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Realism in Economics : Critical or Complex ?

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I – Introduction

The purpose of this paper is to propose a reflection on critical realism (CR) from the double standpoint of scientific practice in economics on the one hand, and of the theory of complexity in its second order ongoing developments (Delorme, 1999b, 1999c) on the other hand. Such a purpose engages inevitably in a trade off between a full fledged argumentation and a simplified, schematised focus on the central features. The limited scope of this presentation condemns us to the second alternative.

There are several ways of dealing with realism (Mäki 1989, Dow 1990) in addition to transcendental or critical realism (Bhaskar 1978, 1979, 1993, Lawson 1994, 1995, 1997). We will refer mainly to the contribution to this subject made by Tony Lawson. It is not intended here to discuss realism as such (Delorme, 1999a) but simply to compare the insights of CR with those of second order complexity (SOCX). Both rely on complexity, although they do it through different ways. Both emphasize the place of generative mechanisms as a way towards more realism and realisticness in social science. However they differ profoundly in their implications for scientific practice. Here CR is found unsatisfactory on this account for three main reasons. First, it provides a rather underdeveloped articulation with scientific practice. Second, it appears unduly restrictive in excluding several parts of scientific practice.

Third, and above all, CR posits a world which does not include the observing, thinking, and acting subject. Questions inevitably arise from this preconception. How can a general ontological position on reality exclude a part of reality ? How can CR denounce positivism in science (naturalism, universalism, deductivism, predictionism) while retaining one of the pillars of positivism, namely the separation of object from subject ? What are the implications of these presuppositions ? It is our aim to sketch out how SOCX provides insights avoiding these limitations. We present successively summaries of CR, of SOCX and of a discussion based on figures which will be commented in the oral presentation.

II – Critical realism

1. The sort of subject matter addressed here seems doomed to the use of -isms, which renders necessary to avoid as much as possible global-ism (!) and oversimplication when it goes down from the realm of philosophy to the domain of scientific activity.

Roy Bhaskar opposes scientific, transcendental and critical realism to empiricism, pragmatism and idealism alike, and, in the detailed working of science, rejects “crude determinism […] and “undifferentiated eclecticism” as well as “atomistic individualism and undifferentiated collectivism” in social science (Bhaskar, 1989, 1993, pp.2-3). Tony Lawson opposes CR to idealism, nominalism and irrealism (1994, p.220) and criticizes abundantly deductivism, empiricism and positivism.

2. Transcendental or critical realism is an ontological or metaphysical thesis about the nature of being. A commonly acknowledged goal of science is realism. This is common sense in sciences in which the protocols of testing against “real facts” are effective. This is less so in social sciences, especially in economics. Then does CR help social scientists in their everyday task of building a realistic knowledge of their subject matter ?

A first answer is given by Bhaskar (1989, 1993, p.3) “Realism is not, nor does it license, either a set of substantive analyses or a set of practical policies. Rather, it provides a set of perspectives on society (and nature) and on how to understand them. It is not a

substitute for but rather helps to guide, empirically controlled investigations into the structures generating social phenomena". It is complemented by Lawson: "[…] critical realism is essentially an under-labourer for science including economics, a ground-clearing device or tendency. It does not exist apart, or detached, from science, and it deals with the same reality. But its task is primarily to facilitate a set of perspectives on the *nature* (emphasis in original) of the economy and society, and on how to understand them. It is never a substitute for, but an essential aid to, or a meta-theoretical moment in, the empirically controlled investigations of science into the general structures that generate and govern the equally real phenomena of economic and social life". (1994, p.224).

3. Definitions and the basic argument.

    1. Scientific realism asserts the "existence and operation of the objects of scientific enquiry absolutely (for the most part in natural science) or relatively (for the most part in social science) independently of the enquiry, or more generally of human activity" according to Bhaskar (1993). Transcendental realism conceived by him posits that it is a condition of the possibility of scientific activity (experimental and applied) that "the objects of scientific enquiry (causal laws, generative mechanisms, structured things) not only exist but act independently of that activity-transfactually, in open and experimentally or otherwise closed systems alike" (ibid). The adjective "critical" denotes realism applied to social science. It is the term used by Lawson although he declares his preference for "structural" or "transfactual". Transfactuality denotes the irreducibility of reality to events and intransitivity the irreducibility to our knowledge. This irreducibility originates from the layered and structured character of reality. It is layered in three hierarchised domains or levels (Figure 1) which are unsynchronized or out of phase, but overlapping.

