A Philosophical Thinking about the Complexity of Social Information System

Jiang Xiao-hui, Chen Ming-yi

(School of Humanities and Law, Northeastern University, Shenyang, 110819;
Department of Philosophy, Huazhong University of Science and Technology, Wuhan, 430074)

Abstraction: Social information science is a kind of rising and high-crossing discipline, the characteristic of which is complexity. The complexity of social information science accords with the features of the complexity of system science and can be studied with analytical methods of system science and system dialectics. Social information systems have their own laws and could be understood and grasped gradually. And the philosophy of information will shed some light on the study of social information science.

Keywords: Social information science, complexity, system science, system dialectics, philosophy of information

1、Social Information Science

Norbert Weiner said in the *The Human Use of Human Beings: Cybernetics and Society) (1950)* that information is the name of contents exchanged with the outside world when we adapt to the outside world and control it. As for the concept of social information, it appeared firstly as a subset of informatics. Since professor Kang Ouyang further proposed that social information science should become the intermediate of combining Humanities and Social Sciences and the modern information technologies, it is necessary for us to take social information science as a kind of high-crossing and rising discipline to be researched specially and deeply. The State Innovation Base of “Scientific Progress and Human Spirit” at Huazhong University of Science and Technology established the Social Information Science Institute(SISI) in 2007, which for the first time proposed internationally that social information science should be considered as a special displine. This move is of great

significance.

Professor Wu Kun, who has done much special researches to philosophy of information for many years, has proposed his own explanation to social information. He claimed that information can be divided into three forms, which are information-in-itself, information-for-itself and reproduced information, while the unification of the three information forms indicated in human society is social information.[1,p231] Social information is "the general name of information world which has been held by human cognition and created by human consciousness and practical activities".[1,p234]

Agreeing with Professor Wu Kun's point of views, Professor Kang Ouyang thinks that information can be simply and directly divided into two forms: social information and natural information, and social information can be proposed as paired concept of natural information, therefore we can define social information by virtue of social information. "Generally, social information are those information correlated with human being's lives, social production, mental lives, social interaction, culture inheritation and innovative creation, which existed in our lives and interactions by way of life, social, historical, cultural, national, even the most complicated form of human beings, and make the existence and development of human beings possible."[2] If we want to transform the problem of social information from a research program to such a kind of discipline of social information science, it is obvious that so much works deserves to be done ahead.

Professor Kang Ouyang pointed out that the study of social information science included at least four levels [3]: philosophical level, theoretical level, special disciplinary level and technical level. He also believed that the study of social information science should learn from the research methods of complexity sciences and start with complex objects, because social information science has the same characteristics of complexity science. [2] Generally speaking, the development of system science which started from the middle of 20th century had experienced stage of System Theory and stage of Self-Organizing Theory, and developed to the stage of Complexity Theory in the 1920s. Weiner's Control Theory, Shannon's Information

Theory and Bertalanffy's General System Theory are the representatives of the stage of System Theory. Prigogine's Dissipativity Structure Theory, Haken's Synergefics, Manfred Eigen's Hypercycle Theory (or Supercirculation Theory) and Rene Thom's Catastrophe Theory are the representatives of self-organizing theory. In addition to those theories, there had been more theories such as Chaos theory, Fractal theory, and complex adaptation system theory of Santa Fe Institute, which meant that system science, had advanced to the stage of complexity theory and complexity science had become an appealing new discipline area. Responding to this situation, scholars from philosophy of science and technology in China had done much methodological research. For instance, Professor Wu Tong from Tsinghua University studied systematically self-organizing methodology and complexity methodology; Professor Wu Jie and Zhang Huaxia from Zhongshan University proposed the new concept of systematic dialectics; professor Miao Dong-sheng from Renmin University of China had done much work about the dialectics of system science. It seems that people tend to take dialectics recognized by virtue of the materials possessed exclusively by system science or dialectics which focused on system categories as system dialectics. As for us, much new content will be inevitably added into dialectics in this era of information. System dialectics should be considered as the succession and development of traditional dialectics, but never the deviation of it. This paper intends to analyze and explain the complexity of social information science from the perspective of connecting complexity methodology and system dialectics. It puts forward the following theses: firstly, the complexity of social information science is similar with the characteristics of complexity of system science and could be studied with the analytical methods of system science and system dialectics; secondly, the complex system of social information has its own laws, so it can be known and understood gradually; thirdly, philosophy of information will shed some light on the study of social information science.

