

Thinking about the Creativity Based on System Approach

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Abstract

Creativity is an essential element of success in contemporary organizations, yet much remains to be discovered about how creativity happens. Based on the system approach, this paper tries to explore how the creativity happens in the minds of individuals. Then it gives three cases to discuss the process of an idea for new product or new technology. And finally, it shows the result of creating knowledge is not an individual's activity but continual interaction standing in individuals or between system and its environment.

Keywords: Creativity, System approach, Interaction

1. Basic concepts and principles of system theory

The system theory is one of the methodological trends in modern science. It thinks that behaviors or characteristics of system depend on both the elements and the interaction in elements (Bertalanffy 1969). Broadly speaking, the interaction means the exchange of both energy and materials in system elements as well as system with its environment. In a system of developing creative thinking, the interaction can be performed in many activities such as argument, discussion, learning, talking, showing, exhibitions and so on. And the exchange of energy and materials can be understood as exchange of insights, institutions, knowledge, information, thoughts and so on. To better understand how the interaction in elements promotes to happen creativity, we first brief give the system knowledge.

Bertalanffy pointed out that a system can be defined as a complex of elements standing in interacting (Bertalanffy, 1969). In dealing with the interaction in elements, the following Figure.1 can give a simple graphical illustration. (See Figure 1)

In case *a* and *b*, the complex is not a system and it may be only understood as the sum of elements considered in isolation because of no interaction between them. The behaviors of the complex may be directly derived from the behavior of the parts when the total of parts contained in a complex is known. In case *c*, the complex may be thought as a system because of elements in complex standing in interacting and may be able to emerge some new characteristics derived from the interaction in elements. System knowledge thinks that the characteristics and behavior of a system are dependent on not only the elements, but also the relations within the complex. They can be described with the following mainly properties (Bertalanffy, 1969; V.Blauberger, 1977)

1.1 Constitutive

The constitutive characteristics are rooted in continually dynamic interaction within the complex, for understanding such characteristics we therefore must know not only the elements in the system, but also the relations in elements.

1.2 Wholeness

It means that "the whole is more than the sum of parts". In other words, the characteristics and behaviors of a system may not be simply derived from the characteristics of isolated parts. The characteristics of the complex, therefore, compared to those of the elements, appear as "new" or "emergent". For example, the non-inflammation of H₂O molecule is a new characteristic emerged from the interaction between an atom of hydrogen (inflammation) and an atom of oxygen (combustibility) and this characteristic is not available for isolated hydrogen or oxygen element.

1.3 Openness

This characteristic shows that there is a continual exchange of energy and matter happen between system and its environment. Any variation in environment irritates the system and its all elements and brings about a variation in the whole system, and vice versa, variations of the system and any element affect the environment around the system.

Dynamic interaction existed in elementary reactions in parts and in continual exchange of energy and matter

between system and its environment is proved to be the most important feature of system and to be the drive of evolution and development of system.

2. Creativity knowledge of systems theory

Based on the approach of system science, we can explain how the creativity happens in the minds of individuals or in group processes. Thinking a group or individuals making ideas or creating knowledge as a whole, we describe that the members or the individuals are the elements of system, that the interaction is presented in exchange of knowledge, insights, information in members or in individuals or between system and its environment and that system characteristics is creativity depended on not only the individuals, but also continually dynamics relations in individuals.

