

Analysis on Characteristics of the Self-organization of Internet

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Abstract : *Compared to newspapers, periodicals, radio and television and other media, Internet is a new media. Internet communication has self-organizing and heter-organizing mechanism. Although the self-organization of network communication occurs and develops in different levels of network communication system, it has similar performance and operating rules. On the basic level, elements of Internet system have their own spontaneous movement mechanism. however, the whole Internet can form a number of ordered structure and function. Therefore, like the self-organization of other systems, self-organizing network communication mechanism has the characteristics of their own as a result of dynamic behaviors.*

Key words: *Internet; self-organizing mechanism; characteristics of the self-organization*

Compared to newspapers, periodicals, radio and television and other media, Internet is a new media. Internet communication has self-organizing and heter-organizing mechanism. However, Internet can be regarded as a self-organizing system. On the basic level, elements of Internet system have their own spontaneous movement mechanism. But the whole Internet can form a number of ordered structure and function. So self-organization of Internet has the characteristics of their own as a result of dynamic behaviors.

1. Information sharing

Self-organization of living systems is a very typical phenomenon of self-organization. In the life system, DNA

contains the genetic information of organisms, but DNA presents in all cells of organisms, which means that every cell has the genetic information stored in DNA. Every cell in all of them has its "game rules" and code of conduct . Each cell expresses part of DNA genetic information, forming a specific trait as a whole.

Internet also have a similar nature with living systems. Internet system is also composed of concrete cells—a network of users, different types of networks, computers, etc.. Each elements generally share the similar information of connecting rules, on the basis of information shARATION, they formed a huge network communication system, with special structure and function.

For instance, different network computers have different hardware and software, but

they use the same connecting protocols. Even if these computers link in different forms, or they belong to different LANs, they all follow the TCP/IP protocol as the main network connecting protocols. That is ,they have the same "game rules" . If a computer does not follow these protocols, it can not contact Internet.

So is Internet users. At a special time, different users have different levels in network using. However, if a user can spend more time in Internet surfing, he will be familiar with the rules and technologies of the web, so he can operate more and more freely. For example, cyber language is the result of constant interaction of Internet users , in the process of using web language a user can learn to use language normally. Recently, some Chinese characters, such as “ji ng (囧)”, “méi(囧)”, “bìng(囧)”, which are all ancient Chinese characters, they would not have become popular without network users’ learning and imitation.

Information sharing between elements of Internet system means everyone can learn and cooperate each other. It is the equal interaction that leads to the self-organization phenomena and behavior of Internet system.

2 . Independent units

In a self-organizing system, the elements are mostly independent, they can change their movements according to status of environment or their own. So is Internet, the elements must follow the same "game rules", and change their behaviors on their own decisions.

The elements of Internet system are highly independent, a proof is the fact that network users can make their own decisions

when their circumstance changed. A user is a part of Internet system, as well as a unit of social system. Net user has the right to make decisions on information publishing and accessing, and their behaviors result in their own decisions. But individual decisions and acts lead to self-organization of Internet system as a whole.

Give an example, a user wants to set up a website, he can decide the content of information and hyper-links freely, at the same time he must obey national laws and social rules. These behaviors and operations are spontaneous and independent, do not take place simultaneously.

Also, Internet users can choose information contents freely. Internet has rich information resources, so web users can access information easier. Therefore, users may determine the time and contents according to their education, work, interests, habits, etc.. Every network user has special habit, it’s the result of their own selections and decisions.

Since Internet is a giant self-organizing system, it is very difficult to control the whole process of network communication. The independent units means no one can control the web, the structure and function of Internet system is result of interaction between elements, namely, so it is the result of the system’s self-organization.

3 . Short-range communications

In the heter-organizing system the various elements are not independent, and their behaviors are controlled by a center. Therefore, the elements of the heter-organizing system often have long-range communications: the information

is first uploaded to the control center by elements of the system, and then sent to the specific elements of the system. Next the elements begin to behave according to the orders of system control center. The long-range communications of various elements are often time-consuming with poor transmission, which is not good to the independent action of various elements. So the efficiency of heter-organizing system is low, most time long-range communications should be reduced. Like the rule "a general far away may not obey the orders of the King" actually reduces the long-range communication within the system. If more rights and freedom is given to the elements, like the generals, it will be easier for them to deal with changing battlefield information and win the war in the end.

The elements of self-organizing system generally have short-range communications. The elements make decisions according to their internal and external environment. In addition to its own internal state information, they only access to the information of nearby elements, and they needn't and can not possibly obtain the status information of the whole system.

