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Constructing University Scientific and Technological Innovation Platform Based on the View of Industry-University-Research Cooperation

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Abstract
It is one of the most effective way of accelerating the transformation of scientific and technological achievements and improving the scientific and technological innovation ability (STIA) in university by Industry-university-research cooperation (IURC). It can provide the correct orientation and strong development power for constructing university scientific and technological innovation platform (USTIP). From the perspective of IURC, in order to construct USTIP, we must be close to enterprises. University is the technical support and the source of innovation in enterprise innovation, Technical requirements in enterprises is the driving force of university technological innovation. The cooperation between university and enterprise can integrate their high quality resources and enhance their ability in scientific and technological innovation. At the same time, constructing USTIP can be propitious to the formation of close IURC system.

Key words: Industry-university-research cooperation (IURC); Scientific and technological innovation platform (STIP); Scientific and technological innovation ability (STIA)

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INTRODUCTION
It has been pointed out that the National Innovation System (NIS) will be constructed in the next five years by the Twelfth-five-years National Science and Technology Development Plan (12-5 Plan) proposed by Chinese government. As an important part of NIS, Scientific and Technological Innovation Platform (STIP) in Chinese University, has been drawn attention widely. STIP, which couple the original scientific research and the technological innovation, has been realized that its influence is not limited in the campus. The innovation ability of the whole society will be improved by the STIP. That is due to STIP will involve the innovation from research and development institutions of universities, enterprises, and other special science organization. Apart from these, the theoretical research is been tightly combined with the applicational research in STIP, the technological innovation and theoretical innovation will interact and improve each other. So, STIP has been seen as an important engine in the ability of the innovation. For perform the 12-5 Plan, as one of the key tasks in the NIS, STIP should be established and then made it functionalized. As a result, in China, almost all the universities are preparing to construct the STIP. Moreover, so far now, some have constructed one or more.

Constructing STIP from the perspective of Industry-university-research cooperation (IURC) is an important measure to promote the construction of national innovation system. IURC is a basic way to allocate national technical resources and form a strong research-development-production platform which reflects the comprehensive advantages in the process of operation. This platform is formed by industry, university and research institute, which cooperate based on the technology contract and in accordance with the principle of benefit-sharing, risk-sharing, advantages-complementing and developing together. University is the main base for knowledge innovation and dissemination, but it can't quickly react

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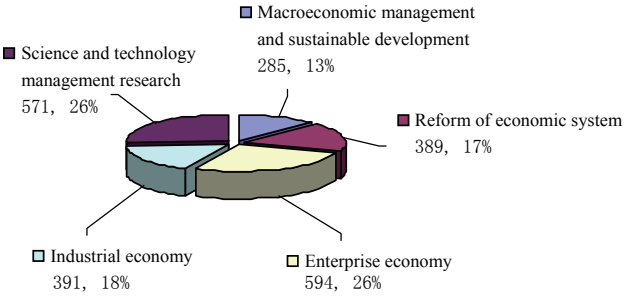
to the national scientific and technological policy and timely react to the demand of science and technology in industry. IURC is to establish the interaction chain between universities and enterprises. With the aid of this, universities can directly involve in technology innovation and construct STIP.

1. RESEARCH STATUS OF CONSTRUCTING UNIVERSITY SCIENTIFIC AND TECHNOLOGICAL INNOVATION PLATFORM (USTIP)

At present, the research of constructing university scientific and technological innovation platform (USTIP) mainly focuses on the effective integration of the internal scientific and technological resources and talent resources. For example, Ma Weihua (2007) proposed to create a truly independent and interdisciplinary STIP in Chinese universities in an article "Countermeasures Analysis of constructing university scientific and technological innovation platform in China" Xu Jianbo (2009) pointed out that STIP should be set up as innovation entity which is an integration of multi-disciplinary talent advantage in an article "Discussion on the working mechanism of university scientific and technological innovation platform". Wang Lijian (2010) thought that USTIP included national and provincial engineering technology research center, national and provincial key laboratory , research and development base which was constructed by university itself etc. in an article "Construction and application of performance evaluation indicator system of university scientific and technological innovation platform".