Domain, level	Entity
Empirical	Experience, perception, impression of the events/actions occurring at the level of the actual.
↑	↑
Actual	Occurrence of events and actions
↑	↑
Deep or deeper	Structures, mechanisms, rules, powers, relations, tendencies, processes governing and causing events and actions

Figure 1 : The layered reality of critical realism.

The arrows indicate the direction of influences from the domain of the deep to surface phenomena

2. The basic argument of CR is summarised by Lawson in the final chapter of his *Economics and Reality*. This chapter is entitled Economic science and prediction. I synthesise it in my own way below.
   a- It is directed against contemporary mainstream economics, whose central feature is a general insistence on the deductivist mode of explanation. Such a kind of explanation depends upon the closure of systems ("whenever this then that" structure of laws), while the social world is open and "seemingly insusceptible to scientifically interesting local closures, or at least to closures of the degree of strictness that contemporary methods of economics require". (p.282).
   b – The problems of mainstream economics originate ultimately from the epistemic fallacy, the reduction of ontology to epistemology, of reality to the events given in experience, in sum, of being following knowledge. Other fallacies are emphasized by CR: linguistic (being is in language), anthropic (being depends on man) and scientistic (persevering with a conception of science without explicitly questioning its ontological presuppositions).
   c – There is ultimately a choice between contemporary mainstream economics and reality. The deductivist project in economics has proved unsuccessful. Yet it remains sustained by the faith "that it is only a matter of time before success is achieved, that it is but a question of (repeatedly) trying harder" (Lawson, 1997, p.283). It is the refusal to focus explicitly on questions of methodology that prevents a recognition of this choice, of the fact that since ontological theory is inconsistent with the deductivist project in economics, at least one of them has to give way or must be transformed. This is nothing less than arguing "for orthodox economics' effective demise (as a general approach and *mainstream* [italics in original] position" (ibid). Yet, "if the choice is made in favour of reality rather than deductivism, economics as science properly conceived emerges as a real possibility" (ibid) since it will be an economics addressing the open and structured character of the social world, and as any science, it will be "primarily concerned to identify and illuminate the structures, powers, mechanisms, processes and tendencies that produce or facilitate such actualities as the events, including human actions, that we experience" (ibid, p.287).
   d – The scientistic fallacy pervades in the "near universal practice in economics of tying conceptions of economic science to the possibility of successful prediction" (ibid, p.285). This linkage is insisted upon as much by economists who believe in the association of science with prediction and consequently reject the possibility of economics as science as by those who believe that economic science, conceived in this way, has already been achieved. Successful economic forecasting is *unlikely*, because prediction of non-experimental events rests upon spontaneous occurrences of constant event conjunctions "which are not widely in evidence in the social realm" (ibid, p.287). It does not preclude the possibility of predicting tendencies and implies that attention be paid to context-specific structures and mechanisms. Successful economic forecasting is *not essential*, since the primary goal of science is not to predict events but to identify and understand the deep features which produce or facilitate them. Finally the possibility of successful forecasting of economic events is *undesirable* since "turning as it does on the existence of constant conjunctions of events, [it] would mean either that the future is already determined, or, if exogenous variables could be fixed by us, open to social *control*

[italics in original] . Either way the situation would be inconsistent with the possibility of generalised human choice and freedom" (ibid, p.289). In the theory of reality and science advocated by Lawson, "human choice, and indeed human emancipation are sustained as real possibilities" (ibid) since action (policies and strategies) can be conceived with the objective not merely of ameliorating events but also of changing structures in order to facilitate a "more desirable (…) range of human opportunities" (ibid). It is then worth quoting in their entirety the last two sentences of *Economics and Reality*: "Rational, intentional, emancipatory, real change is no longer found to be, as in positivism, in contradiction with the explanatory function of science including economics – indeed, it is recognised as being a very condition of science, properly conceived. Rather, critical realism provides a perspective on science, nature, society and economy that is not only explanatorily powerful but also able to preserve the intuition that human social history is explicable and yet actively made" (ibid).

