

# MANAGERIAL ACTION AND OBSERVATION: A VIEW OF RELATIONAL COMPLEXITY

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## **Abstract**

Any interaction implies a reciprocal influence between elements or systems. Observations are forms of interaction between communicating systems. The Uncertainty Principle is always in play when a system is observing something else. Out of the sub-atomic world, it is nearly impossible to record its influence on the observed system. However, when observed systems are observing and communicating systems themselves, the act of observing influences the observed system. It changes under observation or communication with the observing system. This phenomenon of relational complexity affects strongly managerial actions and observations. It sets limits to knowledge and requires radical changes in traditional epistemology.

(Keywords: action; complexity; constructivism; cybernetics; enacted environment; epistemology; falsificationism; management; observation; self-organization; self-reference; system)

## **1. Introduction**

According to Ashby (1962) an organization is a conditional relationship between two or more systems or between sub-systems belonging to a single system. That conditional relationship can be more or less symmetrical, and hence more or less hierarchical. Either way, it is an interaction. If interacting systems are also living systems, they can observe each other, establishing an inter-observation. If interacting systems have a language and system of thinking, the organization between them is a communicating and a cognitive system<sup>1</sup>. Yet more significantly, when organization is a thinking system, it is also self-referential, that is, it is able to do self-observations. For human being that capacity begins with consciousness of the self. However, even without that capacity, in order to be self-referential, the capacity to perform Bateson's (1972) first learning level is sufficient. It means that minimum requisite is that to be a cognitive system.

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<sup>1</sup> Although in the broad sense of information theory, non living systems also exchange, information and therefore "communicate" with each other, by communication we mean the human one, verbal and non verbal.

Management science is developing an enormous literature dealing with organizations as interacting, communicating and cognitive systems<sup>2</sup>. More recently, even issues related with the usage of language as communication media entered the management field (Astley, Zammuto, 1992; Barley, 1983; Donnellon, Gray, Bougon, 1986; Fiol 1989). These works argue how interaction aspires 1) to mutual adjustments among members and organization sub-systems, 2) to make decisions (more or less intentionally), 3) to create organizational identity. Such processes of interaction are affected by many forms of complexity, ranging from computational limits of knowledge to ambiguity of events and words.

In this paper, we focus on an aspect of inter-action between communicating systems, implicit but less stressed in that literature: changes induced by an observer on an observed system through observation. Current literature deals with more or less intentional or goal-oriented interactions, possibly studying the role played by its instruments, like documents, codes, procedures, meetings, etc. It fails to investigate inter-observations, its forms and consequences. We try to explore these issues, and in particular to argue that: 1) observation is a form of action; 2) it unintentionally produces (stimulates) changes in observed systems; 3) and consequently, through feedback and circular causality, on observers. We propose to call this phenomenon relational complexity.

This kind of complexity is particularly relevant because it eliminates any illusion of epistemological realism. In fact, usual analysis of interaction can make it possible to argue that someone acts on an objective and real somebody else. Moreover, recent studies of knowledge formation and application, also in management science, seem to stress only its subjective character, again confirming that the world to be perceived is, in itself, real and objective. Instead, our emphasis on relational complexity argues that observation itself (the act of observing) produces changes in the observed world. Since any observation is an act of communication, boundaries between observation and action are very fuzzy. Therefore, the usefulness of shifting attention from action to observation is that, arguing that that is a source of relational complexity, the impossibility becomes definitely clear of maintaining epistemological realism in dealing with social systems.

Even Heisemberg's Uncertainty Principle in physics is to be regarded as a kind of relational complexity. It has been well investigated alongside 50 years of quantum mechanics and states the impossibility of simultaneously determining, with an arbitrary precision, those joint variables, such as momentum and speed, that would determine fully, according to classical dynamics, the trajectory of a particle. Dominant interpretation ascribes that impossibility to the act of observing both variables (Bohr, 1958; Jammer, 1974; Cini, 1982). Since it has been demonstrated and recorded only in the sub-atomic world, some scientists recently have been trying to find traces of the Uncertainty Principle in the life size world as well (Greenberger, Horne, Zeilinger, 1989). However, since I am not a physicist but a management scholar, and the relational effect manifests itself just in the life size world, like

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<sup>2</sup> In recent years see the Special Issue of the review *Organization Science on Cognition*, and Alvesson, Berg, 1992; Morgan, 1986; Pettigrew, 1979; Schwenk, 1988; Sims, Gioia, et al., 1986; Weick, 1969, 1988, 1995; Zan, 1995.

management, in this paper I deal only with relational complexity and not with the Uncertainty Principle.

