

Research on Mechanism of Achievements Transformation in University Science Parks Based on Market Orientation

Kun Zhang

International School
Huanghe Science and Technology College
Zhengzhou, China

Xiaoyuan Yang

International School
Huanghe Science and Technology College
Zhengzhou, China

Abstract—To promote the transformation of scientific and technological achievements is the advantage of university science parks as well as their responsibility and mission. This study analyzes the achievement transformation problems of the university science parks in China. By comparing the experience and characteristics of university science parks in the United States and UK, this study makes a beneficial exploration to mechanism of achievements transformation in university science parks based on market orientation.

Keywords—university science park; achievement; transformation; mechanism

I. INTRODUCTION

To promote the transformation of scientific and technological achievements is one of the four major functions of university science parks. Transformation of scientific and technological achievements is mainly aimed at valuable scientific research and makes them developed, applied and promoted to form new products, new processes and new materials so as to realize industrialization and improve economic and social development. As university science parks, transformation of scientific and technological achievements is both their functional advantages, but also their responsibility and mission. However, compared with developed countries, China's university science parks started late and success rate of scientific and technological achievements is not high. Therefore, it is necessary to study the enhancing approaches of transformation to establish the transformation mechanism of Chinese university science parks.

II. CURRENT ACHIEVEMENTS TRANSFORMATION PROBLEMS IN CHINESE UNIVERSITIES SCIENCE PARKS

Because much attention has been paid to the successful results of research programs during the procedure of projects selection and evaluation, Chinese research topics have been accustomed to those already done abroad or have focused on theoretical analysis and evaluation on study protocol assessing the flexibility instead of the application prospect, which emphasizes little on the connection with the social demands and leads to the difficulty of direct technical

support from enterprises. Although a large amount of academic papers have been published every year, the annual ratio of technology transfer has been less than 8%, which means that effective results supplied by university science parks are quite limited. For this problem, the reasons are mainly manifested in the following three aspects.

A. Weak Market Awareness

Colleges possess considerable patents and proprietary technology, but the success of the transformation of scientific and technological achievements and technology commercialization needs to set up a market-oriented mechanism and market-oriented enterprise behavior. The integration of technology, capital and markets can effectively convert laboratory patented technology into commercial products. Second, the transformation and commercialization of scientific and technological achievements need operation and decision-makers with business ideas and business measures, while for a long time, the vast majority of colleges and universities are built around the concept of scientific research and knowledge of the talent structure and ability. In addition, most patents applied for or authorized by universities in China are based on laboratory research patents, while those applied for or authorized by the universities in the developed countries, such as the United States, have already had a relatively perfect market consideration and judgment before application. Thus, there is a large gap between marketization operations, resulting in low conversion rate. And even if the transformation is achieved, it is still difficult to open the market quickly, encountering a longer period of incubation.

B. Deficient Capability in Integrated Innovation

Pilot test phase is not only the key link of transformation from science and technology into real productive forces, but also the risk test of whether the technology is successful or not. The scientific research provided by universities or research institutes need be conducted both pilot test and integrated innovation in the university of science and technology parks. However, during the developing process, Chinese university science parks rush to create off-the-shelf products but neglect the pilot test phase. The investigation

reveals that the integration and innovation mechanism has not yet been fully established in many university science parks in Henan province and integrated innovation ability is not high. Besides, innovative resources of the science parks cannot be effectively integrated and the scientific and technological achievements are repeated at a low level and lack of innovation. All mentioned above have impacted the incubation function of university science parks.

C. Inflexible Operation Mechanism of Science Parks

Pilot test phase is not only the key link of transformation from science and technology into real productive forces, but also the risk test of whether the technology is successful or not. The scientific research provided by universities or research institutes need be conducted both pilot test and integrated innovation in the university of science and technology parks. However, during the developing process, Chinese university science parks rush to create off-the-shelf products but neglect the pilot test phase. The investigation reveals that the integration and innovation mechanism has not yet been fully established in many university science parks in Henan province and integrated innovation ability is not high. Besides, innovative resources of the science parks cannot be effectively integrated and the scientific and technological achievements are repeated at a low level and lack of innovation. All mentioned above have impacted the incubation function of university science parks.