III – Complexity and the world.

1. The view sketched out here draws on research in progress and in the process of publication (Delorme 1997, 1999a,b,c). It provides a meta theory of action and of the substance which is the subject matter of action. Complexity is usually associated with the latter, with entities of the observed world. The theory developed under the name of second order complexity, pertains to both action and the object of action. Indeed second order complexity (hereafter SOCX) developed in Delorme (1999c) finds its roots in developments of systems theory which have appeared roughly since the 1960's under the labels of second order cybernetics (Von Foerster), of the sciences of the artificial (Simon) and systems of the second generation or second systemics (Le Moigne, Morin). These are only the main strands of a quite diversified and otherwise rather confused evolution of systems theory in general since its inception after World War II.

Although the interest for complexity is quite anterior to modern systems theory, as is illustrated by Darwin, Veblen or Keynes, among others, it is only recently that a flourishing literature and a kind of multifaceted interest covering practically every scientific domain, even a quasi pop literature, have appeared. This renders all the more necessary to find out what are the common traits and to theorise complexity in its own right. SOCX is such a theory. It has implications for theory making. It resembles critical realism in its emphasis on complexity of the world. However it achieves it in a quite different way and with different implications for scientific practice. It incorporates explicitly a central feature left aside by critical realism, namely the actor, designer or observer. How this comes about is summarized below.

2. There exists a plurality of forms of complexity. The most popularised today is chaos theory. It consists in deterministic unpredictability of otherwise non stochastic dynamical systems. Among other examples are radical uncertainty, system's undecomposability, system's uncontrollability and algorithmic uncompressibility in computer science. I came across complexity when I faced a problem of undecomposability of the state and economy relations in a research on the economic role of the state in market led economies (Delorme, 1997).

3. These views have two basic features in common. First they consider that complexity is a property of objects of the world. Their theorising is developed as if it were possible to produce statements on the world independently of the process of enquiry into it. The latter

is taken for granted. It is one of the merits of Simon to have emphasized that such a substantive rationality in behaviour is legitimate only in specific, simple, – "non complex" – situations, and that in all other situations, deliberative, procedural rationality must prevail. In the general case of non simplicity, there is no independence between substance and procedure.

Second, a leading thread underlies all these instances of complexity : it is irreducibility. The very wording used here to identify these forms of complexity boils down to this unique notion. Unpredictability means irreducibility to a predictable state of affairs, etc. In all cases an actor is involved. This can be illustrated with the famous example of the sheep brain. Taking complexity as the quantity of information required to describe an object, to a butcher the brain is simple since it is easy to distinguish it from the other "meats" a butcher works on. To a neurophysiologist the brain "as a feltwork of fibers and a soup of enzymes is certainly complex ; and equally the transmission of a detailed description of it would require much time". (Ashby, 1973, p.1). Complexity depends primarily on the observer's, or more generally, the actor's purpose, on the field of activity and on the object, given a competent actor and the state of knowledge and know-how in the field of activity.

The irreducibility contained in complexity derives from the gap between the difficulty to perform a task and the standard of acceptable or satisfactory performance in a given field of activity. This introduces the reference to satisficing through extending it from the individual decision maker (Simon) to a socialized, intersubjective universe, thus avoiding the trap of individual solipsism. Then complexity can be defined as irreducibility to a satisficing substantive level of performance in an activity. Complexity pertains to any kind of activity, be it that of a butcher, a scientist, a plumber, an economist, etc.

