and cybernetics (Wiener and Rosenblueth 1948), defined as the study of information and control mechanisms in living beings and machines. Social systems researchers like Talcott Parsons and Jay Forrester adopt the categories of positive and negative feedback as fundamental concepts in analyzing social dynamics.

Cybernetics questioned the traditional causality point of view, introducing the notion of circular causality. However it maintained the objective knowledge principles of traditional science: “The researcher is an observer situated outside of the observed object” and “The properties of the observer must not influence the description of his observations”.

It was Heinz Von Foerster the cybernetitian who in the seventies questioned this first cybernetic framework and its utility not only to solve social problems, but even to perceive them: “How is it possible for an observer to describe an object, if he has not the required properties to make (to influence) the description?” (Von Foerster 1979). He extended the concept of Cybernetics to solve these issues, defining the first-order cybernetics as the
classical cybernetics of observed systems and the second-order cybernetics as the cybernetics of observing systems. In fact, social systems are self-observing, because they can reflect on themselves and change the way they behave in relation to themselves and their observers. To this framework belong concepts like self-organization, self-reference and auto-catalysis. With this new framework it was natural to approach social systems, where the researcher is a part of the social system and an active contributor to analyze and solve social problems from within.

The Sociology community however remained outside from these developments. Only Walter F. Buckley, an american sociologist, tried to convince sociologists not only to adopt the systems approach and the cybernetical concepts but to integrate the second-order cybernetics with the ideas of sociology in order to develop a new social systems field. Buckley conceived social systems as dynamical systems adapting to changing environment through morphostasis and morphogenesis. These concepts prepared the extension of the biological property of autopoiesis (Varela & Maturana 1974) to social systems.

At the end of the seventies a small group of scholars headed by Francisco Parra-Luna and including Felix Geyer, Kenneth D. Bailey and Johannes van der Zouwen took the pioneering ideas of Buckley and began to work in a new field located in the intersection of sociology and the cibernetical approaches that was called Sociocybernetics. Thanks to the pioneering efforts of Parra-Luna this new field was recognized by the International Sociological Association as an independent research group in 1980, becoming the research committee RC-51 in 1998. According to the Center for Sociocybernetics Studies Bonn, Sociocybernetics is the application of systems thinking and cybernetic principles in sociology and other social sciences in order to analyse social phenomena regarding their complexity and dynamics. That means that Sociocybernetics is observing the way sociology observes and analizes Society. Sociocybernetics is in fact a third-order cybernetics.

Meanwhile a new approach to social systems emerged: the Niklas Luhman’s approach (Luhmann 1984) characterized by considering social systems composed not by human beings but by communications. Today’s society is the largest system encompassing the communications of the whole world. Luhmann adopts the Maturana’s biological self-reproduction concept of autopoiesis, and takes it over to sociological field. Social systems,
as communication systems, reproduce themselves in order to survive. Moreover, social systems are observing systems that even observe themselves. This is the role of sociology (Luhman 1997). This fact links Luhmann’s approach not only to second-order cybernetics. In fact it relates Luhmann’s sociological theory to the third-order cybernetics field of Sociocybernetics.

Complexity approaches

To address these new sociological way of thinking, our social systems must be approached from the standpoint of the meta-theory of scientific realism of the British philosopher Roy Bhaskar (Bhaskar 1978, 1986) that is not phenomenological, nor positivist, nor reductionist, but holistic. Bhaskar advocates a realist ontology and a scientific critical naturalism that distinguishes the world of nature from the social world. According to Harvey & Reed (1997) a new social scientific world view emerges from this realist ontology of Bhaskar and the complex systems approach, particularly the theory of dissipative systems, giving way to “a dynamic realism… capable of sustaining the particularity and plurality of the social world while preserving rational canons of scientific understanding” (Harvey & Reed 1997, pp297).

Dissipative systems are based on nonequilibrium thermodynamics (Prigogine & Stengers 1984). They are subject to the second law of thermodynamics: the increasing entropy law that drives its dynamic evolution toward a stage of maximum disorder and undifferentiation. However if dissipative systems are open systems, with active interaction with their environment, they may develop negentropic processes through internal metabolic mechanisms to counteract the increasing entropy processes. These mechanisms must take energy from the environment and eliminate positive entropy (waste) giving it away to the immediate environment. In this way dissipative negentropic systems may not only grow but evolve, increasing their internal structural and functional complexity and have a long life in a state far from equilibrium. The evolutionary process begins driving the system to a chaotic bifurcation point, where the system oscillates between two or more attractor points until it settles in a new configuration that depends from the initial conditions.

