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# Innovative Mechanism of Rural Organization Based on Self-Organization

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**Abstract** The paper analyzes the basic situation of the formation of innovative rural organizations with the form of self-organization; reveals the features of self-organization, including the four aspects of openness of rural organization, innovation of rural organization far away from equilibrium, the non-linear response mechanism of rural organization innovation and the random rise and fall of rural organization innovation. The evolution mechanism of rural organization innovation is revealed according to the growth stage, the ideal stage, the decline and the fall stage. The paper probes into the basic restriction mechanism of the self-organization evaluation of rural organization from three aspects, including target recognition, path dependence and knowledge sharing. The basic measures on cultivating the innovative mechanism of rural organization are put forward. Firstly, constructing the dissipative structure of rural organization innovation; secondly, cultivating the dynamic study capability of rural organization innovation system; thirdly, selecting the step-by-step evolution strategy of rural organization innovation system.

**Key words** Self-organization, Rural organization innovation, Evolution, Innovation mechanism, China

Organization innovation is a persistent and circular process accompanying with finding out the problems, defining the problems, implementing solution<sup>[1]</sup>. Rural organization innovation is an important way for transforming the urban-rural dual structure and realizing the socialist new village construction. As a modern scientific theory, self-organization theory provides methodology for promoting rural organization innovation and innovating rural organization system, as well as important theoretical and practical value for reducing rural organization innovation costs and improving organization innovation performance.

## 1 Self-organization and evolution mechanism for rural organization innovation

**1.1 Forming condition and developmental force of self-organization** Self-organization is the closely structured system, which is organized, created, developed automatically and can develop from disorderly state to orderly state<sup>[2]</sup>. There are four basic situations for forming self-organization system. Firstly, the system must be open system; secondly, the system must be far way from the equilibrium state; thirdly, the non-linear response mechanism; fourthly, random fluctuation. The motive force of self-organization is that it intensifies the relations of elements in the system or inputs the outside stimulus system to produce non-linear functions and creates the orderly development through competitiveness and cooperation to promote new model and function and to promote the system to the maximum and complex possibility.

### 1.2 Self-organization of rural organization innovation

**1.2.1** The openness of rural organization innovation. The ru-

ral organization innovation is not a close organization innovation isolated from rural social environment. It is the organization innovation, which makes full use of rural organization resources under the background of urban and rural coordination development. The organization can let rural areas to enjoy the achievements of reform and opening up through absorbing urban technology, management, information, knowledge, capital and some other developmental elements. Therefore, rural organization innovation is an open system for the exchange of materials, energy and information between rural areas and urban areas.

**1.2.2** Rural organization innovation is far away from equilibrium state. Non-equilibrium is an important condition informing self-organization state. In the inside system of rural organization innovation, there are the differences in terms of politics, economy, culture and ecology. The rural organization innovation continuously exchange materials, energy and information with the outside environment. Under the situation that the "negentropy" inputs to the system, the rural organization innovation separates from equilibrium state and develops to the direction of self-organization.

**1.2.3** The non-linear response driven mechanism of rural organization innovation. The integration feature of non-linear demanding system is not the simple overlay of the features of subsystem. Rural organization innovation is not the simple overlay of inner scientific decision system, organization implementation system, information response system, evaluation and stimulation system and organization protection system. Each subsystem and its internal elements relate and function together to form a complex internet structure and the change of any system or element will cause the change the system elements or efficiency or the positive evolution of system and decay of system.

**1.2.4** Random rise and fall of rural organization innovation. Random rise and fall is the internal cause of system evolution,

which is caused by the separation of steady state of the differences between elements and subsystems through non-linear function system. Rural organization innovation confronts various restrictions include macro-policy background, resource allocation of market economy, absent organization function of rural development. The random change of each element will disturb the equilibrium state of the system and become the random engine of rural organization innovation and form "sharp rise and fall" through the amplification of non-linear mechanism.