2、The Special Complexity of Social Information Science

Some said that the concept of social information was just a particular instance of

concept of information, for this reason social information theory was not needed if there has already been the information theory. Likewise, if there has been a discipline of information science, social information science is also not needed. We don't think so. We can in a nutshell review the history when Engineer Control Theory and Biological Control Theory became independent sub-disciplines. Although Weiner established control theory in 1949, his control theory was not paid enough attention by the academics, on the contrary, followed by much misunderstanding. The subtitle of the *Cybernetics* in 1949 is "about the science of control and communication in animals and machines", which aims to indicate that control theory is the science shared commonly by nerve control of life systems and automatic control of machinery systems. Therefore, in the first sight, it is clear that control theory has direct kin relations with engineer control theory and biological control theory. Nonetheless, does it mean that independent engineer control theory and biological control theory are not needed since there has been control theory? It is never that case from historical facts. As a matter of fact, control theory of 1949 suffered from fierce attacks and critics in Soviet academics when it is proposed before long, because it was regarded as speculative and empty metaphysics or bourgeoisie pseudo-science with no practical values. This kind of situation was not totally changed until the English version of *Engineering Control Theory* by Qian Xue-sen was published in 1954. Scientists ultimately realized that control theory has so much practical values and application potential in the area of engineering technology so that no one would say that control theory is pseudo-science. In 1955, Soviet Philosophy Circle quickly gave normal status to control theory. Ashby, the British psychi-pathologist who is familiar with biology and control theory, initiated Biological Control Theory in 1956. He was enthusiastic in applying control theory to biological systems for many years. All these research results never bring owls to Athens. Separating unique laws from universal laws and developing them into a relative independent and new sub-discipline did not mean weakening the original subject; to the contrary, it strengthened the original discipline. In our point of view, it is also the same case for the relation between information science and social information science.

Information science has complexity, and as a sub-discipline of information science, social information has its own special complexity as well. In our points of view, the main characteristic of social information science is complexity. Professor Kang Ouyang pointed out that the complexity of social information had following forms[2]: (1) many kinds of information intertwine with each other, such as factual information intertwining with valuable information, subjective information intertwining with objective information, rational information intertwining with irrational information, universal information intertwining with particular information; (2) different information differs from or contradicts with each other, such as the difference between holographic information and limited information, the contradiction between intentional information and random information. (3) The involvement of the subject, i.e. Human beings, leads to complexity, such as artificial addition and reduction of social information as well as purposive distortion of social information, the interaction and restriction between social information cognition and social information valuation, the difference between information explanation and information understanding, the different effects made by the passive reception and active collection of social information. With further analysis, we found that the particularity of complexity of social information consists in the value and subjectivity possessed by social information, which is also the fundamental distinction between social information and natural information. In the broaden sense, we claim that social information science belongs to information science, while information science in the narrow or normal sense is specifically the information computing science based on information theory, the essence of which is natural information. Compared with general information science, the features of social information science are psychological and intentional, so we should take different approach to study their respective complexity.

