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Systemism: An Approach to the Study of Systems

Systemism

- Based on scientific and philosophical ontology expounded earlier “Systemism” is the approach adopted by anyone who endeavors to explain the formation, maintenance, repair, or dismantling of a concrete complex thing of any kind. Notice the use of the expression “**approach…**” not “systems theory”. There are nearly as many systems theories as systems theorists. Systemism invites us to analyze wholes into their constituents, and consequently it rejects the epistemology inherent in holism.

❑ *The Social System as an Example* *(see Fig. 2)*

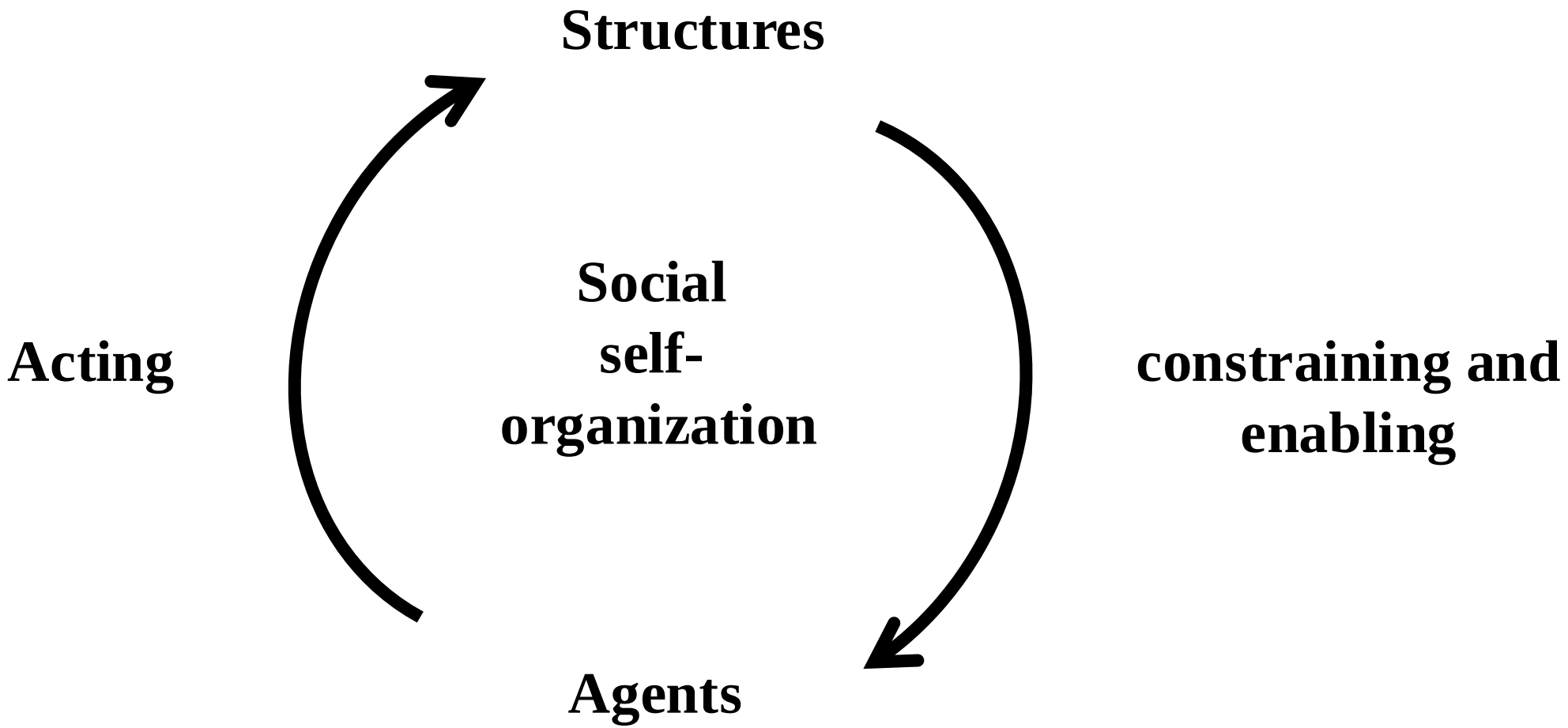
❖ Researchers should investigate the following**:**

(a) how persons or groups interact;

(b) how these interactions over time form relatively enduring social relations and social systems, which we take as social facts;

(c) how these social relations and systems provide contexts that constrain and enable the actions of individuals or groups while affecting their intentions, desires and beliefs, or to put it differently, how individuals or groups alter their thoughts and actions for being *part* of a social system;

Fig-2 Self-organization of Social Systems



(d) how social systems interact and act upon each other;

(e) how individuals or groups influence (thwart, facilitate or transform) the workings of specific social systems, which in turn affect their members; and

(f) how changes at the systemic level influence the individuals, who in turn act in ways that reproduce or alter the workings of systems.

