https://doi.org/10.54989/msd-2023-0010

AN OPINION: WHAT AN ECOLOGICAL SYSTEM IS IT?

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ABSTRACT: Many controversial debates (including conferences, symposia and of of the same) are generated by misunderstanding of the concepts or, often, by associating wrong terms to the same concept. The sustainability science or the ecologic theory (more exactly, the theory on the ecological systems) is an (intellectual) crucial pillar to handle the current and future challenges regarding the non-anthropic and artefactual environment. The paper aims to put a (whatever small) brick to clarify the grounding concept of the ecological system, in order to prevent its inflationary and un-rigorous use in research and public policy. The basic contributions are: (a) identifying the sufficiency predicates to logically define the concept of ecological system, (b) the suggestion to approach the issue from a mix evolutionary perspective based on Lamarckian-Darwinian theories; (c) some opinions regarding the scientific utility of using such a clear, on logical bases, concept of ecological system (given the general concept of system).
KEY WORDS: ecology, system, sufficiency predicates, evolutionism, autopoiesis.

1. INTRODUCTION

1. Preamble

The extensive literature adopted, of long time, very quickly, and careless enough, the syntagm of ecological system, although this concept exhibits many problems, both semantical (regarding the denotate/reference) and logical (regarding its sufficiency predicates). As science works with clear and rigorous concepts, no matter the terms/names used to indicate those concepts, it is necessary to examine as close as possible the mentioned concept, especially since it is used in the baroque of articles and books which flood us daily.

2. About the etymology

The ecology is formed from the Greek term οἶκος, with the general meaning of household (i.e., house and its properties around, or family with all what are belonging to that family), and logos, with the general meaning of discursive reason. So, ecology could have the meaning of reason of the house, of course, in the most general and abstract sense – for example when by house is understood the entire planet or, even larger, the proximate Cosmos. To be mentioned that ecology can have also the meaning of the science about the reason of the house, because the term logos (Nota bene; economy or economics has the same prefix οἶκος but the term nomos give it the connotations of normativity). So, the concept ecology has, etymologically, a positive (or positivist) character, not a normative one – what make somewhat that the exercises in the literature that claim so-called ecological norms to be strange enough. But, if we want to make the ecology a normative science, we should replace the Greek term logos with the Greek term nomos, which lead us to… economy. It results, that what we call economy must refers to ecology and vice-versa, in order to conserve the (as currently alleged) normative sense of ecology and, at the same time, the positive sense of Economics (a sense so loved by the neoclassical economic theory).

3. About the etiology

The etiology of ecology consists in the free will of the human being, on the one hand, and in the optimality paradigm, on the other hand. The free will, based on the property of the rationality model of humans to oppose the necessity of the environment, intrinsically has the „vocation" to disturb the natural chreode of that environment (Nota bene: by natural chreode is understood that chreode which is self-regulating – i.e., is based on the dominance of negative feedback – namely, is self-sustainable). The optimality model of rationality has drove the humankind to the current depletion of natural resources, and to the current global disequilibria. This effect can be reversed only if the optimality model of rationality will be replaced by the sustainability (or viability) model of rationality. Of course, such a reversal requires a reversal of the values themselves which drive the economic, social, and political behaviour.

2. THE ECOLOGICAL SYSTEM (ES)

The concept of ecology has its extensive signification in the syntagm of the *ecological system* (ES) only. I shall presuppose that the concept of system is (in general) known. So, it is required to identify the sufficient predicates (or the predicates of sufficiency) whose verifying deliver the concept of ecological system.

1.1. The sufficiency predicates

In my opinion, the sufficiency predicates of the ES are the following:

(i) it is a *system* (i.e., has a membrane to separate it from its environment, has internal components, which provide its functionality, is externally operationally open, which provide its behaviour, and is characterized by a degree of entropy, whatever it is measured, not necessarily in the Thermodynamic meaning);

(ii) its internal components are of *two types*: (a) non-anthropic components; (a) anthropic components (i.e., artifacts); the reason to impose the anthropic components is the following: if a system does not contain artifacts, it does not matter as house for the humans, although it can be (and is actually) a

house for non-human beings – consequently, such a system has not signification for us from the ecological perspective;

(iii) it *lost* the capacity of *self-regulating* (*Nota bene*: this self-regulating must be viewed in the light of surviving, not of optimizing) because the artifacts which broken the natural mechanism of such a self-regulating. So, a new self-regulating must be built up, this time by the human individuals (and groups), based on a new model o rationality – in fact, a combination between the surviving „rationality" and the optimizing one, namely, what is generally called the sustainability rationality model;

(iv) it *gained* the capacity of permanent *dissipation*, from the entropic point of view. The non-ecological systems have, also, temporarily, and locally, dissipation property, but such property does not have the potential to maintain/replicate – on long term and necessarily, the degree of entropy will increase, i.e., the degree of heterogeneity will decrease. Instead, in the ecological systems, due to the presence of the human being, the dissipation is a mean (the most general and abstract) through which the finality of these systems become purpose.