III. EXPERIENCE OF ACHIEVEMENT TRANSFORMATION OF UNIVERSITY SCIENCE PARKS IN FOREIGN COUNTRIES

A. Experience of Achievement Transformation of American University Science Park

The US government provides policy and regulation support to university science parks, and actively creates a policy environment for achievement transformation. The establishment of professional institutions is to stimulate transformation and strengthen the depth of cooperation with enterprises. In the 1980s of last century, the United States promulgated a series of bills to offer legal guarantee. And the United States set up the University of Technology Management Association (AUTM) focusing on technology transfer in the national organizations, which built bridges between researchers and industry. In addition, the US government devoted itself to solving a variety of problems in achievement transformation by science service agencies, such as small business development centers, the SME Information Center Productivity Promotion Center and so on, and human resources services, management information services, financial capital services, financial services and legal services, whose ultimate goal was to speed up the process of results transformation and to convert the technological innovation into practical productive forces and economic development momentum.

B. Experience of Achievement Transformation of UK University Science Parks

The operation of UK university science parks is of a joint nature with and the division of labor clearly so as to promote

efficiency. And these parks focus on the roles of different parts and institutions with cooperative participation of private enterprises, universities and governments in the operation and management of science and technology parks. Facts have proved that the involvement of private sectors and professional managers can make the parks run in a more specialized way. In this case, university researchers can focus more on research work, service agencies and marketers focus more on the commercialization of high-tech achievements, and the government can pay sufficient attention to macro-environment and policies supports. In addition, some UK science parks have continued to attract new venture capital support, especially from private investors, thereby providing necessary financial capital.

IV. MECHANISM OF ACHIEVEMENT TRANSFORMATION IN UNIVERSITY SCIENCE PARKS

In the process of advancing the construction of technical service platform and implementing the transformation of scientific and technological achievements, the parks should insist on carrying out the guiding ideology of proceeding from reality, geared to the demands of market, enterprises and society, and create innovative operation mode with emphasis on the operation effect, forming their own unique advantages and improving the conversion rate of scientific and technological achievements. Therefore, the transformation model of scientific and technological achievements should be market-oriented, and gradually establish a long-term mechanism of market-oriented operation in order to accelerate the transformation of scientific and technological achievements.

A. Setting up A 'Nursery-Incubator-Accelerator' (NIA) Technology Incubator Chain

"Nursery-Incubator-Accelerator" (NIA) technology incubator chain can provide targeted professional incubator services for enterprises and entrepreneurial teams in different developing stages. This chain is on the basis and core of technology business incubator, extending to the establishment of entrepreneurship nurseries and accelerator respectively. These three parts can create an ecological business incubator system, promoting the rapid growth of technology companies and industrial agglomeration and contributing to regional economic development.

B. Constructing 'Upstream-Midstream-Downstream' (UMD) Transform Chain of Scientific Achievements

The UMD transform chain aims at the establishment of the three platforms: technological innovation, transformation and engineering of scientific and technological achievements and industrialization of scientific and technological achievements and incubation of new and high-tech enterprises, building Upstream-Midstream-Downstream Transform Chain of Scientific Achievements.

Scientific and technological innovation platform belongs to the Upstream and provides intelligence and research resources for colleges and research institutes. Its core task is to undertake major national and local projects, corporate

with research topics, make full use of disciplines and talents and testing equipment, in order to produce more technical prototypes and form the source of technological innovation

The Midstream manages the state key laboratories, engineering and technology centers and technology agencies in school by assembling them together. Its main task is to implement technology integration and product research to engineering projects and enterprises with the use of upstream scientific and technological achievements, which makes universities set up the platform of scientific and technological achievements from pilot tests to the engineering and industrial transformation.