3、The Complexity of Social Information System

The study of social information science will be extremely complicated from whatever perspectives. However, from Aristotle to Kant or from Copernicus to

Einstein, the principle of simplicity is the highest creed embraced by philosophers and scientists, and to some extent, the faith in simplicity by human beings seems to be inherent, which likes being given by God. Indeed, according to the history of scientific thoughts, natural science, especially modern science, has made great progress under the lead of the principle of simplicity, and it is so that principle of simplicity penetrated in each discipline and has become a common goal for scientists to pursue. After the born of quantum mechanics, however, this principle failed, at least, is not enough for the study of modern science. Bohr's Complementary Principle indicates that precise space-time description and strict causality can't be both effective and traditional causation doesn't work any more. On the other hand, Heisenberg's Indeterminacy Principle and Born's Probabilistic Interpretation which challenged strict determinism and principle of simplicity has proved that the nature is governed by causation and chance together.

Consequently, complex system, as a trans-disciplinary science, is of vitally important methodological significance. "The so-called complex system isn't characterized by such a fact that its whole function and behavior can not be determined unambiguous through simple addition and linear causal chain by its constituents and sub-systems. But the existence and evolvement of complex system still have determinate laws to obey, in which both chance and causality, and contingency and necessity determined the existence and development of systems, thus complex system can be said to have certain determinacy wholly. And we called it in-complete determinacy."[7] The non-linear structure in complex system dominates the transmission of causation, then forms causal feedback loop. In such case, the roles of "cause" and "effect" will not be exclusively determined one by one, which can reasonably explain reciprocal causation as feedback loop. Social information system contains intricate interactions of various factors including scientific and technological, social, individual, psychological and valuable factors. How synergetics of social information communication such as the synergetic action mechanism in the communication process of rumor and mendacious information promotes the synergetic action mechanism of mass movement explains that social information

system is really a complex system. Facing such a research object, we should not only recognize the complexity and difficulty therein, but also be confident in the possibility of finding the intrinsic laws and new methodological principles underlying complexity. Although simplicity principle is no longer an effective method and the rules of complexity is not as easily to be grasped as simplicity principle, that doesn't mean that complexity doesn't have rules, or have rules but can't be understood. If it is that case, the study of complex systems will become meaningless, and the works of methodological theorists are just redundant. In fact, ever since system science was founded, much more accomplishments have been made, so we just believe that some contributions will be made in social information science if we can effectively employ the research method of complex system science. We think that to understand the complexity of social information, we should pay attention to the prediction and grasp of local laws instead of pursuing the global and complete determinacy. The laws we want to look for may be like the probabilistic prediction in quantum mechanics, that is, the predictability in non-predictability and determinacy in indeterminacy.

4、Complexity Has Laws To Obey

The true value of complexity lies in pursuing its intrinsic new-typed laws, but not in the superficial negation of Newton and Einstein's simplicity. Instead, it is a kind of dialectic negation. We have got much enlightenment from Professor Kang Ouyang's papers, for example, we realized that Thomas Robert Malthus actually the precursor of exploring the complexity laws. If we review the history of scientific thoughts, we will see how Darwin discovered "natural selection". When Darwin had the idea of gradual evolution, he was plagued by not finding an evolution mechanism. Incidentally, he read some chapters of Malthus's book and unexpectedly discovered a "competition and selection" mechanism which could explain the conservation of advantaged variation and the elimination of disadvantaged variation through feedback regulation automatic mechanism. It is such a mechanism that provided the basis for the reasonable explanation of evolution theory.

