The Research of the Agricultural Technology Transfer

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Abstract. This research looks on the technology metastasis as an important link in the innovative chain. It analyses the factors of the agricultural technology metastasis, and studies the interplay and correlation of technology itself, institute, enterprise and environment on the basis of defining the agriculture technology product and technology metastasis attribute and the connotation, aiming to give a forceful support for the construction of agriculture. The results show that the agricultural technology transfer is a multivariate sophisticated system. No positively optimal solution exits and there are only relatively suboptimal states under some certain conditions.

Keywords: Agricultural Technology, Technology Transfer, Mechanism, Factor.

1 Introduction

The impact of technology transfer for our country technological innovation and economic growth has undergone profound changes. During the past years, the agricultural science technology has brought the important effect into the agriculture development in China, which promotes the agricultural technology innovation.

However, the resource advantage has not been changed into the competitive edge. The input of science and technology has not been transformed into new product or new estate, and the ration between input and output has not overtaken the one abroad. The proportion of the technology that has been put into practice to the total agricultural science and technology is small. It is important to increase the rate of agricultural research achievement conversion.

Agriculture technology transfer is a complicated process, which is related with technology itself、technology supplier、technology receiver and environmental force, etc. The study studies agriculture technology transfer from the factors above.

2 Technology Itself

The characteristic of technology itself is an important element, which is confirmed by many researchers before.

Tacitness, complexity, accumulation and uncertainty are the main features of technology itself. This paper divides technology into two parts, which are high technology and low technology, as is shown in table 1.

Table 1. Characteristics classification of technology itself

	Tacitness	Complexity	Accumulation	Uncertainty
High Tech	High	High	High	High
Low Tech	Low	Low	Low	Low

The higher the technology is, the stronger the tacitness is. Complexity、accumulation and uncertainty are similar with tacitness. Moreover, the transfer is more difficult, one of which is knowledge representation. The transfer is based on researchers' comprehension to the agriculture technology, and accumulation and uncertainty are also displayed in the interactive learning process.

3 Technology Supplier

Colleges, especially agriculture colleges are the main agriculture technology suppliers. Besides traditional functions of teaching and researching, there is a third responsibility which is to transfer the knowledge、technology and achievement into the social services, in order to realize the market value of the agriculture technology.

The third function is classified into two parts in this paper, which are the strong one and the weak one. It is analyzed from the ability of R&D、the ability of judging the commercial value of the technology、the facility and the degree of opening up, as is shown in table 2.

Table 2. Characteristics classification of the technology supplier

	R&D	Judging	Facility	Opening Up
The Strong One	Strong	Strong	Strong	Strong
The Weak One	Weak	Weak	Weak	Weak

Strengthening the third function also means increasing the degree of the opening up to some extent, and more collections between colleges and companies emerge gradually. While the interaction between colleges and companies is reinforced, the third function will show out great effects, and moreover, the ability of R&D、the ability of judging the commercial value of the technology and the facility will give impetus to the third function gradually.

4 Technology Receiver

Generally, agricultural enterprises are the main receivers of agriculture technology transfer.

There are two methods of obtaining technologies. One is to research on their own internally, and the other is to seek out outwardly. It costs less to get technologies in the first way usually; however, the second method will work out when the cost of the first way is large or companies are unable to study by themselves.

There are several aspects of the technology receiver that have influence on the effect of the technology transfer:

- The core technological capabilities of enterprises. The capabilities include the technical capacity、the technical learning ability、the technical assistance capacity、the quality of human resources and the level of R&D. In the interaction between colleges and enterprises, the stronger the core technological capabilities are, the more superior situation the enterprises will be in.
- The development strategy. If the technology that will be transferred is important to the enterprise, the enterprise will tend to control the technology completely, which will influence the mode of the technology transfer.
- The preference. If enterprises expect to acquire the technologies rapidly and effectively, they are likely to take the mode of purchasing. If enterprises pay attention to the price, they may adopt the mode of participation and cooperation which is cheaper relatively.
- The scale of the enterprise. When the scale is extremely large, the structure of the organization may become rigid frequently, and it may lead to the shortage of the ability and innovation. The enterprise has to take the mode of participation and cooperation in the technology transfer.
- The geographical distance between colleges and enterprises. Generally, the smaller the distance is, the more likely the interaction will happen between technology receivers and suppliers.

5 Environmental Force

The external conditions constitute the environmental factors in the interactive relationship. Colleges、research institutes、public organizations、intermediaries and financial institutions are the main behavior actors. Establishing a regional innovation network which is relatively stable and energetic, has a significant impact on the agricultural technology transfer.

The regional innovation network includes three parts, which are organization network information network and learning network.

The organization network is an organic institution network, which contains the behavior actors above. The information network contains two networks. One is the visible shared network based on computers, and the other is the invisible social

network on the basis of the first one. The learning network is an invisible ubiquitous network based on the organization network and the information network. The learning network is also a special competitive and cooperative cultural environment where there exits knowledge exchange and inspiration.

The environmental force is classified into two sections according to the level of the regional innovation network and it is analyzed from the point of the organization network 、the information network and the learning network in the research, as is shown in table 3.

Colleges and enterprises are not only the main participants, but also the important nodes on the regional innovation network. There will be more connections between colleges and enterprises while the level of the regional innovation network rises. With the expanding and deepening of cooperation, the boundary of colleges and enterprises will be indistinct gradually, which contribute to the penetration and diffusion of information and knowledge. Therefore, the emergence and development of the regional innovation network establish conditions and support for the agriculture technology transfer.

Table 3. Characteristics classification of the environmental force

	Organization Network	Information Network	Learning Network
High Level	More Contacts	Ample Information	Great Learning Ability
Low Level	Less Contacts	Impeded Information	Weak Learning Ability

Besides, the policy factor is a particularly important aspect of the environmental forces in the course of the mode chosen of the agriculture technology transfer, especially in China, where the policy leading effect is more prominent.

6 Conclusion

In this study, the interactions and relations of the components of the agricultural technology transfer are discussed in view of the content and characteristic. Some important conclusions are brought through the research.

- The agricultural technology transfer is a complex system. Moreover, it is verified to be a systemic process variable.
- The technology itself、the technology supplier、the technology receiver and the environmental force are the main elements of the agricultural technology transfer. Each aspect includes several factors that have influences on the final transfer effects.
- There is no positively optimal mode in the agricultural technology transfer process. What to seek out is a relatively suboptimal condition, under which the technology itself、the technology supplier、the technology receiver and the environmental force reach to a best dynamic match with contingency.

This study has been carried out from the factors of the agricultural technology transfer forwardly. The future research may be focus on the outcomes of the transfer,

and discuss the performance evaluation in order to investigate the agricultural technology transfer reversely and quantitatively.

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