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From Systematic Way to Informational Way：The New Tendency of Contemporary Scientific Thinking†

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† Presented at the IS4SI 2017 Summit DIGITALISATION FOR A SUSTAINABLE SOCIETY, Gothenburg, Sweden, 12-16 June 2017.

Published: 8 June 2017

Abstract: As a kind of thinking mechanism that grasps motion, change and development of objects on the whole, systematic thinking contains a whole set of thinking principles, methods and operation procedures. With the uprising popularity of studies on informational system science and complexity theory, information reveals a new field that the philosophy of the past has not discovered. Wu's works are putting forward a wholly new scientific thinking way: the Informational Thinking. We can conclude rationally from Wu's explanations of information that the character of informational thinking way can include and surpass the basic idea of systematic thinking way. So far as the whole process of scientific cognition is concerned, functions of informational thinking are expanded in several aspects.

Keywords: systematic thinking; theoretical construction; functional scope

1. Introduction

Scientific thinking refers to the thinking mechanism which not only grasps motion, change and development of objects on the whole, but also contains a whole set of thinking principles, methods and operation procedures, and the last but not least is aims to direct people to understand objects and thinking by regarding the cognitive objects as a whole.

In contemporary times, as a kind of scientific thinking mode, systematic thinking mainly reveals and establishes the ontology implication that the world is a "systematic whole" on the theoretical basis of the systematic research. Method in systematic science and complexity theory further expound it at a meta-methodology level (from a meta-methodology perspective). It aims to direct people to integrate themselves into scientific cognitive activities internally, to start out from the perspectives of openness, dynamism and diversification to make "trans-hierarchy" [1] structural observation on cognitive objects, to make quantitative and unified statistical description, which helps to control cognitive objects in the "overall process" [2], and therefore people can grasp the optimal condition of the integrity. Specifically speaking, it mainly contains the following several aspects.

1. Regarding Objects as a "Systematic Whole".
2. Dedicating Itself to the World with an Idea of Internal Relationalism.
3. Starting Out from the Perspectives of Openness, Dynamism and Diversification.
4. Taking "Trans-hierarchy" Structural Observation.
5. Attempting to Control Objects in the "Overall Process".
6. Adopting Quantitative and Unified Probability Statistical and Descriptive Approach.
7. Taking Control of the Optimal Systematic Condition of Objects as the Aim.

2. The Uprising of Studies on System Science

Since the mid-20th century, there has been a new scientific revolution, which involves the transformations in a series of subject areas, and performed as a continuously promoting and developing process. The mark is the growing up of batches of emerging disciplinary groups, which can be referred to as the theoretical studies of complex information system. In particular, the growing up of emerging disciplinary groups arose by the third scientific revolution has three stages(the course of the emerging disciplinary groups arose in the third scientific revolution can be divided into three stages). The first is early stage of basic theory of information system (1940s-Early 1950s). Born in this stage, the major subjects involved molecular biology, general system theory, information communication theory, general control theory, etc. The second is development stage of self-organization theory of information system (Late 1960s-Early 1980s). Those major subjects founded in this stage involved dissipative structure theory, synergetics, hypercycle theory, catastrophe theory, et al. The third is study stage of complex information system theory (Mid 1970s-After 1990s). Those major subjects founded in this stage included fractals, chaos theory, holographic theory, virtual reality science, nano-science, quantum informatics, cognitive science, complex system study theory, et al.[3]

3. Informational Thinking —The New Approach Of Scientific Thinking

System, levels, structure, functions, these categories are just playing their roles in a direct existent way and a state of substance, they just make the original description of the material world more scientific, and more modern. But information is different; it essentially reveals a new field that the philosophy of the past time has not been discovered. "Information brought an immeasurable future to the philosophy. Information not only exerted an influence on philosophy in the individual characteristics, individual factors and aspects, but also made up for the vacuum field that can be bridged by speculation in previous dialectical philosophy. The discovery of information provided a new scientific basis and method for more in-depth understanding of the relationship between spirit and matter, subject and object, as well as revealed the evolution approach and pattern of the universe and society more scientifically. Information brought about a new revolution for philosophy. In modern times, any philosophical system that takes no account of information link or underestimate the role of information link would ill-adapt to our age."[4]

1. The revolution in philosophical ontology field. Information reveals a new world of indirect existence. It makes a new division for existing fields of the world, thereby establishes a new philosophical ontology conception of dual-existence of matter and information, leading to the fundamental transformation in philosophical ontology, and thus changing the specific unscramble way of the basic problems of philosophy;

2. The revolution in philosophical epistemology field. Information thinking establishes an information intermediary theory of philosophical epistemology, and interprets the process and mechanism of noegenesis all-roundly in the multi-stage intermediary constructional and virtual sense, while System thinking just pays more attention to grasp the process of cognition activity on the whole, and is unlikely to make a substantial contribution to specific mechanism of intermediacy and proceduration of noegenesis.

3. The revolution in philosophical and scientific theory of evolution field. Information thinking puts forward a kind of dual-evolutionary theory of matter and information forms; thus, it changes the human views of evolution. System thinking is impossible to provide this kind of dual-evolution perspective.

4. The revolution in philosophical and scientific theory of space-time field. Information thinking reveals the information condensation mechanism of time-space conversion in the interaction of things, and thus builds a brand new time-space view of space-time inner fusion (the inner change of time and space); System thinking is impossible to clarify the specific mechanism of the space-time inner fusion.

5. The revolution in the field of value philosophy. Information thinking puts forward the dual-value theory including matter value and information value from dimension of nature-in-itself, so as to provide the value of

the Tao of nature and sustainable development theory with a theoretical basis; System thinking is impossible to rise information value to the scale of basic value.

6. New interpretation of social development theory. Information thinking provides the brand new explanation on social essence and social evolution scale, and provides information civilization development of human information economy and information society with some interpretation principles; System thinking does not have interpretive function in this area.

7. New cognition of the essence of human practice and productive activities. Information thinking makes a brand-new explanation on human practice and human production activities, which regards human practice as the process of purposeful information of subject realizing in object, and draws a new conclusion that human production can only be information production, and that human productivity can only be information productivity from the law of conservation of matter and non-conservation of information.

8. Integrative functions for existing scientific research program. Information thinking is able to get the reductionism and holism, as well as determinism and no determinism unified, to make elements, relations, structures and the nature of dual-emergence united very well, and to unit the contents of many aspects, such as the organizations interaction, network feedback chain, holographic mapping, mutual transformation of space-time inner fusion, the unity of direct existence (matter) and indirect existence (information) , the compatibility of order and disorder, the emergence of autonomous individuality of elements and the overall behavior.

9. The intensity of transformation to the existing science and philosophy. In this respect, the possible role of information thinking cannot be matched by system thinking either. Being the most general and universal, the theory and method of information thinking way and information system science is a new scientific paradigm, which has a strong permeable, penetrative and transformative power.

10. Information thinking not only includes system thinking rationally but also has the surpassing character. From Wu's definition of information thinking, we may conclude that the character of information thinking can includes and surpasses the basic idea of system thinking rationally.

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