

Study on the Structure and Operation System of Laboratory Economy Co-establishing by University and Enterprise

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Abstract: This article summarizes the theoretical results in Laboratory economy , defines the model of the laboratory economic of schools and enterprises to build , analyzes its organizational model and elaborates its operational mechanism , so as to provide a reference for School-enterprise cooperation , laboratory-economic development and innovation performance of Laboratory economy established by university and enterprise.

Key words: laboratory economic; organization structure; operation system

1 Introduction

Laboratory economy is a new model for enterprise development which includes research input , key technology and industrial capability. This new model is put forward by experts of the field from home and abroad. Under this model , enterprises can rely on their own laboratories or set up partnerships with laboratories of universities and scientific research institutes , which can help enterprises become real main body of independent innovation by transforming knowledge into technology , turning technology into industry and enabling enterprises to have the vitality for sustainable development. This model combines the technology strength of both enterprises and scientific research institutes so that it has the characteristics of market-oriented , fast transformation from scientific fruits to productivity and high economic benefits. Different from previous cooperation between universities and enterprises , laboratory economy chooses enterprise as the main body of innovation and always regards core technology for independent innovation as a green card to the market ^[1].

As a subsystem of the country innovation system , the cooperation of universities and enterprises is usually guided by the government. In this way , the academics and industry are closely combined by the government. At present , there are many models for the cooperation

of universities and enterprises. These different models are classified according to the online level of innovation , the main body of innovation and the absorptive capacity of enterprises^[2]. However , the cooperative way of innovation which relies on enterprises has been an effective model facilitated and especially fostered by the country.

Han Muxun(2011) points out that the development of laboratory economy has been the key to technology innovation and to remaining competitive. The significance of laboratory economy lies in the establishment of the union of productivity and research , the restructure of enterprises , the update of industry and the development of foreign trade^[3].

According to the research of Chenjin (2009) , the industry-university-research cooperation in our country mainly have the way of “consigned research and development” and “transfer of technology”. However , “joint technology research” and “cooperation of laboratory build” are not so common and the phenomenon of “co-establishment of technology center” and “innovation enterprises” is more unusual^[4]. By now the researches on the technology innovation of cooperation of universities and enterprises mainly concentrate on the influential factors , alternative models , motivation , dynamic models and strategy analysis^[5] , with a lack of an all-round analysis of the structure and operation mechanism of laboratory economy. Therefore , researches focus on the view of universities so as to

form a unilateral posture of university-enterprise. The researches on co-establishing laboratory are mainly about cooperation model, operation mechanism and personnel training. The researches on cooperation of universities and enterprises innovation focus on the cooperation system and mechanism, cooperation model, personnel training model and strategy analysis. The researches on effects of cooperation mainly concentrate on factors which can influence the effects of industry-university-research cooperation and the benefits of industry-university-research cooperation under special circumstances. Therefore, there are few researches focusing on the performance of laboratory economy co-established by universities and enterprises.

At present, domestic researches about laboratory economy are restricted to the concept and preliminary application level. However, there are fewer researches on the operation mechanism and performance assessment of laboratory economy. Therefore, this article concentrates to study the laboratory economy with emphasis on the operation mechanism and performance assessment of laboratory economy.

2 The definition of laboratory economy model co-established by universities and enterprises

Laboratory economy has three modalities. First, the enterprises which have more actual strength can build their own modern laboratory themselves. These enterprises invest a lot of money, absorb talents, complete the development of core technology and the transformation of scientific fruits and realize independent intellectual property so that can improve the capacity of technology innovation and market competition. Second, enterprises cooperate with each other by relying on the laboratories of universities and scientific research institutes. Enterprises make full use of resources and demands, develop core technologies with clear goals and enable the technology transform themselves. Meanwhile, enterprises can train talents for their own. Third, enterprises co-establish laboratories with universities and scientific research institutes. Enterprises can invest money on establishing laboratories with the key courses of universities according to the demand of market so that enterprises can train talents, develop core technologies and transform scientific fruits together with universities.

As shown in Figure 1, the definition of laboratory economy model co-established by universities and enterprises can be defined according to the following three aspects: laboratory co-established by universities and enterprises, laboratory economy system and effect of laboratory economy.