4. Complexity is a property of both the *world* and the *process of action and enquiry into the world* (Figure 2). This duality is still hard to accept for scientists educated to believe, – and sticking to the belief –, that the strict separation of object from subject is the sine qua non condition for existence of science, which includes a majority of scientists in all fields of science. It is conforting to notice that this majority is slowly eroding, not only under the challenge of systems theory but also under the implications of the growing interest for the kind of reality represented by the entities of quantum mechanics (Mugur-Schächter, 2000) or even in the wake of disequilibrium thermodynamics (Prigogine and Stengers, 1984, 1992).

A second proposition ensues: since substance can be dealt with separately from procedure only in non complexity, it is necessary to identify the character of the situation previously to deciding on how to operate on it. In this sense action or procedure is logically prevailing over engaging on the substance. Action is prior to substance.

Third, *complexity is not complication*. In complicated and in simple situations as well, it is possible to achieve a satisficing level of performance however lengthy and difficult it may be. This denotes non complexity.

	Observing universe	Observed universe in social science
1- Standard approach	Separation Strict separation from the observed universe : « objectivity ».	S Observed
2- H.A. Simon	Concern for method but no explicit reflexivity on observer.	P→S Observed
3 - Second order complexity	P→S Observer	P→S Observed

Figure 2 : The relationship between observer and observed universe.

P : procedure S : substance

Fourth, it is necessary to draw a *distinction* between the complexity attributed to an *object* and the complexity of a *situation* entailing an action on this object (Figure 3). A given object can be perceived complex and yet be acted upon satisfactorily through the use of available techniques of treatment. Take the example of physics. Although the knowledge of the reality of the physical world is irreducible, physicists know how to compute trajectories, etc. But when there exists no available technique of treatment enabling to achieve a satisfactory outcome, a situation I experienced on the state-economy relations, then the situation is complex. Irreducibility resides in the absence of a satisfactory technique of treatment. This triggers the rationale for investigating at a meta, second order level compared to the initial object, first order level. It entails that a complex object does not imply necessarily a complex situation (line 3 of Figure 3).

Fifth, defining a *purpose* and a level of *satisficing*, and identifying the situation are key moments, but not the only moments, of the process of action and inquiry into the world. A fuller account entails a model of action in a complex situation. It is schematised on Figure 4 and developed in Delorme, 1999c. Given what has been written sofar, the recognition of situation is central to the argumentation.

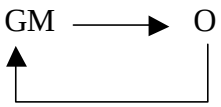
Sixth, complexity thinking, like systems theory earlier, arose out of a dissatisfaction with the kind of reasoning embodied in the analytical method – analysis for short – dominating in science. Thus the term of comparison for complexity theory is analysis. There is an *asymmetry* between them. While analysis excludes complexity, complexity subsumes it, it accepts its possible relevance to local, well defined situations. In this sense, complexity is more general than analysis or non complexity. The aim of situation recognition is then to identify non complexity. If a situation is not perceived "non complex" then the process of action in complexity follows. Because of this asymmetry, it is proper to behave in any case in a first step as if the situation were complex, then to recognise the practical situation, unless one has a solid reason to believe from the start that the situation is not complex.

Seventh, irreducibility can be represented by the *non-separability* of a pair of terms (A,B) in which A and B are different, can even negate each other, yet constitute a non separable duality. Complexity denotes this non separability. An example is the (order, disorder) pair : complexity does not reduce to order nor to disorder and yet "is" or "contains" both. This strange property illustrates what is paradoxical for, and ruled out by, the axiom of excluded middle which is the cornerstone of classical analysis. This paradox disappears once an axiom allowing for the possibility of recursion or of an "included middle" is introduced, which implies adopting a set of axioms ensuring the consistency of complex thinking (Delorme 1999, Le Moigne, 1990, 1995). Moreover this linkage is specific. It is recursive. In a recursive relation the outcome or product produces what produces it. It is a relation between a generative mechanism (GM) and its outcome (O).

Line	Logical level	Character of object	Technique of treatment	Situation created
1	Object	Simple	Simple	Simple
2		Complicated	Complicated	Complicated
3		Complex	Complicated	Complicated
4		Complex	No satisfactory technique	Complex
5	Meta	Complication of object at meta level and complexity at object level	Meta technique : anchored cmplexity (ACX)	Second order complexity (SOCX) generalized as meta complexity

Figure 3 : From objects to situations, the emergence of second order complexity.