This paper is structured in the following manner. In Section two a precise statement of relational complexity, and its cybernetic roots, is discussed. Section three, recalling some concepts and experiences of psychotherapy, addresses the issue to the field of management theory and practice. Section four explores the epistemological consequences of relational complexity.

## **2. Relational Complexity and its Cybernetic Roots**

Observation is action, as language indicates, including in the very word for observation that of action. Anyway, besides linguistic aid, best refutations of traditional dichotomy between observation and action come from the interaction between observer and observed. This is a blueprint for second order cybernetics, which in fact created the concept of the observing system (Foerster, 1982), in order to enclose observer and observed in a single, unique system. They cannot be separated. Of course, it is a reciprocal influence, and hence the observing system reacts to changes in the observed system, creating a recursive co-evolutionary process of mutual adjustment. It is a structural coupling. The concept of reality disappears, because it should be observed in order to be perceived and possibly understood. But if the act of observation changes reality, you cannot perceive and understand it in a pure sense.

Observation changes observed systems because it represents a change in its environment (context), to which the observed system reacts. Communication can more directly change the set of expectations or beliefs of the observed system, re-stimulating its reactions. To the extent communication influences the behaviors of the observed system, semantics becomes a source of relational complexity. To the extent observation occurs through signs (actions), semiotics becomes a source of relational complexity. Since passive (neutral) observation does not exist either in observing objects (natural systems), because of the Uncertainty Principle, or observing observers (living systems), observation is action and implies, more or less intensively, semiotic communication. Moreover, when the observed system is endowed with well developed languages and systems of thinking, observation implies communication and its semantic problems. Hence paradoxes of communication, mainly deriving from self-reference, apply to observation between observers.

The action of communication modifies the observed system during observation and, through feedback, the observer itself. Therefore communication is a fundamental concept in relational complexity, and cybernetics is the theoretical ground to explain it. Inseparability of observer and observed systems, self reference, and self-organization are the focal points of the second order cybernetics. One of the most meaningful consequences of this theoretical perspective is the suggestion to re-integrate the observer into its observations and to be very careful in assigning some property to the observed system rather than to the observer itself, or better, to the relationship between them.

The psychotherapist creates a relationship (transfer) which involves himself and his patient in a "super-system" (Haley, 1963; Jackson, 1968; Watzlawick, Beavin, Jackson, 1967; Watzlawick, Weakland, Fisch, 1974); managerial action and observation are wholly involved in relational complexity because "the manager is himself an element of the system he is managing" (Foerster, 1984, pg.3). Jointly taken, therapist and patient, manager and his organization, constitute an observing system, and second order cybernetics is the appropriate epistemology to take account of that situation. Two questions arise: 1) how concretely does relational complexity occur in social systems?; 2) how is it possible to design, control and develop this kind of system?

### **3. Relational Complexity in Management**

The Palo Alto school has developed and disseminated the concept of relational complexity in psychotherapy (Beavin, Jackson, Watzlawick, 1967; Watzlawick, 1981), but a pioneer in this work has been Bateson (1972, 1980), who deeply worked and discussed it with Foerster and other cyberneticians (Heims, 1981, 1991). In particular, family therapy uses such cybernetic notions as circular causality, self-organizing processes of change, and systemic interactions (relational complexity) between therapist and patient.

It is impossible to observe without communicating, so that observation can be regarded as a type of communication. Observations are expectation-driven, because one observes in order to understand the external world. Expectations are oriented to check our cognitive maps either for rational or for emotional issues. Therefore one can observe an individual or a group in order 1) to evaluate their performances, 2) to learn something, 3) to imitate some behavior, 4) to seek friendship, complicity, or consensus, 5) to prevent surprises, 6) to menace, 7) to relax oneself, 8) to explore, etc. Although far from complete, this list is sufficient rich to show how many types of expectations can influence people through observations.