Through utilizing the integrated service platforms in university science parks, the downstream reinforces the achievement transformation and capitalization, contributing to local economic development directly.

This is different from the traditional market-based scientific and technological transformation model, whose advantage lies in market demand, the source of scientific research, intermediaries, science and technology parks (business incubator platform). They link and tie together closely to form the overall strength so that the transformation is more targeted, direct and effective.

C. Constructing Specialized Institutions to Promote the Industrialization of Scientific and Technological Achievements

Universities can have access to the market prospect and advantages and disadvantages of technique results by constructing specialized institutions to promote the industrialization and cultivating professional promoting teams responsible for market evaluation. Besides, these specialized institutions can also establish technical results pools to reserve and manage with classification in accordance with technical proficiency and market prospect so that the success rate of transformation could be improved. The specialized institutions can also expand the capital channels for achievement incubation, recruit managers and marketing staff and provide legal support and so on. All above intend to help science and technology university parts attract social involvement and connect with social venture capital, by which universities can cooperate with society to evaluate technical results, set up unhindered evaluation and investment and finance channels and shorten the industrialization process.

D. Evaluation System for Innovative Technologies

The evaluation system for innovation technologies aims at assessing the innovate achievements and diagnose and analyze enterprises through introducing a variety of mechanism like capital evaluation, trademark evaluation, price evaluation, stock evaluation and manager rights and so on.

The evaluation on research subjects should not only recognize the scientific results but the exploitation, expansion and conversion as well. Besides, it should also involve the recognition of the theoretical achievements and

of practical technology and production industrialization. This is a new evaluation concept adapting to the market economy system, showing respect and recognition to teachers' intellectual property. For any scientific research production, its theoretical influence will be tested by its actual contribution to the real productivity. Thus, when it comes to the distributive principle, research as well as transferring realization should be both considered as evaluation contents so as to set up corresponding criterion and distributive system and encourage teachers to convert research results into realistic productivity. The exploitation and utilization of scientific research and its economic benefit should be also considered as hard index during awarding professional titles or promotion. So do papers and works. Only by combining research with conversion and regulating transferred benefits as assessing focus, will the problems of low conversion rate be solved and will researchers consider technical feasibility and advancement and result transformation adequately.

V. CONCLUSION

Currently, Chinese economic development has entered a new normal and it is an innovation-driven economy, whose core is to improve creative ability and applied transformation ability. Therefore, constructing high-level universities scientific and technological parks can create it has an important significance to a favorable ecosystem for business incubators, promote science and technology enterprises' growth and motivate industrial clusters' contribution to regional economic development, which has an important significance for driving national scientific innovation and public entrepreneurship.

REFERENCES

- [1] Lu, Yanan, D. Zhang, and H. Chen. "Research on Technology Transfer of University Science and Technology Park in China." *Jiangsu Science & Technology Information* (2015).
- [2] Póvoa, Luciano Martins Costa, and M. S. Rapini. "Technology transfer from universities and public research institutes to firms in Brazil: what is transferred and how the transfer is carried out." *Science & Public Policy* 37.14(2010):558-564.
- [3] Zhang, Juan, L. Wei, and X. Peng. "Research on Technology Transfer Readiness Level and Its Application in University Technology Innovation Management." *International Conference on E-Business and E-Government IEEE Computer Society*, 2010:1904-1907.
- [4] Zou, Yonghua, and W. Zhao. "Anatomy of Tsinghua University Science Park in China: institutional evolution and assessment." *The Journal of Technology Transfer* 39.5(2014):663-674.
- [5] Song, Meng, N. Driffield, and J. Du. *Inward Investment, Technology Transfer and Innovation: Direct Evidence from China*. International Business and Institutions after the Financial Crisis. Palgrave Macmillan UK, 2014.