Once the four sufficiency predicates are cumulatively verified, the entity in the case qualifies as ecological system (ES). But, once the entity qualified as ES, it acquires a new necessary predicate (*Nota bene*: we say „new", because, by definition, each sufficiency predicate is, also, an „old" necessary predicate). This new necessary predicate can be stated as follows: an ecological system evolves by a LaDa mechanism.[i] This means that a mix of deliberative and random mutations necessarily occur in such a system, so that its evolutionary path (chreode) is internally significant for the humans „contained" – such a signification is not internally present in the biological systems, although the human observer can assign any signification to them but only externally. It is as if the ES has a kind of sui generis consciousness (of course, in a metaphorical sense, since only human individuals has a true consciousness).

1.2. The denotate/referential

Based on the above, we are led to the conclusion that any ES is a symbolic species, in contrast to the well-known biological species (Dinga *et al*., 2023a). Consequently, the concept of ES has as denotate/referential a symbolic species that contains human beings. The last mention is fundamental, since there are symbolic species which contains artefacts, but do not contain human beings as such. So, an ES is an order 3 system. An order 1 system is a system in which the (human) observer is external (for example, natural systems), an order 2 system is a natural system in which the (human) observer is internal, and an order 3 system is a system which contains artifacts (or, at limit, is constituted by artifact only, for example, a political system) and the (human) observer is inside.[ii] Based on the above discussion, an ES has as denotate/referential an order 3 system, or a symbolic system/species.

1.3. About the (scientific) utility of the ecological system

The concept of ecological system identifies a real part of the world once the human beings entered the natural world, namely the world which either contains human beings, or contains both artifacts and human beings.[iii] The concept of ES provide a minimal set of scientific utilities, as follows:

- allows the development of the *evolutionism* in the case of symbolic systems – for example, in the economic field, although there are some regional notable essays to edify an evolutionary economic theory,[iv] it does not exist yet a solid theory in that matter (*Nota bene*: the institutionalism, that seems to be the most articulated theory looks only to a side of the problem – the normative one);
- allows the development of the concept and mechanism of what could be name the *logically living system*, which brings into the symbolic species the logical bases of the biological life (Dinga, 2020);
- brings into the symbolic species, as the ESs, the concept and mechanism of *autopoiesis* (Maturana; Varela, 1972), (Dinga *et al*. 2023b);
- allows the *axiology* and *teleology* to enter the models of ES, so these systems be edified in relation with freedom, democracy, ethics, and social justice; in fact, the concept of ES reintroduces the subject into the system, after the rejection of the subject under the (too much awarded) neoclassical theory;
- contributes to the development of the praxiological (actional) paradigm of sustainability, by replacing of the paradigm of optimality, so it will secure, from the most general perspective, the adequate humankind path on the Earth (Dinga, 2022);
- allows to use a new logic – namely, the *quadrivalent logics* (with four values of true[v]), instead of the bi-valent logic currently copiously used.

3. 5. WHAT TO DO WITH THE CONCEPT OF ECOLOGICAL SYSTEM?

The concept of ecological system, cleaned from the superficial and non-rigorous usage, must be put as the fundamental brick to edify a theory of *Sinnomics* (Dinga, 2012), i.e., a theory which addresses the entire significant Universe of the human individual and of the humankind (*Nota bene*: it is talking about a social theory of everything, in mirror of the physical theory of everything). In my opinion, the ES must initiate, relatively urgently, an intellectual movement to catch intro a single bundle all the significant entities and processes, from a long-term perspective, which are assigned to the human being. I strongly think that the ES should be the core of a theory of the logically living system (or autopoietic logical system), including the taking over of the proposal of the German sociologist Niklas Luhmann (2013).

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[i] Abbreviation La-Da comes from Lamarckian-Darwinian mix evolutionary mechanism.

[ii] Literature discusses about (cybernetic) systems of order 1 and order 2, while the category of order 3 systems is coined by the author, on logical bases.

[iii] To contain human beings does not imply the physical presence of those humans, but a logical presence – for example, an Artificial Intelligence (AI) entity contains, logically, human beings, even if it is located on planet Mars.

[iv] Only a few examples: (a) Nelson, R.R., Winter, S.G. (1982); (b) Lo, A. (2019) ; (c) Dowling, B.F. (2005); (d) Dinga *et al*. (2022); (e) Luhmann, N. (2013); (f) Georgescu-Roegen, N. (1971); (g) Peters, E.E. (1994).

[v] The four values of the true are: (a) objective reaching without rest; (b) objective falling without rest; (c) objective reaching with some negative unintended consequences; (d) objective falling with some positive unintended consequences. Of course, such a logic must (and should) be developed similarly with Łukasiewicz's tri-valent logic.