From a view of system, creating knowledge is not an individual's activity but continual interaction standing in individuals or between system and its environment although new knowledge maybe begin with an individual's personal highly subjective and vague insight. Presuming some meaning but vague ideas for new product or new technology are come up with from an individual at a project-development team. And these ideas would directly stimulate other members in the team to further think and argue what the vague idea might possibly mean. In response of the argument, the initial vague ideas are inspired and improved in the form of yet clear ideas and in turn the clear ideas further enrich and add them. During this process, team members broaden, extend, and enrich their knowledge toward more clear ideas. Then they put together what they knew in new ways and argue the advantages and disadvantages of the improved-ideas again, but this time at a higher level. Such, a spiral of ideas for new knowledge or new product is eventually formed, from vague to clear and then more clear and finally an actual model which may make innovative product and technology. In the process of active argument and discussion, the exchange of thought and knowledge in members plays a catalyst and important role. So it can be said that creativity is from the result of strong interaction in members. Similarly, when the environment takes place change such as market shifting, technologies proliferating, competitors multiplying, it may bring the system members new intuitions and insights. To adjust themselves to changed environment, the members of project-development system would further discuss and then respond them with more clear concepts. As a result, the team rewards the changed-environment by providing quality products or better service. It is the interaction in members that inspires or perfects vague ideas into valuable product concepts and create knowledge about new products and new technologies. This explains well that any an individual alone is not enough to complete new knowledge-creating but the product of dynamic interaction among team members because any individual is only good at his own narrow perspective while losing sight of broader context. To understand the potential of this interaction in creativity development, consider the following company names: Honda, the maker of automobile, Japan; China Mobile Company, a mobile communications company; Shaoxing Textile County, China textile center. Although they all operate at different industries, they have something in common: each perfected models of new products development or knowledge creating from vague ideas through continual interaction in individuals.

3. How three companies do it

3.1 Honda Company

Honda's Accord car models were and are familiar to all of us. They were good examples to understand how a vague idea was converted into a new product through interaction in team individuals (Ikujiro Nonaka, 2007).

To develop a favor car for the new postwar generation in Japan, a vogue idea "Let's gamble" was begun with top management at Honda in 1978. To transfer the idea into real product, Honda Company formed a new-product development team which was given only two instructions: one was to come up with a product concept fundamentally different from anything the company had ever done before; and second was to make a car that was inexpensive but not cheap. Following the instructions, team members proposed the first insight "inventing something totally new". Thus "What's totally new" and "How to be new" became main topics argued and discussed by team members. After continual exchange, feedback and collision of knowledge, insights and information, team members converted the slogan into "theory of automobile evolution" and then eventually came to get a more clear concept of ideal cars "man-maximum and machine-minimum" totally contradicting the traditional wisdom about automobile design at that time, which emphasized long, low sedans. Further arguing, they reasoned that "man-maximum" meant that new car could provide the most room for the passenger but not sacrifice comfort and "machine-minimum" meant that new car should minimize the space taken up by the engine and other mechanical systems and be cheaper and lighter but also more solid than traditional cars. As a result, a product concept called "Tall Boy" was given birth and then led to an actual and revolutionary styling car Honda City, which has become the company's distinctive urban car for its taking up the least amount of space on the road and has resulted in the new generation of "tall and short" cars now quite prevalent.

3.2 China Mobile Communications Corporation (short for China Mobile)

China Mobile's many new service ideas originated from its customers and then were step by step come true in exchange of ideas and information between the company researchers with its customers (Wang Qiyun, 2006).

For instance, mobile value-added service called M-zone catering for younger fashionable people was developed from a vogue insight which mobile phone should hold multi-function like Switzerland Knife through interaction in members. "What's the preference of the younger in mobile services? They are a fun group who seeks for being fashion, personalizing, feeling excited, liking consumption but lesser money". Thus, it became critical for the company how to express this knowledge and how to embody this knowledge into younger's favor service. The company began the service development with holding many interesting activities on university campus, such as mobile interactive message service match, special performance for university students, and campus-dance which was directly joined by over 6 millions campus-students with enthusiasm. Through these mutual activities, the company further cleared the multi-function service for campus-students mainly in two ways: one was various innovative personalized services and the other was various fee packages of cheaper unit service price but series service consumption required. In extending service, the company was fully use wireless function to provide not only sounds service such as giving calls, receiving calls and leaving message but also pictures or letters service such as online entertainment, downloading personalized ring tones and pictures, transferring pictures or letters each other, games treasure, enjoying various special information services such as weather, restaurant, sports or other interested by users. Inspired by the successful cooperation with McDonald, the company confidently declared that it is possible for the company to provide more special services for younger generation according to their preference. In price, M-zone service provided extra-value service which was free month-rent, 500 mobile-letters for only RMB¥30 dollars, average one mobile-letter for RMB¥0.6 dollars lesser than regular at least RMB¥1.0 dollar for one. These services developed with extra-value and low unit price but series consumption could made the younger generation enjoy entertainment possible at any places, on the ways or at home, and at any time, by day or at night and could meet very well the needs of younger persons. What's more, they were very fit the live style of campus students. In the short 15 months from the beginning, M-zone has "moved" over 20 millions younger to enjoy these services, averagely increasing one more customer in every 3 seconds and become one of three main services in the company.