### 1.3 Development mechanism of rural organization innovation

#### 1.3.1 The structure of rural organization innovation system.

The basic elements of rural organization innovation are the material resources, economic resources and system resources. These elements are distributed in each main body of the society and each main body can or has the opportunities to participate in the innovation process of rural organization. Each resource and main body constitutes the subsystems of rural organization innovation system. Each subsystem forms the correlation mechanism which restricts and promotes mutually and then complex system will be composed. The development of system can be constituted through the effective coordination functions.

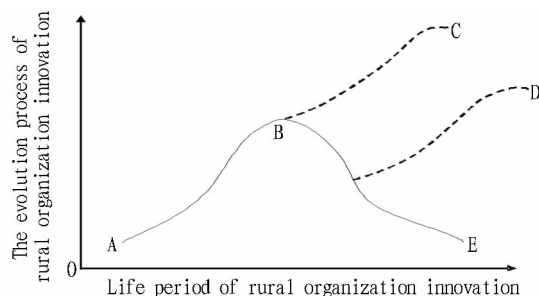
#### 1.3.2 Environment of rural organization innovation system.

Rural organization innovation system environment is a huge social economy system. Under the background of globalization and informationization, it becomes more and more complex. The first one is the political environment, which covers socialist new village construction, social service equalization, the adjustment and reform of governmental functions, which provides special system space and system development framework for rural organization innovation and affects the structure, function and developmental mode of rural organization innovation. The second one is economic environment, which covers perfection and development of socialist market economy system, urban-rural dual economic structure, agricultural competitive layout and some other elements, which affect the dynamic and risk-taking features of rural organization innovation. The third one is cultural environment, which includes ecological civilization, family system, social trust, social norm and some other invisible elements that affect the rural organization innovation. The fourth environment includes technology, knowledge, information and geographic environment.

#### 1.3.3 The development mechanism of rural organization innovation system.

Negentropy is the prerequisite of self organization. The second law of thermodynamics points out that under open condition, the entropy production of system is composed by the external entropy change and the internal entropy change of the system and the entropy change in the internal system is not negative. Therefore, only when the entropy change in the external system is enough to cancel out the entropy change in the internal system, then the entropy production of the system is negentropy. The system will rise and fall and the system will become the dissipative structure. When the rise and fall is lower than the threshold limit value, the rise and fall is the disturbance of stability and it will facilitate the improvement of system.

When the rise and fall is higher than threshold limit value, the non-linear function of the system will change the tiny rise and fall into "huge rise and fall" and the system will change violently. Therefore, the system will separate from the original stable state and form the orderly structure which adapts to the new environment.



**Fig. 1 The evolutionary track of rural organization innovation system**

The adaptability of organization is the expression of the evolution mechanism of organization. It changes its self structure and behavior model through continuous "learning" and "experience accumulation" in the process of the mutual function of organization and environment<sup>[3]</sup>. According to the life cycle theory of the adaptability of organization, the evolution of rural organization innovation can be divided into the growth stage of innovation, ideal stage of organization innovation system and the decay stage of organization innovation. In Fig. 1 A stage is the growth stage of organization innovation and it is the self positioning of the organization and the coordination function of the internal elements in the organization according to the demand of system development to choose the reasonable evolution direction of path and reasonable position in the social system. It is reflected on the formation of high recognition and high trust and the strong interact of the members and promote the positive evolution of organization. The enthusiasm represented in the primary stage of rural family contract responsibility system shows the successful dual operation of organization innovation and lays the basic organization mode Chinese rural social production. B stage is the ideal stage of organization innovation and the organization adaptability of dynamic equilibrium formed as a result of the change of external environment. It is reflected on the dynamic adaptability of organization innovation to social system. In the ideal stage of organization innovation, the organization mode is relative stable. The ideal stage of organization innovation is caused by the change of external environment, which makes the organization innovation confront two choices. The first one is to break through the ideal state of the decay stage of organization innovation. The process of implementing organization is reflected on the organization innovation in the C stage and forms the spiral rise of organization innovation. As a result of related stability of organization, the path dependence of organization innovation is formed. The positive feedback mechanism of path dependence shows the rigid trend of organization mode. The mode section of organization innovation changes from the function improvement to form change;