Inside organizations, these expectations imply interactive relationships between colleagues, managers, professionals, workers, etc. Since each one has expectations about the others, any observation activates a reciprocal reaction, based on reciprocal expectations. Therefore, each one is no more what he was before the beginning of the observation. Such change happens even if observation is not coupled with verbal communications, which actually are speech acts (Austin, 1962; Winograd, Flores, 1986). Even without this kind of genuine action, through the game of expectations, observation still remains an action.

Once it is accepted that one cannot observe systems without communicating with them, all problems of human communication also affect observation. Sciences of human communication, like semantics, semiotics, linguistics, pragmatics, etc., do share in different ways and measures an epistemological perspective close to relativism or constructivism. Social construction of reality, invented reality, circular causality, self-reference, scientific explanation as rhetoric or conversation, are all concepts common to the sciences of human communication and, for three decades, entering social sciences as well (Berger, Luckmann, 1966).

Since organizations are communicating and cognitive systems (Alvesson, Berg, 1992; Sims, Gioia et al., 1986; Weick, 1969, 1995) all communicating aspects of relational complexity play a fundamental role, and management theories have followed the same development of social sciences. For the past ten years, many articles in strategy, organization and accounting have stressed the role of human communication and language, as well as such concepts as cognitive maps, self-fulfillment, rhetoric, etc<sup>3</sup>.

The game of expectations, self-fulfilling prophecies, and communication rules are three relevant forms through which relational complexity works in management practice and theory. Since this paper has focused on relational complexity due to observation, I shall try to show the influence of expectations and self-fulfilling prophecies in two types of relationships: 1) those more "polluted" by actions, such as strategic behavior and work control; 2) those more authentically observational, such as consulting problems. The former ones imply greater space between observing systems, while the latter ones are usually of the face-to-face type. Lastly, I will try to provide some suggestions for approaching relational complexity.

The field of strategy is a paradigmatic one for relational complexity, because it involves strategic interaction between competitors and the pure epistemological activity of understanding the external world, which means assigning sense and constructing effective causal maps. Strategic interaction requires a previous inter-observation, to understand what competitors are doing and thinking, and in particular, what they would do and think if I did and thought certain things. It is precisely a selfreferential situation: "what he thinks that I think that he thinks ..." and so on, ad infinitum. Like any such situation, observations are embedded in expectations and give rise to immediate reciprocal changes, and possibly self-fulfilling prophecies.

Once abandoned traditional perspective of an objective observation of the competitive environment, there are many versions of the subjectivist one. Firstly, the most deterministic one depicts an environment which univocally determines organization behavior. Secondly, there is the cognitive-scientific approach, by which organization reacts to environmental constraints and stimuli in a two-way process of feedback. Thirdly, the role of cognitive maps drives and can distort environmental disclosure. However, all three of these subjectivist perspectives do not touch the realistic view of environment. On the contrary, Weick's enacted environment implies simply a change of environment through its recognition, which is precisely relational complexity. Weick claims that "how can I know what I think until I do not see what I say?" (Weick, 1969). The concept of enacted environment expresses quite well the idea of a constructed and invented-as opposed to a discovered-reality. It addresses constructivism, the only epistemology coherent and compatible with the concern of a world affected by many forms of complexity.

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<sup>3</sup> See (Alvesson, 1993; Arrington, Schweiker, 1992; Barley, 1983; Conger, 1991; Fiol 1989; Hines, 1988; Lavoie, 1987, Morgan, 1988; Smircich, Stubbart, 1985).

The case of work control is well explained by Mayo's research in Western Electric plants in the 1930<sup>4</sup>. They were searching for relationships between the physical variables of environment and motivation (productivity), selecting and keeping apart a group of workers for whom light intensity in the work place was increased. Significantly higher productivity was obtained. After some early enthusiasm some researchers tried diminishing light intensity, and again obtained an increase in productivity. After many other similar experiments, they abandoned the original project to find meaningful relationships between environment and productivity. Any increase in motivation had to be related to the execution of the experiment by itself, because any anonymous worker would have reacted positively to experiments because of the unexpected escape from anonymity. Besides other questions and criticisms regarding that important experience (Argyle, 1953; Carey, 1967; Franke, Kaul, 1978; Landsberger, 1958), we may say that observation invariably changed the observed system producing effects and results not very meaningful for understanding the "reality" of the possible relationship between environment and productivity.