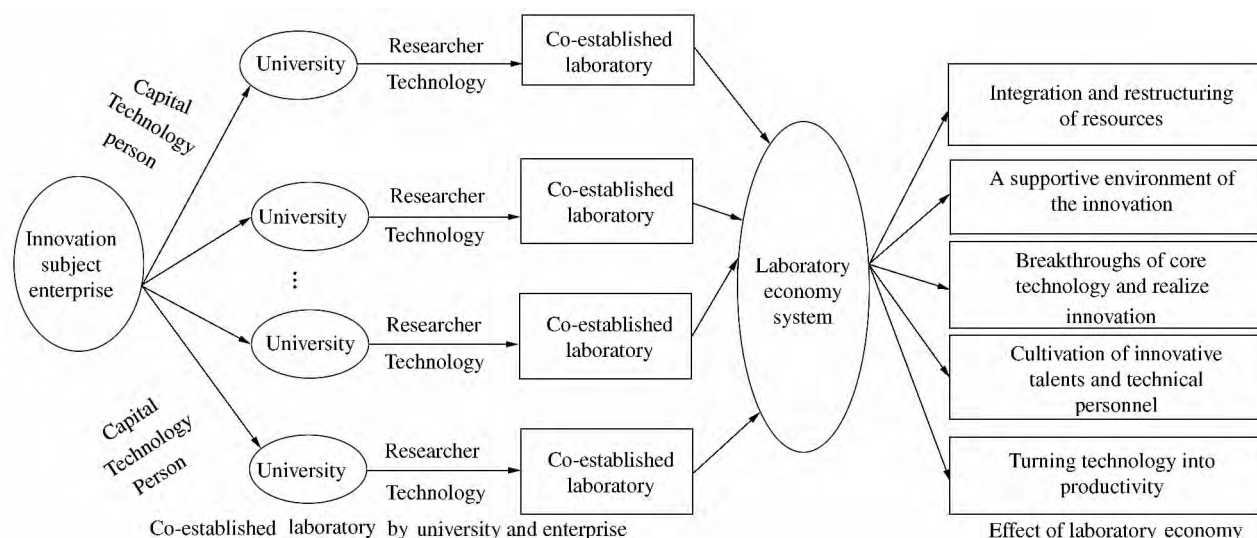


Figure 1 The structure of laboratory economy co-established by universities and enterprises

First, as for the definition of laboratory economy co-established by universities and enterprises, the current theoretical research defines laboratory economy co-established by universities and enterprises as following: universities cooperate with enterprises and both two parties build the laboratory together but universities and enterprises take different responsibilities with the purpose of achieving win-win effects by establishing laboratories. This article holds the viewpoints that the main body of innovation in the system of laboratory economy co-establishing by university and enterprise is the enterprise. In order to keep the pace with the development of market and technology and have advantages in the fierce competition, enterprises have to seek for outside knowledge resource which is university. Enterprise invests money, technology and personnel. Meanwhile, university offers research personnel and technology. Therefore, they can co-establish the laboratory so that they can share the resource together and complete for each other, thus improving capacity for innovation and realizing the goal of cooperative innovation.

Second, laboratory economy system is another model of laboratory economy co-established by universities and enterprises. Under this model, the partners of enterprises are not single because the needs of enterprises are various and the subject strength of different universities are different. Therefore, enterprises can establish laboratory with several universities at the same time based on their own needs for technology innovation, aiming at realizing the best network for technology innovation and system of laboratory economy co-established by universities and enterprises. Under the innovation network, enterprises target at market, develop new technologies and products, update products and transform scientific fruits into productivity so as to improve the core capacity for competition.

Third is the effect of laboratory economy. During the process of technology innovation co-established by universities and enterprises, both of the two parties can benefit from the system of laboratory economy. Enterprises and universities can achieve the integra-

tion and restructuring of resources and form a supportive environment of the innovation by the system of laboratory economy co-established by universities and enterprises. Enterprises can achieve breakthroughs of core technology and meanwhile realize innovation based on original technologies. By turning technology into productivity, enterprises and universities can create wealth and benefit from the fruits of the cooperation.

On the whole, the laboratory economy model co-established by universities and enterprises refers to the innovation network system co-established by universities and enterprises based on their shared goals. They build connected laboratory by combining their shared resources including information, money, technology and talents with the purpose of the integration and restructuring of innovation resources, the formation of supportive environment for the development of enterprises and the realization of breakthroughs for core technologies. This model enables enterprises to improve their original technologies and transform technologies into productivity so that both parties can benefit from the wealth created by the laboratory economy model. The co-established laboratory model is the highest and most effective way for the transformation from technology to productivity.