The elements of Internet system also have short-range communications. As Internet system is very large, no element of can obtain the whole information of the web status. So people are not quite aware of the structure and characteristics of Internet, and know little about the process and mechanism to access information. a site or a user can get insufficient information before doing something, so they can not foresee all results of their actions. Therefore, the short-range communication is the normal

state of self-organization of Internet. Because of short-range communication, elements of Internet system are "blind", but flexible and active, so the self-organization of Internet emerged and developed. For example, a search engine display a new service, this is the result of technologies and users' needs. If the search engine needs to get sufficient information before taking action, it will lose the chance of innovation and development.

4 . Micro decision

Micro decision implies that the independent decisions of elements of a system are not made for the whole system, but only for their own interests. Self-organizing Internet system also follows the principle of micro decision. No element of Internet has power to control behaviors of other elements or processes. The individual elements are independent, so micro decision is real rules.

E.g. , a network user decides to set up his own blog, then the content, topics, the interface style of the blog are all determined by user himself. And the user can also decide on the content and frequency of updates. At the same time, the user can not control other people, they can create their own blog, or not, which is other people's decision.

The micro decision of each element means that the behavior of the network system is the result of complex interactions of various elements. No element can not determine the system's structure and function by itself, but more or less, all of them have an impact on the self-organization of the whole system's structure and function.

5 . Parallel operation

Parallel operation means that in a self-organizing system, the elements are all equal independent actors, the decision and action of each system element are parallel processes, and the decision and behavior of each element of different systems can carry on at the same time. No control center controls the decision and action of each element, and the order of the decision and behavior of each system element does not depend on the control center or any other external forces.

The self-organization of Internet also obey the principle of parallel operation, which is based on the interactions of elements. The elements are equal, so the order is not natural and not be arranged; it is independent, so it can be interactive. The interaction between elements leads to survival of the fittest, so that Internet system can produce and maintain structure and function. Therefore, parallel operation is the important feature of self-organizing mechanism and it is very essential to the maintenance of self-organizing Internet.

Network technologies are evolving all the time. Different users develop and optimize the same communication technologies at the same time. For example, the Chinese input software has great market, From the beginning many companies and Internet users were engaged in the development of Chinese input software, and some companies such as Microsoft and other foreign companies also did much work. Different kinds of Chinese input software had their own characteristics, but developed together, and thus benefited the ordinary users a lot. Now some Chinese input

software, such as Sogou Pinyin input method, works faster, so it is quite popular. This process is self-organizing. Different users have made their contributions in improving and optimizing the Chinese input software. Chinese input software could not have achieved so rapid progress, if it had been developed only by one or two companies and there were no parallel operation.

Parallel operation ensures open communication, equality, harmony and order of Internet. With parallel operation, Internet encourage innovation, no element has advantages and must pass the test in the process of network communication in order to achieve sustainable development.

6 . Integral coordination

The self-organizing process of the web is one in which all elements work together to form the orderly structure and function and achieve integral coordination. Just like the Bernard convection, from microscopic point of view, the movement of water molecules is random, but from a macro perspective, it has its own the structure and function. On the micro level, the elements of the web can take, independent action. However, through interactions between elements, orderly structure and function emerges in the system.

Integral coordination is one of the important characteristics of self-organization mechanism. For example, many Internet users in the world use Google search engine to search for information. Each user uses Google search engine has his own specific reasons and intentions, due to which Google search engine possesses a larger market, and thus have a huge impact. Google's rise

shows that the random behavior of Internet users will have a huge impact, and will form an orderly structure.

The Internet system not only ensures the independence of each element, but also ensures the integral coordination of the various elements. For example, the same protocols ensure the transfer of information between networked computers, which is the basis of self-organizing. In the specific mode of transmission, there are some rules such as chat etiquette rules and certain rules to use language. These rules come from the elements, especially the interaction or agreement between network users, and this ensures the coherence of the network system.

7 . Never-end evolution

The evolution of Internet system is a never-ending process. Network system can evolve and tends to be better in the process

The never-end evolution shows the evolving nature of Internet. Whether the resources of network information increase or the system functions enhance, they are all manifestations of evolution of the Web, and they show the evolution of self-organizing Internet.

On a word, these features show us a picture of the self-organization of Internet. Self-organizing network system emerges through the interaction of elements. So, these features do good to our analysis of self-organizing mechanism of Internet

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