We may add another example referring to a self-fulfilling mechanism that acts in a hard-control oriented organization. Obsessing on observations and controls causes frustration, de-motivation, and hence latent conflicts so strongly that the management is confirmed in its hard-control orientation. In the same way, bureaucratic management induces bureaucratic behaviors in workers, inhibiting learning functions. They will therefore need a bureaucratic management for working, because it is the only one which does not require any participation and learning. The well known dichotomy stated by McGregor (1966), Theory X and Theory Y, is a classical example of self-fulfilling managerial approaches.

When a consultant enters an organization, this latter changes immediately because people wonder why he is there. They will respond cooperatively, defensively or aggressively depending on the history, identity and culture of the organization. These three variables create different expectations of each member, so that their interactions and coalitions will activate a variety of positive or negative reactions to the observing and observable presence of the consultant. Moreover, he usually ignores partially or totally what kind of inter-personal or inter-group dynamics are in play. Often, the manifest problem to be solved hides latent struggles between internal coalition or individual managers. In observing the organization, the consultant is no longer external to it, but becomes part of it. Consultant and organization begin to co-evolve together. In this perspective, both jointly constitute an observing system interacting and inter-observing each other. Organization becomes his learning context, in which he tries to rise alongside Bateson's learning levels.

All leading authors in the field we have called relational complexity share common suggestions as to how to face this phenomenon, which does not mean that it is possible to avoid or to deny it. On the contrary, they propose that the only way to navigate in a world affected by relational complexity - which is our world as human beings - is to be conscious of its assuming constructivist epistemology, putting themselves in their own observations, observing themselves observing other systems. We can face self-referential situations only through what Bateson calls the second

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<sup>4</sup> See Argyle (1953), Bendix (1956), Mayo (1933, 1945), Miller and Form (1951), Roethlisberger and Dickson (1939), Wilensky J. and H. (1951).

level of learning function, that is, learning to learn. We must rise to a meta-level observation, observing ourselves as an observing system. Most likely, it is this ability that has driven some firms to escape from competition as the only way to strategically interact and so try to search for cooperation. Maybe it could lead to a different way of managing organizations and the social system as a whole.

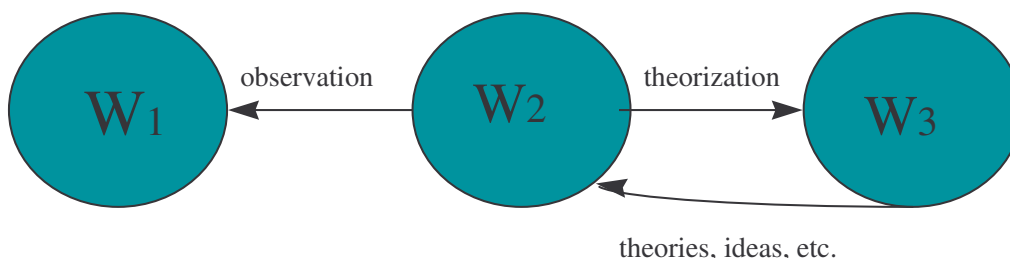
This possibility lies in a new view of the managerial task (Ulrich, 1984). First, it should develop the workers capacity for self-control, rather than forcing hetero-control, which is always implemented through heavy, rigid, and usually ineffective operating systems. That shifting from hetero- to self-control is totally consistent with that from hetero(hierarchical) to self-organization. The second change of the managerial task is that of seeing the manager as a sense-maker (Weick, 1995) rather than a problem-solver. "When managers are termed "decision-makers" or "problem-solvers?", it is misleading in that the associated concept is one that "sees" problems as "given" and as something that needs merely to be understood and solved. But problems are the products of human judgments; they cannot be found like an object, but must instead be contrived. This problematization of actual or anticipated circumstances and processes represents a primary management task" (Ulrich, 1984, pg. 89).