In SOCX, several complex pairs are constructed. Three of them have an especially important place: the (meta, object), (procedure, substance) and (GM,O) pairs. The (GM,O) pair plays a key generic role and can be used to represent the archetypical symbolic and operating entity of SOCX, the *recursive loop* :



Whenever the loop can be dis-activated, we enter the non complexity realm. This occurs whenever O can be dealt with satisfactorily through the use of available techniques or algorithms. Then GM is neutralized or, equivalently, can be taken for granted and the relation becomes one sided : GM ⟶ O. The same goes for the other pairs.

A built-in consequence and fundamental feature of the propositions above, through the recognition of the central roles of action and recursion, is the place of time, duration and process. The very action or functioning of the loop implies an essential time dimension through which the abstraction of a loop is transformed into a recursive process, a spiral unfolding over time. It is a process since it has no absolute commencement nor any preconceived or predetermined end state.

We add the following statements, without further elaboration here. The generic loop is *invariant* with respect to scale and to context and has thus a general bearing. The representation or modelling of complexity necessitates a complex representation : the representation of complexity is itself complex. This follows from the irreducibility of complexity. However a complex representation can be simplified provided it meets the requirements incorporated in the agreed or constrained satisficing. The scheme of action in a complex situation of Figure 4 illustrates this : it is meta complexity rendered operational. (Delorme, 1999b).

Another simplification pertains to the relation between action and substance or “the world”. It involves always a double loop hierarchichal setting (Figure 5).

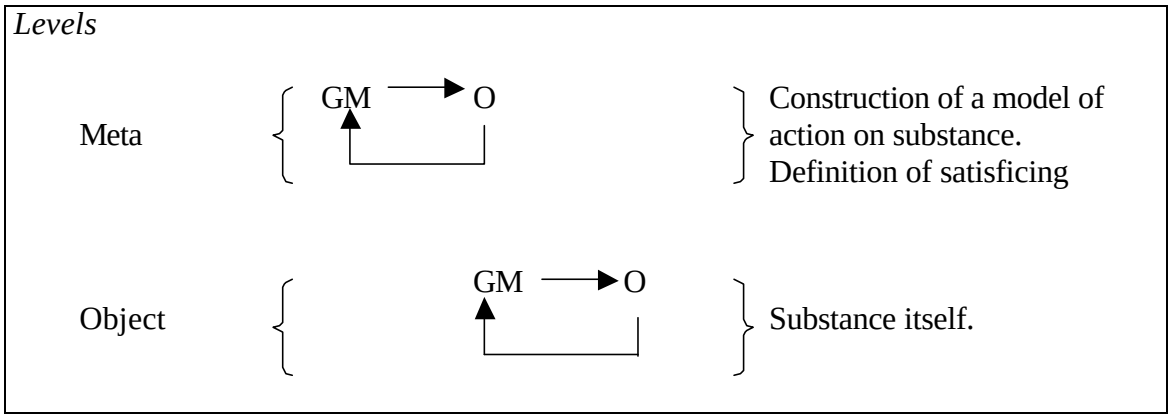


Figure 5 : The double loop structure.

Always behaving as if the world were complex leads to the (GM,O) structure attributed to substance. If the situation created appears to be non complex then it is sufficient to direct attention to O. In case it proves to be complex then GM is reactivated and the whole schema of action in a complex situation is put to work. The duality of action and substance is a constant feature. It calls for actors being aware of it and capable of not looking for substantive solutions before having taken care of this step. Problem setting comes before problem solving unless it is established that the available algorithms perform satisfactorily.

The considerations above apply to complexity independently of any particular substance or field of action. They depict a meta theory of action and of a generic substance. Moving to a particular domain such as scientific activity entails the identification of its specific satisficing. This is the anchoring for the whole argumentation.

