

An Investigation on Enterprises' Technical Requirements in Hubei Province of China and Its Solutions*

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Abstract It is very important for furthering the economic development in Hubei to satisfy the technical requirements of industrial enterprises. So it is the key to find out what are the indeed requirement and what extent these requirement are satisfied, the investigation is to meet the demands. The investigation give a description of the types of enterprises' technical requirements and the solutions, cooperation willingness with universities and research institutes and the cooperation status. At last the solutions are proposed from two sides of the government and the enterprises.

Keywords Technical requirements; Enterprises in Hubei; Investigation

1 Introduction

The investigation aims to understand the technical requirements of industrial enterprises in Hubei province. For this sake, an investigation team is set up, which is composed by experts in related fields of the CAS bureau, Hubei provincial science and technology agency, Wuhan biology Institute of the CAS Bureau, Hubei provincial development and reform Commission and Wuhan University of Technology. The team investigated the related enterprises of key industries field in Wuhan city circle and vice-central city of Hubei province. This investigation has issued 131 questionnaires in total, with 131 questionnaires returned, 119 valid questionnaires, achieving a validity of 91%.

Table 1 Characteristic of Investigated Enterprises

Enterprise Type	Proportion	Enterprise size(Registered capital: Million)	Proportion	The proportion of R & D	Proportion
State-owned private enterprises	1.68	<=500	25.83%	<=10%	24.58%
Cooperative Enterprises	2.52	500~1000	21.67%	10%~20%	45.76%
Joint venture	0.84	1000~5000	37.5%	20%~30%	9.32%
Limited Liability Enterprises	51.3	>5000	15%	>30%	20.34%
Shares Limited Enterprises	22.7				
Private enterprise	16				
Hong Kong, Macao and Taiwan invested	0.84				
Foreign-invested enterprises	1.68				
Others	2.52				

The enterprises samples (shown in Table1) involve industries of electronic information, automobile manufacturing, biomedical, electromechanical, petrochemicals, agricultural products growing and processing businesses. And the enterprises types cover stock cooperative enterprises, joint ventures, limited liability (enterprise), shares limited (enterprise), private enterprises, foreign-funded enterprises, etc, and more than 95% of them are more than the scale. In the investigation, 93% of the enterprises have R&D institutions; 86% of enterprises have long-term stability of the technical support unit, and the proportion of enterprises which rely on university R&D is 91%, which are mainly Huazhong University of Science and Technology, Wuhan University of Technology and Wuhan University etc. Another 9% mainly rely on scientific research institutes. The above figures show that enterprises in Hubei Province owning research efforts are still weak, but the R&D institutions and universities are closer.

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2 The Investigation on Enterprises' Technical Requirements

2.1 The type of enterprises' technical requirements

Among the technical challenges related to the development of productive technology, energy conservation, pollutants reduce, new product development, informatization, cost reduction and productivity improvement the enterprises have faced, the results (as shown as Figure 1) have shown that about 70% enterprises choose new product development, and secondly the development of productive technology, which indicates the enterprises attach great importance to product and technology innovation.

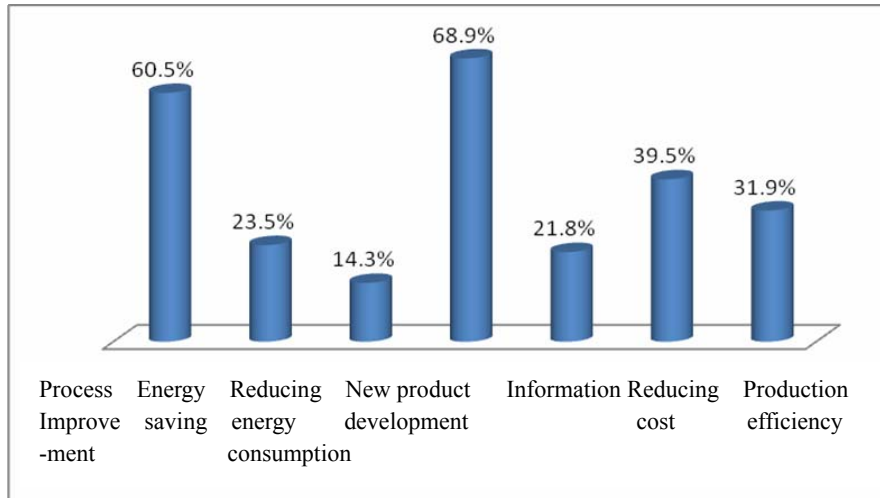


Figure 1 The Type of Enterprises' Technical Requirements

2.2 The solutions to enterprises' technical requirements

As to the expected solutions to enterprises' technical requirements(as shown as Figure 2), 68% of the enterprises are "internal organization research", 67% of the enterprises choose " R & D with universities and research institutions ", 46% of the enterprises choose "the introduction of technical personnel" solution, 39% of the enterprises choose "entrust to universities and research organizations ", 31% of enterprises choose "find their own technical resources to discuss technology import", 5% of the enterprises choose "authorize the technology intermediary for the introduction of technology."