A similar discourse holds true for the consultant, who should take into account and analyze his own reactions in the sequence of reciprocal interactions and inter-observations with the organization's members. A first level of observation has to be coupled with a second one. Its knowledge of organization and of himself will depend on his ability to understand the observational-communicating strategies of the organization's members and groups. He has to think like a psychotherapist much less metaphorically than is usually believed.

#### **4. Epistemological Consequences of Relational Complexity**

To better understand the epistemological consequences of relational complexity, we may compare it to Popper's theory of knowledge (1972, 1974). Popper distinguishes three worlds (fig. 1): the world of reality (W1), the world of perceptions (W2) and the world of thoughts (W3). W1 gives data and facts (events) to W2, even if perceptions are subjective. Observers are in W2 and generate ideas and theories, which belong to W3. This latter is an objective world, because rationality is only one and its application can select the best of competing theories, by comparing them and testing them in W1.

# Fig. 1 Falsificationism and observation

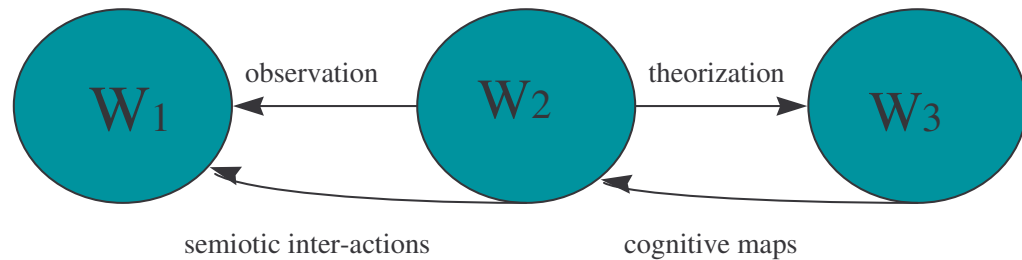


Besides the very disputable question of uniqueness of rationality, it is worthwhile that

Popper recognizes subjectivity of observations and perceptions. Since Popper cannot certainly be counted among constructivist or second order cyberneticians, the persistence (even in this conference) of many scholars in these fields to claim subjectivity of observation as a crucial distinction from previous approaches appears quite strange. A Popperian epistemologist would definitely agree to this point. For either Popperian or for constructivist epistemology, knowledge is of a conjectural nature. Both can use the metaphor of theories as maps constructed by the observer-scientist.

Popper's approach is subjectivist but denies relational complexity. Except for a weak concern for the indeterminacy principle and for a partial, episodic and contradictory reference to self-fulfilling prophecy, his W1 remains untouched by observation and theorization (communication). What changes between the two approaches is the claim of the former for realism, while the latter do not argue any immobile reality, toward which knowledge goes on asymptotically and incrementally. On the contrary, constructivists believe in very limited knowledge, and in a reality which co-evolves with the observer and is affected by his observations and tests (fig. 2). This is even more true in social sciences, in which reality itself is constituted of observers. In this perspective, Foerster's idea that "properties of things are properties of observers" carries much greater meaning. It is precisely a self-referential observation.

## Fig. 2 Constructionism and observation of natural systems



Moreover, Popper also accepts the feedback effect of W3 on W2, that is, of ideas (theories, conjectures or expectations) on perceiving systems of observers (actors, people, scientists, managers, etc.). He recognizes that the former entities influence the ways with which subjects observe the world. The essential point is that according to Popper, W1 does not change: it represents an immutable trial to which to submit theories and apply observations. It is independent from both of them. He precisely denies relational complexity<sup>5</sup>. For him there are no observing systems, but W1 separated and unaffected by W2 and W3. This is the significant and genuine discrimination between Popperian epistemology and constructivism or second order cybernetics<sup>6</sup>.

We argue it depends on two reasons. The first one is that he claims realism in philosophy of science, and therefore he cannot accept that reality disappears or changes when observed. The second one is that he does not recognize that in social sciences W1 and W2 coincide, in the sense that they are both observing and communicating systems. It means that W3 influences W1 directly, or indirectly through W2. The play of inter-dependent expectations and strategies-self-fulfilling prophecies are examples of this. Moreover W2 influences W1 directly, as shown by the Hawthorne effect, consultant activity, and organizational change.