the laziness of organization structure grows gradually and the organization innovation transits from ideal stage of organization innovation to the decay of organization innovation. After 39 years' development, the family contract responsibility system has changed the basic organization mode of China. But, with the development of market economy, the risks of organization modes, which take family as the social unit, are increasing by its low organization degree and defying the market, so it can not change the layout of urban-rural dual structure and the weak position of rural organization. The rural organization confronts the second-time reform layout. E stage is the decay stage of organization innovation; the organization innovation can not suit to the changes of external environment; the decay of adaptability to the external environment and the process to decay. In the process of developing from B stage to E stage, the D stage may probably appear, at this time, the organization will not completely loss the adaptability to the external environment, and it is the self innovation of organization innovation in the process of decay. If the reform succeeds, the organization in the decay stage will become the starting point in the growth stage, and then the organization will go to the next ideal stage. If not, the organization innovation will decline and fall and will not be turned back (Fig. 1).

## 2 The basic restriction mechanism of self organization of rural organization innovation

**2.1 Objection collaboration** Rural organization innovation concerns multiple kinds of resources, main bodies and innovation activities. How to coordinate various parts of organization to realize the order evolution of system structure and function of rural organization innovation is the key that concerns the fail and success of organization innovation. Organization target is the basis for the survival and development of organization and the direction for the order evolution of structure and function of organization innovation. The self organization of rural organization innovation is different from the "other organization" of rural organization. The "other organization" of rural organization innovation is the mandatory reform led by the government. The target of the organization is designed by the administration institutions according to the demand of organization development. The innovated organization is strong, when the external environment changes greatly, the adaptability of the organization will decline due to the strong target of it. However, the self organization is a complete organization reform of rural organization. It is the order evolution of organization on the basis of the dynamic balance of external environment. The target of the organization is formed by the interaction between various resources and main bodies on the basis of mutual development. The various resources and supporting equipments of participated rural organization innovation bring collaboration effect and form the joint force of collective actions, which may conducive to amplifying the efficiency of individual resources or main body of rural organization innovation. The common targets formed by the self organization of rural organization innovation lay a solid

foundation for the mutual activities and mutual interests of rural organization.

**2.2 Path dependence** Path dependence refers to a system with positive response mechanism. Once the mechanism is adopted by a system in a accidental event, the mechanism will develop follow a certain path and then it is hard to be replaced by other better evolution path. The path independence of organization innovation is the intensification of organization caused by the positive response mechanism in the process of innovation. The past organization innovation determines the current probably path selection and two contrast innovation tracks might appear. When the innovation performance increases progressively, the organization innovation will be intensified and supported, and shows benign innovation momentum as a result of positive response mechanism. When the innovation performance decreases progressively, the organization innovation can not adjust the innovation path due to the complexity and dependence of organization innovation. Organization innovation is locked in the state of inefficient state. The rural family contract system has changed the traditional organization form of the People's Commune. The function and efficiency of family production has changed the rural social life in short term. As a result of the change of innovation activities and innovation performance of rural organization innovation, the rural organization on the basis of family can not realize the scale efficiency under market economy. The performance of organization decreases progressively for its less disadvantaged position in the market gaming. The rural organization innovation under the path dependence needs the second time organization innovation to create new path for organization innovation as a result of progressive increase of organization innovation to shake off the non-efficient state of basic organization unit on the basis of family.

**2.3 Knowledge share** Knowledge share refers to the share of individual knowledge (explicit knowledge and implicit knowledge) through various means and organizations under certain environment, and then forms the continuous competitive advantages. Knowledge share is an important way for promoting organization innovation capability, learning capability and learning performance. Inserting social capital, system stimulation into knowledge share can eliminate the obstacle between suppliers and receivers of knowledge in the internal organization. In rural organization innovation, the self organization of knowledge share comes from the knowledge differences of the members who participate in the organization innovation activities. Due to the common target and interests, the members can communicate smoothly in the organization through penetrating the isolated and disordered knowledge and integrate the knowledge in the organization. When the external environment of the uncertain members changes, the non-obstacle communication makes the members to spread the knowledge in the organization through non-linear function and change the partial knowledge of other members in the organization to cause chain effects to converge the structural knowledge in the organization. The capital convergence of structural knowledge has decreased the complexity of organization and the adaptability of

complex dynamic environment. Therefore, in order to suit the changes of the external environment, increasing the complexity is the basic prerequisite for rural organization innovation to observe and handle the relations of external environment by the way of complex system way. The organization innovation will seek the knowledge differences and input them to the system to facilitate the knowledge change of members in the organization and start the new evolution of knowledge share. Under the function of rural organization innovation, rural organization innovation can share the knowledge within the organization and absorb the knowledge without the organization.