3 The structure of laboratory economy model co-established by universities and enterprises

Under the system of laboratory economy model, the technology innovation of enterprises is divided into several subprograms and subsystems. Enterprises seek for universities which have actual strength to cope with according to their own needs. They co-establish laboratory by way of signing contracts. Then the research and operation of the subprogram in each laboratory forms the organization of technology innovation network for the enterprises. Meanwhile, the network of technology innovation system is part of the whole organization of technology innovation for the enterprise.

Therefore, the principles of the construction of this organization are classified as following: first, the laboratory economy co-established by universities and enterprises is a closely connected union for industrial and academic technology innovation. This union is based on the contracts signed by universities and enterprises and targeted for the market. Universities and enterprises cooperate with each other in the same field with the final purpose of facilitating technology innovation and transformation. Second, enterprise is the main body for this union. Enterprise is the important bridge for the connection of technology innovation and industrial application and the technology fruits and market. Moreover, enterprise can drive the demand of market so that motivate the development of technology^[6]. Third, the organization of this union has the feature that each enterprise can cope with several universities.

The organization model of laboratory co-established by enterprises and universities can be described as following: this model is based on the strategic contracts of industrial technology innovation. The board of the enterprise is responsible for the management and the management personnel are responsible for the operation of program in each laboratory. The main operation institution is the co-established laboratory management committee. The dean of the laboratory is the main boss of the management. Meanwhile, the basic technology platform is the co-established laboratory. The distribution of industrial and academic technology innovation union mainly concentrates on the breakthroughs of core technologies.

The basic organization structure of laboratory is shown in Figure 2.

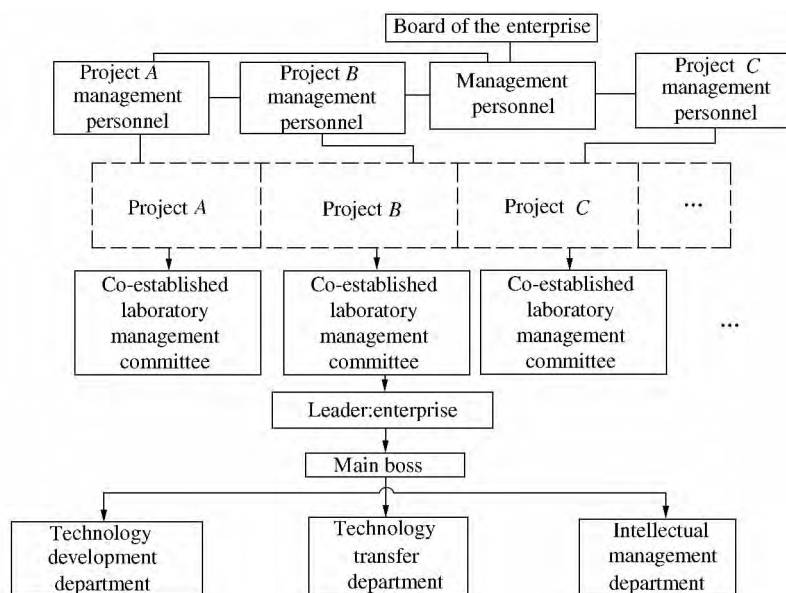


Figure 2 The organization of laboratory economy model co-established by universities and enterprises

Through the analysis of the structure of laboratory economy model co-established by universities and enterprises, we can draw a conclusion that the laboratory economy model co-established by universities and enterprises is a distributive model of innovation. This model is sponsored by enterprises. Enterprises choose the talents for innovation and allocate innovation goals

to each laboratory. Then the integration of innovation results is realized by enterprises.

The laboratory economy model co-established by universities and enterprises has the characteristic of a parallel mode. The dominate enterprise has the preliminary achievement of innovation and the clear goal of innovation. Universities join in the process of the

innovation as a module and several universities can join together at the same time so that the co-established laboratory is formed. This kind of distributed innovation allows the laboratories to innovate at the same time. Therefore, this model has the feature of a parallel mode^[7].

The identification of project and personnel and the appropriation allotment are decided by the board of directors. The project management personnel are composed of the management personnel of the co-established laboratory and they are responsible for coordinating the operation of each program. The major operational institute is the management committee of the co-established laboratory. The laboratory director is responsible for the whole process. The technology development department, technology transfer department and intellectual management department are the subordinate departments. The laboratory management committee is the supreme decision-making body of the co-established laboratory, which is composed of personnel from the enterprise and university. The major job of the laboratory management committee is to decide the project to be developed. The laboratory director is elected by the laboratory management committee and the director is the executor of the laboratory who is responsible for the routine work of the laboratory management committee.