The definition of *scientific practice* given here complements the definition found in Delorme (1997) and includes the sciences of the artificial or design (Simon 1969, 1996, Le Moigne 1995). It is aimed at respecting the dictionary definitions, thus attempting a to express the implicit convention regulating scientific activity. Thus, scientific practice consists : i. of some active (participatory) representation (description, explanation, prediction) or design ; ii. systematically put to the test (satisficing, falsification when relevant, mutual criticism…) ; iii. of some observed or designed reality or phenomenon of interest.

While CR emphasizes the goal of science (to uncover the real understood as belonging to the domain of the deep or deeper), SOCX emphasizes scientific practice combining a procedure and an outcome, or, in the language of complexity, a generative mechanism (GM) and an outcome (O).

IV – Discussion

1. The insistance of CR on the goal of science provides a starting point for discussion since, taken litterally, it excludes not only design, but also prediction, deduction, induction and econometrics based on regression and time series techniques(Mearman, 1999). Such a brutal practice is however tempered by Lawson in his defense of a method based on empirical evidence and on a mixture of reference to partial event regularities (“demi regs”), to epistemological relativism, to judgmental rationality and to ontological realism. How this is compatible with uncovering the real seems to remain an open question. The border line within which local practices of deduction, prediction and empirical investigation are acceptable and beyond which they are not acceptable is not explained. No such exclusion exist in SOCX. The only anchor or constraint is provided by the convention of scientific practice.

2. Both approaches rely on complexity of the world although they achieve it by different ways. And they converge on several aspects of method, with some noticeable differences. Complexity is present in the relation between GM and O in the recursive loop. GM can be understood as a condition of possibility for O which may operate with other influences on O or which may give rise to unpredictable Os. The same goes for the backward influence of O on GM. This potentially indeterminate relation is analogous to unsychronization in CR. The main difference lies in the conclusions about scientific activity. In CR it is restricted to obeyance to a general goal deduced from an initial metaphysical view. In SOCX it originates from practical scientific practice.

Going back to CR, it seems that once you have stated what reality is, then you cannot but have a strategy of knowledge following from it, whatever the "is" is. The task becomes to uncover the world. The observer is ascribed a passive role. The world is indeed a world-out-there. The substance of science is predetermined. This predefinition provides the anchoring point. It is different in SOCX : the goal of science is not restricted substantively, it is defined procedurally. The comparison between the two approaches is summarized on Table 1.

3. We have attempted to show that it is possible to conceive of a reality including the subject while abiding by scientific practice. SOCX permits it through reliance on a dual, double loop structure of reality. This is its implicit ontology. While the world is one way "DAE" (deep, actual, empirical) in CR, it is recursively "(GM,O)" in SOCX. It substitutes a loop to the one way hierarchy of CR. Indeed, SOCX entails a nested hierarchy of loops which can be dealt with by pairs of (meta level, object level) loops in which the basic generic relation is (GM,O). If we admit that outcome or surface phenomena can be designated as "empirical", covering thus both the actual and the stricto sensu empirical level of CR, then O in (GM,O) can be viewed as the empirical and GM as the deeper rather than the deep. The reason is that the GM in a given lower loop, ie at the object level, is the O in the upper, meta level loop. And so on. There is no absolute notion of "depth" and "surface". Thus GM and O are "deep" and "surface" in turn when we move from one logical level to another.

   Another aspect of the (GM,O) character of the world follows from recognizing that the subject is part of the world. Acknowledging that man is in the world implies reflexivity and self-reference and undermines the axiomatic analytical foundations of positivism. It drives analysis crazy, so to speak, through repudiating the separation – but retaining the distinction – between subject and object as well as between means and ends: the possibility of recursion as presented in SOCX destroys the exclusiveness of the excluded middle. Then the world becomes the observed, object based, world-out-there, together with presence our and our action in the world. Let us call WI the object based world and W the world including WI and us. WI is the CR world, W is the SOCX world. Instead of positing a world WI based on the belief that the real world is independent from, or prior to, belief, SOCX relies on the belief that the world is neither exclusively out there, nor totally constructed by us, but that it is irreducibly both, in various proportions depending on the particular phenomenon of interest. Figure 6 illustrates this difference between W and WI, for the domain of nature and for the social domain. Recursion at the object level seems to be a priori less pervasive in the natural domain than in the social domain.