In fact, USTIP need many organizations to support the normal operation, including the government, universities, research institutions, enterprises, related service industry etc. This platform is a new mode of cooperative innovation between university and social resources, is a strategic research-development (R & D) alliance which is initiated by the government and leaded by universities, enterprises and research institutes work closely with them, financial institutions and intermediary organizations actively involved in them. Therefore, the research work of constructing USTIP not only needs to discuss the optimal combination of internal resources in university, but also expand ideas and construct STIP from the perspective of IURC. As the effective way of propelling the transformation of scientific and technological achievements of universities and research institutions, IURC make the government, enterprises, universities and research institutes united together when it was born. Through IURC, universities transform scientific and technological achievements into industrial advantages, so as to promote regional economic growth. It has become an important topic of university development.

Domestic scholars began to study IURC in the 1980s (Miao, 2010). In 1986, the former State Economic and Trade Commission, the State Education Commission and Chinese Academy of Sciences proposed "industry-university-research cooperation (IURC)". In 1992, the former State Economic and Trade Commission, the Ministry of Education, Chinese Academy of Sciences jointly organized the implementation of the "industry-university-research joint project", its purpose was to explore a suitable way for science, technology and economy closely integrated in China through joint research. Since the thought of IURC was put forward, it has carried out theoretical research and practice for 20 years, and has made certain achievements in China. We made IURC as the keyword, and precisely searched in CNKI(China National Knowledge Infrastructure) (not limited literature years), there were 3600 papers in journals, most of the papers in fields of social science and economic management science, the former 1324 papers, accounting for 37% of the total, the latter 2235 papers, accounting for 62%. According to the topic categories, the papers in fields of economic management science roughly divided into macroeconomic management and sustainable development, reform of economic system, enterprise economy, industrial economy, science and technology management research, etc. the distribution of the literature as shown below, on the whole, people pay more attention to science and technology management and enterprise economy, accounting for 26%.



But comparing with the developed countries, there is still a big gap in research on IURC in our country, the research work needs to be further improved and deepen. In foreign countries, USA was one of the countries which took up research on IURC earlier and better in the world. In early 20th Century, University of Wisconsin-Madison took the lead in reform of cooperation between university and society which lasted ten years, then the "Wisconsin Thought" was born, which had epoch-making significance in the history of higher education. In the 1950s, during the construction of the "Boston 128 Road High Tech Park", the Massachusetts Institute of Technology constructed the park through IURC, which has played a role of the cradle of IURC, Stanford University constructed the "Standford Research Park" in 1951, the establishment of the research park laid the foundation for the rise of the largest

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electronic industry base "Silicon Valley" in the world. "In Japan, Japan Business Coalition issued *The Opinion about Technical Education Adapting to The Requirement in new era*, put forward *make universities of science and technology system* and industry closely link together, the universities accurately grasp the requirement in industry in 1956" (Xu & Cai, 2005). In addition, the European Union also attached great importance to IURC.

Thus, abroad early began to explore the promotion of innovation through IURC and focused on the integration of existing scientific and technological innovation resources. Compared with foreign countries, scientific and technological innovation resources are more limited and scarce in China, we should take measures to optimize allocation of the existing scientific and technological innovation resources, and construct STIP, then realize the effective integration of university and enterprise technology innovation resources, and improve university scientific and technological innovation ability (STIA) through IURC.

2. CONSTRUCTING UNIVERSITY SCIENTIFIC AND TECHNOLOGICAL INNOVATION PLATFORM (USTIP) FROM THE PERSPECTIVE OF INDUSTRY-UNIVERSITY-RESEARCH COOPERATION (IURC)

2.1 The Construction of USTIP Must Carry out the Development Idea of "Close to Enterprises"

From the perspective of IURC, The construction of USTIP must be close to enterprises. On one hand, universities can formulate plans and policies according to the needs of enterprises, determine the specific scientific research and the transformation project of scientific and technological achievements, so that the research results are transformed as soon as possible, and produce economic benefits and social benefits; On the other hand, through cooperating with universities, enterprises gather outstanding scientific and technological talents, enhance their own R & D and innovation ability, and lay a solid foundation for the development of enterprises. At the same time, universities and enterprises integrate their both resources, form a public and effective space for development, by the aid of continuously update technical requirements and strong financial support of enterprises, universities improve the ability of R & D and innovation efficiency; enterprises combine talent and technology advantages of universities with their own demand, accelerate application technology R & D and the transformation of scientific and technological achievements, improve the technological innovation capability.