The intellectual property management department deals with the IPRs protection problem inside and outside of the co-established laboratory, including the definition and allocation of the intellectual property of innovation achievements.

4 The operation system of laboratory economy model co-established by universities and enterprises

The operation system of laboratory economy model co-established by universities and enterprises is composed of operational mode and operating mechanism.

As for the operational mode of laboratory economy model co-established by universities and enterprises, this arti-

cle refers to the experience of Bell Laboratory. The operational mode of laboratory economy model co-established by universities and enterprises follows the order of "basic research-technology development-new product producing-marketing management-information feedback"^[8]. Since laboratory economy model co-established by universities and enterprises and Bell Laboratory lie in two different fields and the technology innovation of laboratory economy model co-established by universities and enterprises is mainly applied in the market, the operational mechanism of the two models are also different. The laboratory economy model co-established by universities and enterprises is mainly about the research of applied technologies and not about the research of basic science. Therefore, the operational mode of laboratory economy model co-established by universities and enterprises can be summarized as "applied scientific research-marketing technology development-marketing management-information feedback and the development mode can be summarized as patent-industrialization-market orientation-benefit producing". The operational mode of laboratory economy model co-established by universities and enterprises is shown in Figure 3.

The laboratory economy model is a new model for the cooperation of industry, academic and research. Different from the common integration of production-study-research, laboratory economy model is special because the upper level of technology research and development belongs to the laboratory and the lower level of industrialization belongs to the enterprise. Therefore, the enterprise and university cope with each other to do the research of applied technology so that it is easy to gain the right to have patent. During the process of industrialization, the enterprise produces new products in a volume production, markets the products and gains benefits. The products have to be tested by the market and then the enterprise gives the feedback to the laboratory. Therefore, the laboratory can improve the products. The benefits of the products will be partly invested as the later on scientific research funds for the co-established laboratory.

try". At present, the central and local governments all realize the role of laboratory economy in the improvement of technology development. For instance, the Changping District of Beijing has drafted "Changping District Economic Development Support Laboratory Interim Measures to Speed up the Integration of Production, Science and Technology Innovation" and set up special funds of science and technology innovation with the purpose of supporting the laboratory economy. Later on, the laboratory economy should be combined with the regional technology innovation so that the function of laboratory economy in the improvement of technology and enhancement of enterprise competitive force can be fully realized. Moreover, the laboratory economy model co-established by universities and enterprises and the innovation operating system of laboratory economy model co-established by universities and enterprises need to be fully motivated. The operation mechanism of the laboratory economy model co-established by universities and enterprises can be improved in this way, thus the economic effects of laboratory economy can be maximized.

References

- [1] Changping "laboratory economy" is expected to become the new development mode of China Economic Herald. 2009/12/19/B07 (in Chinese)
- [2] Li C L. Research on the mechanism of coupling interaction innovation of university-industry collaboration [D]. Dong Hua university, 2011, 10 (in Chinese)
- [3] Han M X. Research on Laboratory economic development based on the view of technological innovation [J]. Modern Business Trade Industry, 2011(12): 243-244 (in Chinese)
- [4] Chen J. Innovation and development of university-industrie strategic alliance in the new situation [M]. Beijing: China Renmin University Press, 2009: 14-15 (in Chinese)
- [5] Wang W L, Liu Y. Investigation into operation mechanism of university-enterprise cooperative innovation network: taking Henan province as example [J]. Technology Economics, 2011(8): 32-38 (in Chinese)
- [6] Shen J X. The study of innovative industry-university-institute cooperation based on strategic emerging industry development [J]. Scientific Management Research, 2011(6): 1-5 (in Chinese)
- [7] Huang G Q, Li P L. Research on the mechanism and key processes of distributed innovation [J]. Forecasting, 2008, (5): 8-13 (in Chinese)
- [8] The united states of baer laboratory [J]. Science & Culture Review, 2008(4): 122-128 (in Chinese)
- [9] Zhu G N, Peng Y F. The research on organization mode and operation mechanism of innovation network in cooperation of industry university and research institute [J]. Soft Science, 2003, (6): 49-52 (in Chinese)

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