   Finally, science itself is part of the world. As such, it has a (GM,O) or (deep, surface) character. It is as legitimate to investigate surface regularities as it is to investigate the deeper as long as the rules of scientific practice are respected.

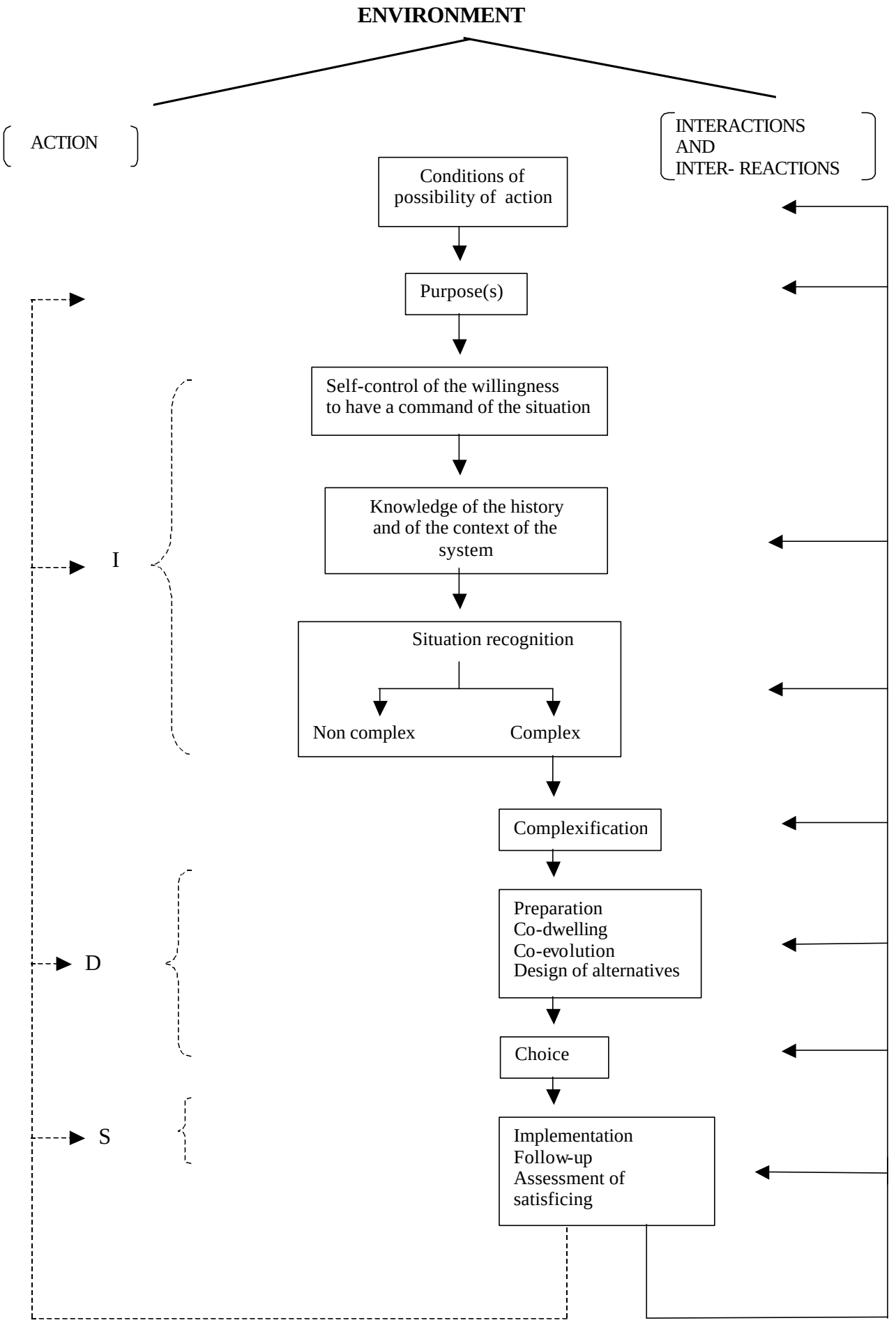


Figure 4 : A model of action in a complex situation.