- In part one on ontological rationale we have established the centrality of the *part-whole* relation and *level structure* of the world in constructing an ontologically grounded theory of systems, and now it's time to introduce and discuss the *CESM* model laid down by Bunge.

The CESM Model

- An ontologically solid foundation of a systemic approach needs consideration of:
  (a) what it consists of (*its composition*);
  (b) the environment in which it is located (*its environment*);
  (c) how its components and environmental items are related to one another (*its endostructure* and *exostructure*); and
  (d) how it works, or what makes it what it is (*its mechanism*[s]).

- Therefore a system **s** is to be defined by the collection:

$\mu(s) = \langle C(s), E(s), S(s), M(s) \rangle$, where

1. C(s) = Composition- Collection of all the parts of ***s***;
2. E(s) = Environment- Collection of items, other than those in ***s***, that act on or are acted upon by some or all components of *s*;
3. S(s) = Structure- Collection of relations, in particular bonds, among components of ***s*** (endostructure), or among these and things in its environment (exostructure);
4. M(s) = Mechanism- collection of processes that allow **s** to perform its specific functions.

Remember:

- The distinction of a system **S** from its model(s) **μ(s)**, just as the electrician distinguishes an electric circuit from its diagram(s). In Bunge's materialist ontology, only concrete (material) systems have mechanisms. Conceptual systems (e.g. theories) and semiotic systems (words, musical notes, figures and graphs) have compositions, environments, structures, but no mechanisms.

- All four components of the model μ(s) are taken on a given level, such as the person, the household, or the firm in the case of social systems. They are also taken at a given time. In particular, M(s) is a snapshot of those processes in the system in question that are peculiar to its kind, such as research in a scientific team, and combat in a military unit. In turn, a process is a sequence of states; if preferred, it is a string of events. And whereas the net effect of some processes is to alter the overall state of the system, that of others is to maintain such state. For instance, wind moves a sailboat, whereas the impacts of myriad water molecules on the hulk keep it afloat.

- ***The Nuclear Family as an Example for CESM Model***

  Its *components* are the parents and the children; the *environment* is the physical surroundings, neighborhood, workplace and so on; its *endostructure* consists of biological and physiological bonds such as love and sharing, while the *exostructure* is made up of the relations of its members with people in other social systems; lastly, its *mechanism* consists of daily chores, parent-child interactions, and the like.

- Why is the notion of *mechanism* of central importance? The answer is that it is the key to the workings of a system: once the original mechanism is undermined or undergoes changes, the (kind of) system that it makes possible will probably break down or transform. This is why a *deep (mechanismic)* explanation has to include the notion of mechanism. By contrast, the *covering-law* explanation and *functional* explanation are both *shallow* explanations- mere *descriptions*.

- Note the following about mechanismic explanation:

1. Since there may be a number of mechanisms operating and interacting in one and the same system, it is recommended that ***essential*** mechanisms be distinguished from ***non-essential*** mechanisms. While the former are specific to a given kind of system, the latter may also occur in different kinds of systems. For example, organized teaching and research is an essential mechanism of a university but inessential to a firm.

- *An essential mechanism of a system is its peculiar functioning or activity*. In other words, an essential mechanism is the specific function of a system— that is, the process that only it and its kind can undergo.
- The above conflation of ‘mechanism’ with ‘specific function’ is not advisable when one and the same task can be performed by different mechanisms—the cases of functional equivalence. For example, some birds can advance by walking, swimming, or flying; documents can be reproduced by printing presses, mimeographs, or photocopiers; markets can be conquered by force, dumping, free-trade agreements, or even honest competition.

- Because the functions-mechanisms relation is one-to-many, we should keep the two concepts distinct while relating them. Another reason is that a purely functional account, such as “cars are means of transportation,” though accurate, is superficial because it does not tell us anything about the mechanism whereby the function in question is carried out.
- **A warning is in place:** there are no *universal mechanisms*. All mechanisms are stuff-dependent and system-specific. For instance, only live brains, when properly trained and primed, can engage in original research; and only brains in certain abnormal states can hallucinate. Still, mechanisms, like anything else, can be grouped into natural kinds, such as those of cooperation and competition, stimulation and inhibition, blocking and facilitating..etc.

2. Mechanisms are typically unobservable or concealed, so they have to be ***conjectured***, not by wild speculations, but with imagination constrained and stimulated by data, well-established hypotheses and mathematical concepts.

3. There is no unique method or logic for conjecturing mechanisms. It’s more an art than a rule-directed technique.

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4. Since most mechanisms cannot be observed directly, their description necessarily contains concepts that are absent from empirical data, and this is why mathematical thinking, which comprehends the complexity of the world better, is conducive to identifying mechanisms.

5. The *black box* approach (phenomenological, descriptivist, holistic approach) describes the working of the system in question only in terms of its input and output, thus failing to uncover *its components*, *environment*, *structure*(s), and especially *its mechanisms*.