All biological systems, including man, are evolved dissipative systems. They live so long as their internal metabolic negentropic mechanisms are able to counteract their
positive entropic processes.

Dissipative social systems have the same thermodynamic properties and traits that the human beings that produce them. They have evolved from certain initial conditions, through collective internal structuration and external perturbations.


**Social practice theory**

Now how can we define an agenda for Sociocybernetics? Before trying to answer this question we must discuss the definition of the social research objects.

Quoting Castellani “sociology is the study of social practice” (Castellani 2009, pp37). This definition is based on a new branch of social theorizing called practice theory, whose principal exponents are Anthony Giddens (1984), Pierre Bourdieu (1990), Michel Foucault (1980) and Brian Castellani (2009). In fact, they conceptualize social reality as social practice, taking social practice as some combination of structure and agency avoiding the dualist sociological discussion between structure and agency. Elaborating on this approach, Castellani (2009) defines social practice as follows: Social practice is any pattern of social organization that emerges out of, and allows for, the intersection of symbolic interaction and social agency. Social practice is the critical concept to define a social system. In fact, for Castellani social complexity theory begins with the assumption that a social system is a type of social practice (Castellani 2009 pp44). This approach coincides with the social systems approach of Luhmann where the referred social practice is communication (Luhmann 1984).
Taking the social practice as the research object of sociology, we may now identify the different types of social practices that are the focus for Sociocybernetics. According to Ritzer (1975, 2000) we may define two dimensions in social analysis: the macroscopic – microscopic and the objective – subjective dimension. Combining these dimensions we define four levels of social practices:

1) The macro – objective level, for instance: practices related to society as a whole, macro-economy, urbanization, industrialization, technological development, governability, etc.

2) The micro-objective level, for instance: practices related to behavioral patterns, social interactions

3) The macro-subjective level, for instance: practices related to culture, social norms, values

4) The micro-subjective level, for instance: practices related to perceptions, beliefs, social construction of reality.

If according to its cybernetical definition the basic task of Sociocybernetics is to understand the guidance and control mechanisms that govern the operation of social practices and to devise better ways of regulating and intervening in them, it is obvious that Sociocybernetics is then the integrated sociological paradigm able to tackle all four levels of social practices.

**A framework for sociocybernetics**

This is the framework we propose for the development of Sociocybernetics. For this framework we propose to adopt social practice theory (Giddens 1984, Bourdieu 1990, Foucault 1980 and Castellani 2009) as well as social analysis theories based on the interaction of the social systems elements, self-organization processes and social emergence as the new sociological approaches to Sociocybernetics. Among these social theories we may consider the generative social science (Epstein 2006), the social network analysis (Wasserman & Faust 1997, Barabási 2003, Carrington, Scott & Wasserman 2005, Newman, Barabási & Watts 2006, Barrat, Barthélémy & Vespignani 2008, Ganguly, Deutsch & Mukherjee 2009, Barabási 2010), the theory of social structuration (Giddens

Conclusions

In this paper an agenda for Sociocybernetics was presented in order to provide the basis for a meta-methodology of social complexity. We proposed to adopt the complex systems approach as well as social practice and social analysis theories based on the interaction of the social systems elements, self-organization processes and social emergence as the new sociological approach to Sociocybernetics. Moreover this approach must be completed by mathematical-computational modeling and simulation because it is not feasible to use experimental social research on human subjects. The results of these simulations can generate valuable information for both the theoretical advance of the social sciences and pragmatical decision analysis in organizations. It is therefore necessary to assess the methodological possibilities and limitations of different modeling and computer simulation techniques, as well as analyze the comparative advantages each offers to different types of problems. In this way, the application of computational modeling techniques to social problems must be evaluated. Based on these considerations in this paper an agenda for Sociocybernetics was proposed in order to provide the basis for a meta-methodology of social complexity.

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