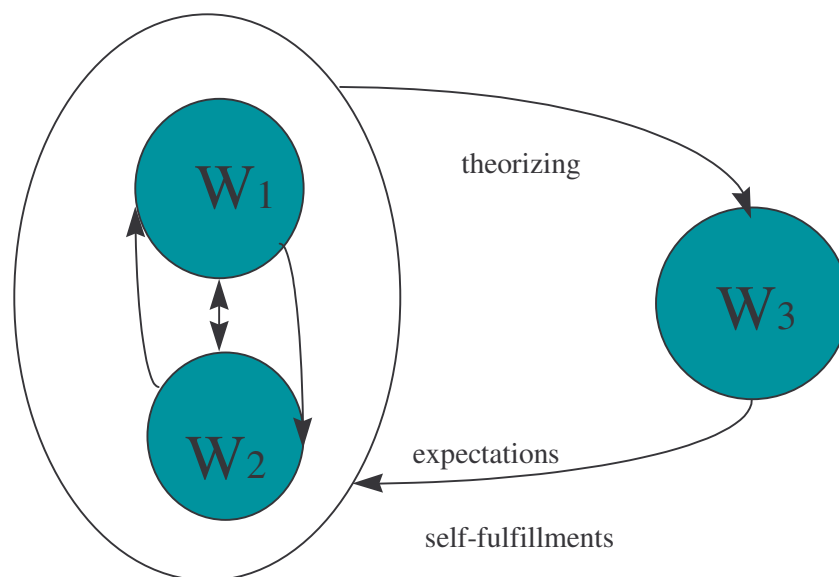
Self-reference is complete in social systems, because W3 is, in a certain sense, part of W1 and hence of the W1-W2 block (fig. 3). The coincidence of W1 and W2 in social sciences clearly shows the relationship between relational complexity and self-reference. In fact, if management of an organization thinks about the organization, it

<sup>5</sup> Indeed, he discusses the Uncertainty Principle, accepting it but confining it to a marginal effect (Popper, 1958). He accuses Bohr's complementarity principle and all Copenhagen's interpretation of quantum mechanics, of instrumentalism while he claims for epistemological (even if critical) realism. He argues that indeterminacy of quantum mechanics is compatible with realistic epistemology.

<sup>6</sup> To this, we may add some other important considerations, including, according to constructivism and post-positivistic epistemology, the following two: 1) data are theory-laden (Laudan, 1977), and 2) the act of testing modifies reality, like the act of observing.

means that W2 thinks of itself. Any change in W2 through actions or observations is a change in W1. Moreover, W3, through ideas, cultural values, representations, and expectations, influences W2-W1. When both are observing systems, reciprocal observation-communication leads to co-evolution. In this sense Foerster's idea that "property of things are properties of observers" carries much greater meaning.

## Fig. 3 Constructionism and observation of social systems



A final interesting consequence of relational complexity is a sort of inversion of traditional epistemology's linear causality, because the following event "causes" the preceding. In self-fulfilling prophecies and actions driven by expectations, this inversion is very evident, but indeed cybernetics, already at its origins, shocked the scientific world with teleological explanations, where the consequent "causes" the antecedent (Watzlawick, 1981). It explains why, even if self-fulfilling prophecies have been introduced early by Merton (1948) and reposed by Popper (1960), they can be really understood only with cybernetic approach, which stated and discussed deeply circular causation.

### 5. Conclusions

Managerial actions and observations imply relational complexity, that is, interactions and self-observations, which manifest themselves with exemplar evidence in strategic behavior, in defining the business, in work control and in consultant

activities. To the extent a managerial action or observation involve expectations or inter-actions between human beings, relational complexity play a strong unavoidable role. Any area of management theory and practice is affected by this effect, which can be faced only re-inserting observer (manager, consultant, worker, etc.) in its own observations (actions). Circular causality, teleological behavior, self-fulfilling prophecies are typical manifestations of relational complexity, which can be effectively understood by means of second order cybernetics. It vanishes any possibility to adopt realism as epistemological perspective, even in its recent versions, like Popper's theory of knowledge.

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