3.3 Shaoxin Textile County

Shaoxin Textile County's development from a traditional small textile county into China Textile Center was also result of interaction among multi-actors such as enterprises, government, intellectuals, researchers, and so on (Dai Hongmei, 2006).

Shaoxin county is one of top ten industry counties in China. Its 70% of the total revenue came from textile industry so that it was reputed to be an industry county on a cloth. But recent years, Shaoxing textile industry has met critical challenge from the cost of raw materials in production highly increased, the technologies in textile industry backward and the trade friction often happened in international markets. In these situations, "what to do and How to do for Shaoxing's textile industry" were fiercely discussed among the entrepreneurs, government officers, researchers and intellectuals. Investigating, arguing, and then investigating, arguing again, over and over, they gradually recognized that Shaoxing Textile County would orientate as China Textile Silicon and improve toward two directions: one was to extend textile industrial chain and the other was to develop new products with modern technologies. In extending industrial chain, they developed from past single clothing production to present products on whole textile chain including PTA (Pure Terephthalic Acid), polyester, chemical fiber, clothing and apparel. In new products, they expanded cloth products from previous only for clothing to present for automobile cloth, surgical clothing, farm cloth, wet towel, and lint lenses. These achievements were made mainly from the interaction among members on the "Innovation Platform of Modern Textile and Equipment, Zhejiang" which was not a special department or organization but a flexible structure. According to project, actors were dynamically constituted to a team who exchanged insights, information, and knowledge. And then new ideas from discussion were quickly put into practice at local medium-small enterprises to test if they could be converted into meaning products. By these ways, they developed many new value products. In 2005, the revenue from textile industries reached over RMB¥100 billions in Shaoxing Textile County.

4. Managerial implications

Each of three companies got the ideas of products-developed or services-developed by the different ways of interaction at different scopes. For Hodon, the interaction was fallen on the members of new products-developed team. In the case of China Mobile, for developing new service, its interaction was extended from the company's researchers to younger consumers. Shaoxin Textile County dynamically aggregated relative actors to join the interaction according to the needs of different projects.

Generally speaking, a value idea maybe begin with someone' vague insight but must be gradually perfected through continual exchange of energy and knowledge in members, in other words through interaction in elements of system because an individual's knowledge is very limited. As a system of knowledge-creating, converting new ideas into value products concepts or models must be eventually completed in elements' continual interaction which is a good platform of knowledge integration. Such as Albert Einstein said that the most essential characteristics of creativity is knowledge integration. Therefore, making a liberal atmosphere for the actors to join interaction is most fundamental because creators in safety and freedom of mind can fully and effectively stimulate and trigger one another. Thus, various knowledge and insights are synthesized and improved during actively discussion and argument and then new and value concepts are be able to be perfected. if people' creating thoughts are often inspired and encouraged by their environment, they will become men with creativity (Peter, 2002). Then members to join value thought-developed teams are also required with different knowledge and information because the creativity is, in fact, a kind of ability integrating many insights to form value idea whereas homogeneous elements could not form a system which emerges new characteristics. An example in life is a good explanation. Many automobile engines even with most excellent quality put together could not be assembled an automobile car but the sum of engines considered in isolation. Whereas an engine is combined with other automobile parts of different function such as automobile chassis, body, and electrical equipment, this can emerge a function of automobile car.

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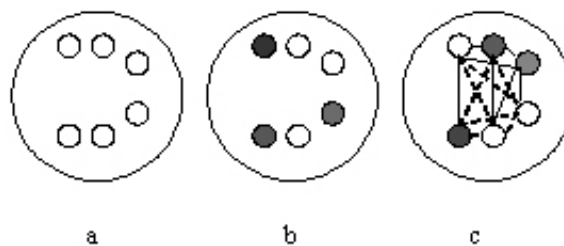


Figure 1. A System of Graphical Illustration