6. How are the concepts of *mechanism* and *law-statement* related? Mechanisms without conceivable laws are called *miracles*. Scientific research presupposes **(a)** *materialism*, or the hypothesis that the real world is material, so that it contains no autonomous (subject-free) ideas; and **(b)** the principle of *lawfulness*, according to which all events satisfy some law(s). Trust in the first principle allows scientists to dispense with the ghostly. And trust in the second principle sustains their search for laws and the rejection of miracles.

- However, in the social sciences, law and mechanism are necessary but insufficient to explain, because almost everything social is made rather than found. Indeed, social facts are not only law-abiding but also norm-abiding; and social norms, though consistent with the laws of nature, are not reducible to these, if only because norms are invented in the light of valuations—besides which every norm is tempered by a counter norm.

- All real mechanisms are lawful, but the laws-mechanisms relation is one-to-many rather than one-to-one. For example, pollen particles, drunkards, and financial markets move similarly (random walk); the exponential function, another ubiquitous pattern, describes both the growth of a population with unlimited resources and that of scientific papers.

- Because the *patterns-mechanisms relation is one-to-many*, the search for either can be uncoupled from the search for the other. However, barring miracles, there are no lawless mechanisms any more than there are mechanism-less patterns. Hence, any mechanism-free account must be taken to be shallow and therefore a challenge to uncover unknown mechanism(s). By the same token, any mechanism unsupported by some law(s) must be regarded as ad hoc and therefore equally temporary.

- The mechanism-based explanation has received growing attention in recent years. Scientists from both natural and social sciences, including biology, psychology, cognitive neuroscience, physics, sociology, economics and political science, have engaged in the debates over the status of mechanism-based explanation and modeling, even though most of them refer to the explanation based on mechanisms as “mechanistic” explanation instead of what Bunge calls *mechanismic explanation*.

❑ *Systemism and Social systems*

❖ For Bunge:

1. *A social system is a concrete system* composed of gregarious animals that **(a)** share an environment; **(b)** act upon other members of the system; and **(c)** cooperate in some respects and compete in others.
2. *A human social system* is a social system composed of human beings and their artifacts, held together by feelings, beliefs, moral and legal norms, and mutually related actions.

3. A human social system can be **(a)** *natural* (spontaneous) if it emerges by way of free association or reproduction (e.g. families, circle of friends, street-corner gangs); **(b)** *formal* (designed) if it is formed in compliance with explicit rules or plans (e.g. schools, armies, business firms, political parties, NGOs).

4. A human society is a social system composed of four major subsystems: **(a**) *biological system*, whose members are bound together by sexual, kinship, and friendship relations; **(b)** *economic system*, the bonds of which are relations of production and exchange; **(c)** *political system*, characterized by the coordination and management of social activities and the struggle for power; and **(d)** *cultural* system, the members of which engage in cultural or moral activities like learning, teaching, inventing, designing, singing, painting, and so on.

- These four subsystems partially overlap and interact with one another, because most people are members of at least two of them. Bunge calls this systemic view of human society the *BEPC model*, which he contrasts with the traditional base/superstructure model of Marxism. According to the BEPC model, every social fact has five interrelated aspects*: environmental*, *bios-psychological*, *economic*, *political* and *cultural*.
- Equally important is that every subsystem of society evolves according to its own dynamics as well as under the influence of the other subsystems. sometimes one of the subsystems takes the lead and the others follow, but at other times it is the turn of a different subsystem to start a new development. there is no single prime social mover, not even in the last analysis.

5. A *supersociety* is a system composed of tow or more human societies, such as the European Union.

6. The *world system* is the supersociety composed of all human societies.

7. A *social process* (or activity) is a process that involves at least two interacting persons and occurs in a social system of all sizes, like *getting married*, *rearing children*, *making friends*, *working*, *trading* and *waging war*.

8. A *social movement* is a directed social process that takes place in at least one social system and incorporates people into it.

- Implied theorems and postulates for a systemic sociology:

1. Every human being belongs to at least one social system.

2. Social systems are held together by various types of links: *biological* (including psychological), *economic*, *political* or *cultural*. *Social segregation* of any of these kinds weakens social cohesion.

3. The *beliefs*, *desires*, *intentions*, *preferences*, *choices* and *actions* of every individual are *socially conditioned* by his or her membership in social systems: there are neither *fully autonomous* nor *totally heteronomous* persons.

4. The changes of a social system arise from **(a)** endogenous changes in its members, **(b)** interactions among its members, or **(c)** interactions among these members and items in the environment.

5. Every social system can be analyzed into its *composition*, *environment*, *endo*- and *exostructure* and *mechanism*(s) (recall the CESM model).

6. From 2 and 5 readily follows that the study of any social system involves investigations into **(a)** its *CESM*, and **(b)** its *BEPC* subsystems.

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