The law of exponential growth is one of the most important laws of complexity

science. Differently speaking, Darwin discovered the mechanism of natural selection with the help of complexity laws. Thus it can be seen that complexity science has strict laws to obey and is never in a chaos or in a mess. Social information has laws to obey as well. Opportunity of fluctuation, feedback and non=linear interaction are the main mechanism of the evolvement of complex system. The evolvement laws of social information can be understood by appropriately applying these mechanisms deeply. The scientific spirit advocated in the era of Galileo and Newton is idealizing and simplifying the research objects. The development of modern science, however, makes us realize that over-simplifying objects has much limits, therefore we must envisage the complexity of objects and at the same time consider the complexity of the way of dealing with them. But we should never forget that pursuing for the knowledge of law (including law of complexity), in some sense, contains the pursuit of intrinsic simplicity. If we want to express this idea in dialectic language, it means pursuing the more deeply intrinsic simplicity implied in complexity. Actually, we have realized from experience that we can grasp the trend of information in some cases such as the guiding effect of sales promotion and advertisements in marketplace. As Professor Kang Ouyang pointed out that the main characteristic of social information is the value selection of subjectivity. Because sales promotion is leading the value selection of consumers, it can make some commodities superior to other congener commodities. Just as we can't unilaterally seek simplicity, we should take an open attitude to complexity, which means that we couldn't give up pursuing simplicity when we uphold the complexity of phenomenon.

5、**The Inspiration Brought To Social Information Science By Philosophy Of Information**

Information theory, as a science of studying the laws of information operation and transmission and a quantified theory of communication, belongs to special science, while philosophy of information which differs from information theory is critical study and reflection of information science. In terms of the definition to philosophy of information by Doctor Liu Gang in his book *the Origin for Philosophy*

of Information,[9] philosophy of information belongs to philosophy, and it involves the nature of the concept of information and the analysis and evaluation of various dynamics principles of information. What's more, philosophy of information also touches upon the elaboration and application of information theory and computer methodology to diversified philosophical problems. Information theory and computer methodology have broadened the understanding of human cognition capability and machinery intelligence. The great methodological advantages of philosophy of information exhibits a kind of unique power of semantic analysis, which has powerful concept vocabulary and provides a unified and coherent concept (linguistic) framework granting further discussion.

Luciano Floridi, the trailblazer of philosophy of information, published his book *What Is Philosophy of Information* in 2002 internationally, in which information for the first time was looked upon as central philosophical problems, and other philosophical problems were classified into four categories: semantics, intelligence, nature and value. This book was compiled into *Meta-Philosophy* and t*he Handbook of Philosophy of Information* published in 2004. When information was confirmed as basic philosophical concept, philosophy of information entered into establishment stage. [9, p34] The development of science and technology in 20th century has two paths: physical approach and intentional approach, according to *the Origin for Philosophy of Information*. Logics is the basis of intentional science, while intentional science is studying specially signs operation, meaning, reference, explanation and truth value , such as cognitive science, artificial intelligence, computer science, information science and psychology etc . [9, p43]

Personally, we are inclined to read philosophy of information from the perspective of uniqueness of social information, but philosophy of information, in fact, is in possession of obvious humanistic and social characteristics. The so-called "three great technologies" in the late 20th century are Information Technology, Genetic Engineering and Space Technology. The general trend is that science turns to technology, and human beings enters into information society. The reflection of information technology has two approaches as well. The first approach is deconstruct

ional, which is represented by speculative Phenomenology, Existentialism, Frankfurt School and Post-modernism of European-continental humanists; while the other approach is constructive, which is moving forward to philosophical problems proposed by formalism science. For example, the machine intelligence problem of Turing machine has an effect on philosophy of mind, philosophy of language, Hermeneutics and metaphysics.[9, p58]

With the opening of Internet, the pattern of information exchange of human beings has entered into a new phase. According to the generalization of international philosophers of information, Internet has been promoting the development of philosophy of information from following four aspects:

（1）The first one is that the reflect or representation of reality turns to the reflection of reality, and subject actively involves in that process. Therefore, “Self” becomes a meaningful component of reality, which was called “meta-semantic of narrative” by philosophers of information. (2) The second one is delimitation of culture. The human society is not the isolated island described in *Robinson Crusoe*, because Internet greatly promoted the information communication between human beings. The previous meaningful empirical world constructed by individual centrism was transformed into the construction of reality of inter-subjectivity. Just as Rorty’s community-centrism indicated, human beings are cooperative and affinitive in linguistic community and cultural community. They share the common information resources and semantic resources, and make the world become more meaningful. From social information scientific point of view, the phenomenon of globalization is actually a socialized information phenomenon, that is, a phenomenon of culture delimitation. (3) The third one is so-called de-physicalization of nature. With the information socialized, physical world is experiencing a process of virtualization and alienation. Arts, commodity, entertainment and news are placed in glass showcase and virtual windows of information media to be experienced. The true individuals can be replaced with objects, and become tokens of ideal types. In the information society, individuals are obviously symbolized, and natural man becomes social man, which means highly de-physicalization and socialization.[9, p59] The fourth one is

personification of conceptual environment of so-called mind design or sojourn by philosophers of information. Narrative subjects with intention, value and thoughts and feelings are shaped into semantic objects in today's information society. Comparing with material world, mental world plays more and more important role. History and culture move forward, while nature and physical reality move backward. Cultural factors and physical factors stand side by side, and spiritual civilization sets alongside with material civilization through property of de-physicalization and specific narrative in the virtual world. In our personal point of view, the culture world is no less true than physical world.

Floridi emphasized "information shift" in *Programs of Philosophy of Information*. There are many important shifts in history. For instance, the scientific revolution in seventeen century symbolized that ontology turned to epistemology; the language shift placed traditional ontology and epistemology into the language level to study; philosophy of information shift indicated that language turned to information, and information became more basic level. [9, p60] Michael Dummett pointed out in *Origins of Analytic Philosophy* that information is transferred by perception and stored by memory. The operation level of information flow is more basic than acquisition and communication of knowledge. American philosopher Dennett thinks that concept of information ultimately contributes to the unification of mind, object, and meaning.[9, p61]

The information society of 20th century has its own important characteristics. A Japanese research team in 1967 put forward that transition from industrialization to informatization is a fundamental change. In industrialization society, touchable material products plays a leading role, while untouchable information products plays a leading part in information society. [9, p62] Digitalization and networking can be said to be the main features of information society. People all feel that digital media makes a strong impact to traditional media. Young readers are attracted by Internet and electronic media, and readers who are still reading newspaper are aging persons. Daniel Bell further proposed the concept of "knowledge society" in his famous book *The Coming of Post-Industrial Society (1973)*. In post-industrial society, theoretic

knowledge has central status, and research and development become spring of innovation. [9, p79] Knowledge is a set of reasonable statements of facts and thoughts[9,p81], and it has become strategic resource.[9,p84] Since Alvin Toffler's *The Third Wave* published in 1980, the role and status of information have been much improved, and in 1990, the new concept of information society appeared. Toffler discussed relationship between knowledge and information in *Powershift*, and he thinks that knowledge, differently speaking, is processed and generalized information. Information has value only if it is processed, which is the prerequisite of becoming knowledge.

Sociologists are doing positivism research, while futurists are doing prospective and descriptive research. Sociologists think that the characteristics of information society lie in the reduction of Manufacturing and diversification of Services. Services are relocated, and new posts belong to information industry. But it doesn't mean elimination of manufacturing. Toffler said that despite the deep transformation of American economy, it is still powerful in manufacturing, and the proportion of industrial workers is declined. [9, p87-88]

All in all, if complexity science provides a "strong weapon" of understanding complexity mechanism for complex systems of social information, we can see that semantic analysis tool of philosophy of information provides a "weak weapon" of understanding social information systems. The latter is another kind of methodological instrument, and complements with the former.

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Introduction to the authors:

Jiang Xiao-hui, female, born in 1982, city of Dalian, Liaoning Province, is the lecturer of School of Humanities and Law of Northeastern University. Her main research area is philosophy of physics.

Chen Ming-yi, male, born in 1986, Qichun County, Hubei Province, is a PH.D candidate of Philosophy Department of Huazhong University of Science and Technology. His main research areas include philosophy of science and philosophy of logic.