

## SYSTEMS THINKING: RISE, DEVELOPMENT, PROSPECTS

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### Abstract for a chapter in the Oxford Handbook on Interdisciplinarity

In the middle of the previous century systems thinking arose with the proposal for a ‘general system theory’ conceived as an interdisciplinary doctrine. One of the first who launched this idea was the biologist-philosopher Von Bertalanffy in his search for principles and models that apply to “systems” in general, irrespective of their particular kind or elements involved. Besides the problems entailed by over-compartmentalized research and education failing to see the larger interconnections, it was furthermore recognized that modern technology and society have become so complex that also for that reason synthetic approaches of a ‘holistic’ or systems nature have to be adopted. These concerns in favour for a synthetic or interdisciplinary approach have inspired Von Bertalanffy and the other founders of the systems movement and underlie also the later development that crystallized into three realms or basic types: systems theory, systems methodology, and systems philosophy. In the history of systems thinking each realm has followed its own path, with many overlaps and interactions.

Systems thinking is said to be superior to non-systems thinking in both theory and practice, in understanding the world (systems theory and philosophy) as well in providing guidance for human action (systems methodology). In the opposition against the dominant mechanistic-reductionistic approach in science leading to technical manipulation and control of the human person and society, systems thinking is claimed as a liberating view for a humane culture. It has been argued, however, that the systems view is still a disguised form of ‘control thinking’. And it is important to notice that such a critique is not only put forward by external critical observers but is also a continuing matter of debate in the systems movement itself. In the early days of systems thinking, the nineteen fifties, there was e.g. the opposition between ‘general system theory’ and ‘cybernetics’ – this is denoted by Von Bertalanffy as an organistic versus a mechanistic trend. Later in the nineteen seventies and eighties there was the incisive critique of Habermas on the dominance of technical categories in Luhmann’s social theory, which inspired a program termed ‘critical systems thinking’ seeking an alternative for other streams in the realm of systems methodology and management sciences.

It will be argued in this chapter that the ambivalences in systems thinking and its role with regard to science and society result from deeper lying tensions in Western culture and the history of modern Western thought since the scientific revolution of the sixteenth century. This chapter aims to point a way out by thinking through the underlying ontology and philosophical underpinnings of systems thinking. A key issue in this regard is the view of hierarchy of systems. It will discuss thus not only the development of systems thinking and in what sense it has proven to be (un)successful in the realization of interdisciplinarity, it will elaborate especially on its significance for an integrative and normative framework for technology and society and the way forward.

### Essential readings and links

Ackoff, Russell L. (1974). *Redesigning the Future: A Systems Approach to Societal Problems*. New York: John Wiley & Sons

Laszlo, Ervin. (1996). *Systems View of the World: A Holistic Vision for Our Time*. Cresskill, NJ: Hampton Press. (2<sup>nd</sup> revised edition)

Jackson, Michael C. (2000). *Systems Approaches to Management*. New York: Kluwer Academic/Plenum Publishers

Strijbos, Sytse and Basden, Andrew (2006). *In Search of an Integrative Vision for Technology: Interdisciplinary Studies in Information Systems*. New York: Springer.

Von Bertalanffy, Ludwig. (1976). *General System Theory – Foundations, Development, Applications*. New York: George Braziller. (revised edition)

<http://iss.org/world/> website from the International Society for the Systems Sciences