### 3 Countermeasures on cultivating self organization of rural organization innovation mechanism

**3.1 Constructing the dissipative structure or rural organization innovation** The organization will go from order state to disorder state, from low order state to high order state. New structure and organization will be formed spontaneously, and the order structure formed spontaneously is called dissipative structure. Therefore, the openness of rural organization innovation system is the prerequisite of constructing dissipative structure. Opening different resources (including capital, technology, information, education, management, etc.), different participants and main bodies (including government, enterprises, non-governmental organization, etc.), different organization innovation thought (organization reform, system reform, cultural reform, technology reform), can help them keep away from equilibrium state and keep their differences, as well as contact with the input and output of materials, energy and information in the external environment. Introducing the various factors of negentropy (including governmental policy, enterprise experiences, non-governmental organization efficiency, etc.) and introducing the rural organization innovation system to form an open organization structure and organization culture to eliminate the entropy production within the system to facilitate the change of system from order state to disorder state, in the end, by doing these to improve the adaptability capability and self-organization capability of rural organization innovation. At the meantime, due to the non-linear mechanism of competition and collaboration caused by the difference among the organizations, the relevant department should encourage the existence of the differences and facilitate the corporation to foster the order spatial structure to create favorable condition for the forming of self-organization and the order evolution.

**3.2 Cultivating the dynamic learning capability of rural organization innovation system** Rural organization innovation system is an orderly developed self organization system. The learning capability of rural organization innovation system is the basic means for adapting the complexity of innovation system, as well as the strategic resources for rural organization innovation to improve self organization capability and organization performance in the dynamic environment of market. Cultivating the dynamic learning of rural organization system requires rural organization to overcome the learning obstacles in the process

of learning. Both the experimental learning based on the practice and the innovation learning based on deduction should be implemented. Only by the rural organization innovation has the capability to absorb new knowledge and flexibly integrate various subjects and construct the innovation capability of rural organization, and then it can form the sustainable competitive advantage in the dynamic environment. The government should take the cultural reform to construct the engine on the basis of dynamic study; take organization reform to construct the developmental platform on the basis of dynamic study and take system reform to construct the system framework on the basis of dynamic study and take technology reform to construct the supporting approaches on the basis of dynamic study<sup>[4]</sup>. The complete and systematic learning framework covering cognitive learning, practice learning and action learning should be constructed to facilitate the benign cycle of organization learning and dynamic capability and form the dynamic organization learning network of rural organization innovation and create inner mechanism for the dynamic evolution of rural organization innovation system in the complex system.

**3.3 Strategy selection of the progressive evolution of rural organization innovation system** In a life circle, the rural organization innovation is dominated by linear innovation and progressive reform in a relatively stable stage. But, when a life circle evolves to a higher stage, the entropy value within the organization will increase, the organization innovation capability will decline and enter the unstable stage and the non-linear features becomes the basic form of organization innovation system. In the stage, which is dominated by non-linear innovation and fundamental change, the system becomes very sensitive to the primary situation; so the "butterfly effect" is easy to be triggered. Through rise and fall, many factors lead the mass state to new order state under the function of the non-linear mechanism. The rural organization innovation faces two choices, therefore, when rural organization innovation achieves the edge of mass, rural organization innovation system should recognize, evaluate and use the already appeared innovation opportunities according to the relations between system and environment. Through effective organization culture reform, organization structure reform and organization system reform, the organization innovation in the mass edge will enter to a even more complex and consistent stable stage to propel the gradual formation of order structure of rural organization innovation which is used to the complex change of environment.

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