

Avances **SISTÉMICOS**



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- The [International Encyclopedia of Systems and Cybernetics](#), Editor Charles Francois. ALAS, IASCYS, [IFSR](#), [https://en.wikipedia.org/wiki/Charles_François_\(systems_scientist\)](https://en.wikipedia.org/wiki/Charles_François_(systems_scientist)), K.G. Saur, München, Germany, 2nd edition, 2 vol., 741 p., 2004, and
 - [Systémique & Accompagnement](#), 2007, UPPA, Pau, France, 155 p., par un collectif AFSCET, sous la direction de Pierre Bricage.
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The Systemic Approach(es)



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What is General Systems *Theory*?

General Systems Theory is a term coined by Ludwig von Bertalanffy, an American biologist of Austrian origin.¹ The underlying idea is that organized wholes of any kind should be describable and, to a certain extent, explainable, by means of the same categories, and ultimately by one and the same formal apparatus. A typical general systems type definition would be: "A system is an organized whole of relationships between elements [which maintains its identity]." Or even more abstract: "A system is a portion of the world sufficiently well defined to be the subject of study" (Anatol Rapoport²). General Systems Theory triggered a whole movement which has tried to identify invariant structures and mechanisms across different kinds of organized wholes (for example, hierarchy, teleology, purposefulness, differentiation, morphogenesis, stability, ultrastability, emergence, and evolution).

What is a systemic *approach*?

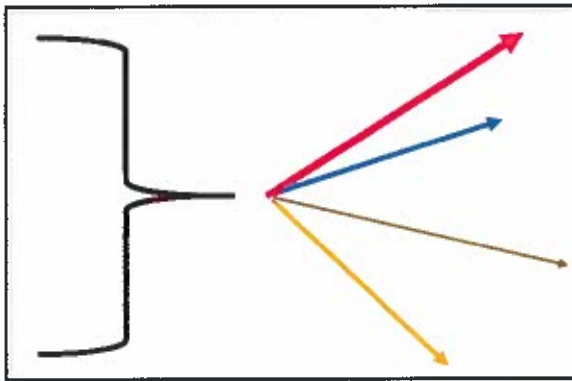
¹ Von Bertalanffy L (1968). General Systems Theory. New York: Braziller.

² Rapoport A (1953). Operational Philosophy: Integrating Knowledge and Action. New York: Harper.

“Systems Approach” denotes a way of thinking and acting, which is based on a holistic, integrative worldview. Scientifically, the Systems Approach is grounded in Systems Theory and Cybernetics.³ Systems Theory is a formal theory for the description, explanation and development of systems of all kinds. Cybernetics is the science of communication and control of complex, dynamic systems.⁴ The systemic view offers an alternative to the dominant scientific thinking which tends to be exclusively analytic, fragmented and reductionist. A systemic approach combines both analysis and synthesis. It focuses on structures and relationships, feedbacks and delays giving rise to system behaviors, which are often counterintuitive. It aims to model and understand these processes. Systems are conceived of as dynamic wholes which interact with their environments. Methodologies based on systemic thinking emphasize multidimensional, transdisciplinary and pragmatic features and procedures. They make use of both qualitative and quantitative modeling.

Which is the usefulness of the systemic *approach(es)*?

In relation to the established paradigm of scientific inquiry, the systems approach reflects a new conception, needed for weathering the complex challenges ahead, such



as the ecological crisis, social disruption, and economic instabilities. The cybersystemic theories and methodologies are specialized in dealing with complexity. Compared with mathematics, another formal science, these are less precise, but they are more effective in coping with dynamic complexity. The latter calls for modeling and simulation methods. Systems methodologies are also better equipped for understanding broad issues,

non-obvious structures, as well as unexpected systems behavior. And they contribute to providing long-term strategies for contending with complex dynamic issues effectively. The systemic approaches are becoming ever more relevant because they enable better ways of handling the complexities faced in the Anthropocene.

³ Often the terms “Systemics” or “Cybersystemics” are used. The latter expresses that essentially System Theory and Cybernetics are a unity.

⁴ Wiener N (1948). Cybernetics or Control and Communication in the Animal and the Machine. Cambridge, MA: MIT Press.