The construction of USTIP carries out the development route of “close to enterprises”. on one hand, universities give full attention to the technical demand of the enterprises, timely grasp the new direction for the development of the industry, tightly integrate with their scientific research, so that the scientific research work in universities can make better service for enterprises; on the other hand, universities give full play to the advantage of multi-disciplinary, actively devote to original innovation, then provide technical support for the upgrading products of the enterprises. For enterprises, they should give full play to the subject role of “technical requirements, investment in scientific and technological innovation and application of scientific and technological achievement”, but “subject” is not equal to “domination”, enterprises should respect universities, especially give the required support in academic achievements.

2.2 The Construction of USTIP Must Establish Technology R & D System in Which Industry-University-Research Tightly Cooperate

The cooperation between universities and enterprises creates a platform for scientific and technological innovation, forms an “industry-university-research alliance”. During broad participating in technology R & D of enterprises, universities actively participate in the transformation and industrialization of scientific and technological achievements, and gradually form the technological transformation and service system which main target is to promote technology progress in all walks of life.

At present, universities establish technological transformation and service center, form technology R & D system in which industry-university-research tightly cooperate. There are five typical forms as following:

2.2.1 Relying on University Science and Technology Park (USTP)

USTP is the important channel for transformation and industrialization of university scientific and technological achievements, it also has the important significance for the entrepreneurship practices and training high level technology, business and management personnel. Relying on USTP, we combine university intellectual resources with other social resources, provide the combined support platform for the transformation of scientific and technological achievements, the incubation of high-tech business, the cultivation of innovative talents.

2.2.2 Co-Constructing R & D Institutions With Enterprises

Universities and enterprises co-construct joint laboratory, experimental teaching demonstration center, engineering center and other research institutions. Through co-constructing research institutions, enterprises continue to invest on technology innovation in universities, shorten the production cycle, storage technology and talent; Universities utilize funds provided by enterprises to

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tackle key problem in the professional field, ensure the continuity of science research, and quickly occupy the commanding heights of the field.

2.2.3 Building Research Institute in Key City

Some scholars have studied on Chinese CEEUSRO (cooperative education in promotion the mutual development of high education institutes and local economy), pointed out that "there are many problems for CEEUSRO; the deep reason is the lack of normalized and effective platform for cooperation and innovation" (Fu, Li, & Fang, 2013, pp.52-59). In view of local economic development, universities build research institute, carry out the incubation test work of technological achievements, solve common and key technical problem in local dominant industry, so as to promote industrial upgrading.

2.2.4 Establishing Science and Technology Company

As the main body, universities' scientific research personnel establish science and technology company which covers scientific research, production, cultivation of innovative talents. The main task of the company is to hatch scientific research results into ripe technology and products which are put into market as soon as possible, to realize the rapid transformation of scientific and technological achievements into practical productivity, to embody the value of scientific knowledge and scientific research.

2.2.5 Co-Constructing Economic Entity With Enterprises

Basis of the cooperation in project and the exchange of information on research for many years, universities and enterprises establish long-term cooperation mechanism which integrates the advantages of both sides and close the interests of both sides together through economic levers, form the economic interests of the community. In practice, universities and enterprises can set up joint-stock companies, universities can own a share of stock in the form of product or technology (individual invest some money), participate in the management in the form of the board of directors; universities and enterprises also can jointly undertake the scientific projects, the leadership, work mechanism and cooperation content can be clarified by protocol or contract.

CONCLUSION

University includes education, scientific research and technological innovation, it is an important birthplace of new knowledge and new ideas, it is the source of innovation and provides technical support for enterprise innovation, at the same time, and enterprise's demand is the motive power of technological innovation in university. From the perspective of IURC, the construction of USTIP, which integrate resources of personnel, funds, objects in universities and enterprises, not only help enterprises turn the advanced science and technology into productivity quickly, and promote the technological innovation in enterprises, but also help universities improve scientific research conditions and enhance STIA. IURC and co-construction of USTIP, can solve the problem of insufficient R & D ability in enterprises, also solve the separation problem of scientific research and production, and shorten transformation time from scientific and technological achievements into products, so that universities play a leading role in regional industry development.

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