Critical realism	Second order complexity
1-Initial step : dissatisfaction with prevalence of empiricism and deductivism in social science.	1- Dissatisfaction with exclusiveness of classical analysis (applied Cartesianism) in science.
2- Philosophical standpoint: metaphysical, ontological realism; fallibilist view of knowledge.	2- Epistemological, phenomenological realism; fallibilist view of knowledge.
3- Goal ascribed to science: uncover the "deep".	3- Purpose: satisficing scientific practice.
4- Method advocated: 4.1 Observation of phenomena of interest	4- 4.1 Observation, design. Observation is only one purpose.
4.2 Abduction as mode of inference	4.2 Abduction, induction and deduction: depending on purpose
4.3 Abstraction: essential and real	4.3 Abstraction: essential and real.
4.4 Explanation: "triangle" of judgemental rationality, epistemic relativism and ontological realism.	4.4 Reduce the degree of arbitrariness compared to existing representations of the same problem; satisficing design.
5- Conception of reality or of the world : 5.1 Open and complex. Reality of the world fixed by an initial metaphysical standpoint (three layers; structured and changing; transfactual and intransitive).	5- 5.1 Open. The world is recursively (GM,O). World conceived as being potentially complex.
5.2 World does not include the observer.	5.2 World includes the designer/observer.
5.3 Deductivism and predictionism do not work in social science because the world is an open system by virtue of an initial ontological decision.	5.3 The world proves to be open and complex because it cannot be dealt with satisfactorily in every case with the tools of classical analysis.

Table 1. A schematised comparison of critical realism with second order complexity

NB The comparison is adapted to the CR categories, notably its limitation to observation. Then SOCX is compared mainly from this standpoint.

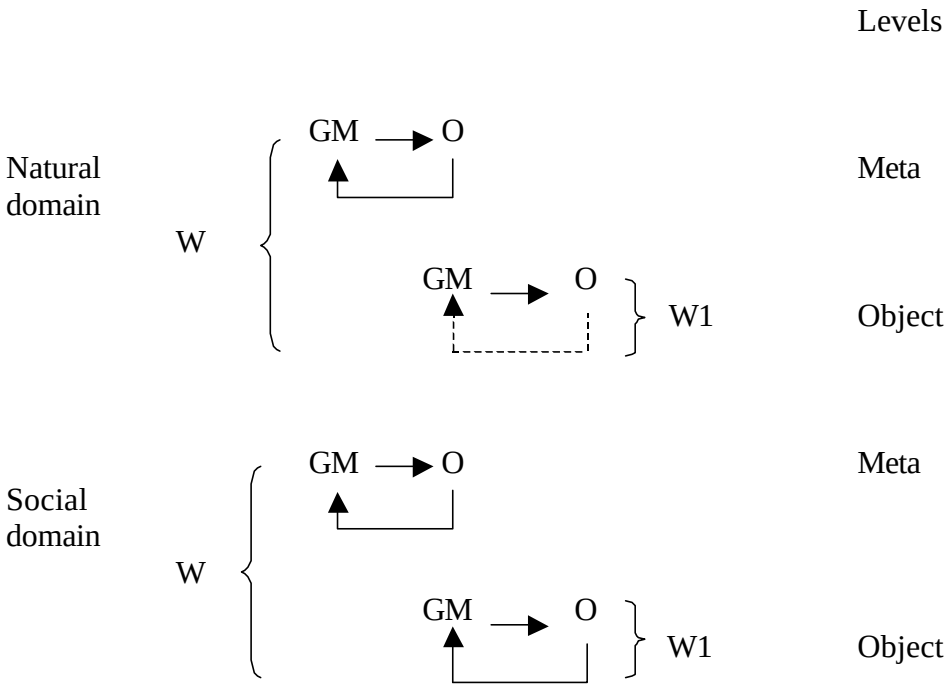


Figure 6 : Complex world W and object level world W1

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