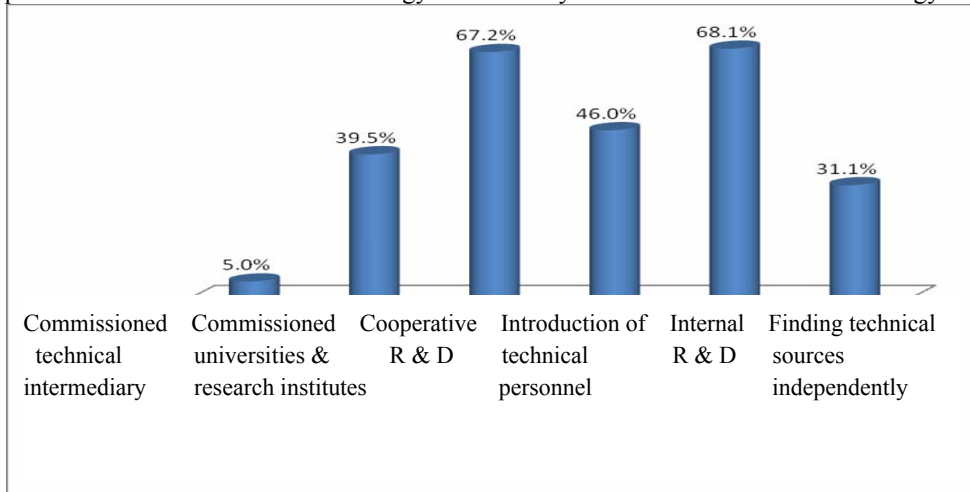


Figure 2 The Solutions of Enterprises' Technical Requirements

3 The Investigation on Enterprises' Cooperation with Universities and Research Institutes

3.1 The enterprises' cooperation willingness with universities and research institutes

For the emerging enterprises' technical requirements problems, 80% of enterprises are willing to cooperate with universities and research institutes, and can accurately make their own technical requirements, of which 90% of the total enterprises are in the proactive search for cooperation opportunities with universities and scientific research institutes, and get the ability to maintain its long-term partnership. In the cooperation with universities and scientific research institutes, 75% of enterprises are willing to invest substantial human, financial and material resources and carry out joint technology foresight.

3.2 The cooperation between enterprises and technology intermediary and its evaluation

In cooperation between the investigation enterprises and technology intermediary, only 45% of the enterprises have "successful cooperation case" with the technology intermediaries, 42% of the enterprise "have heard of technology intermediaries but have not contacted", 83.2% of enterprises "have contacted but without cooperation" 30% of the enterprises "have close contact but have no successful cases," 42% of the enterprises "have no willingness to cooperate with the intermediaries", and 7% of the enterprises "have never heard of technology intermediaries."

The pragmatic evaluation investigation result on the technology intermediaries shows, only 37% of enterprises believe that the technical intermediaries "be able to promote the success of technology transfer", and 34% of enterprises show "no understanding" of the role and the effectiveness of technology intermediaries, and 20% of the enterprises have not give any evaluation. The results show that the cooperation between production and research in Hubei is not very optimistic. Enterprises lack understanding of technology intermediaries, and technology intermediaries have not played effective.

3.3 Enterprises' technology import status

Among the investigation enterprises, 75% of the enterprises have introduced technology, as to the introduction ways, 52% of the enterprises import "directly from the technical source unit", 24% of enterprises import "directly from the person who researches technology", 20% of the enterprises "introduce technology through the introduction of talents". That is, more than 95% of the enterprises import directly, only 4% of the enterprises introduce "through the technology intermediary service organizations." For the contact with the technical source units (shown in Figure 7), more than 45% of the enterprises through the "call on universities and research institutions", 27% of the enterprises are informed by "participating in technical seminars, project presentations, etc.", 20% of the enterprises are introduced "by students, business partners", 13% of the enterprises are "brought together by the local government", only 3% of the enterprises "through the technology intermediary service institutions."

4 Conclusions and Recommendations

As the investigation findings show, there is a high degree of technology requirements of enterprises in Hubei Province, and enterprises have a strong willingness to seek technical cooperation. There are a lot of strong researches and technology resources in Hubei Province, but the utilization and effect of these research resources are not very satisfactory, particularly the effectiveness of technical services institutions in the society has not appeared, whose technical service capabilities need further improvement. Therefore, a sound government science and technology public platform and a technology innovation system with enterprises as the mainstay and the combination of production, study and research should be established in Hubei Province. With the further concentration of regional innovation resources and the establishment and improvement of the four systems including macro-control, knowledge innovation, technological innovation and intermediary service, the science and technology energy get full release, and the convert from the technological advantages to the economic advantages is achieved.

(1) Establish and improve the government macro-control system. Enhance major technological development research and technology foresight, improving science and technology decision-making mechanism, in realizing the guiding role in the optimal allocation of technology resources, enhance the macro-control ability to stimulate technological innovation power and vitality effectively, strive to create an innovative environment and to achieve the organic combination of the government guidance and market traction, to promote the orderly and rational flow of the science and technology resources elements.

(2) Set up and improve the technology innovation system with the enterprises as the mainstay and the combination of production, study and research. Enterprises play the main role in the technological innovation, with the project as the carrier, the integration of production, study and research as the path

and the science and technology intermediary as a link, make efforts to solve the highlights contradictions such as scientific and technological resources being separated from the enterprises, technological innovation base and capability being weak, to vigorously promote scientific and technological resources into the business, create the enterprises groups with active technological innovation and high-level independent intellectual property, and improve the production, study and research cooperative mechanism.

(3) Establish and improve knowledge innovation system. Bring the vital new force role and leading role of the universities and research institutes in the regional technological innovation, and take effective measures to encourage to attract universities and scientific research institutes in Wuhan to participate in national level scientific research, at the same time, carry out key technologies joint research around the distribution of productive forces and the economy in Wuhan social development needs, and thus enhance the original innovation capacity and capability for innovation.

(4) Set up and improve science and technology intermediary service system. Give play to the bridge and link role of science and technology intermediary to link the innovation subjects in the regional science and technology innovation and to promote the joint interaction, forming the science and technology intermediary service network with the organizational networking, industrial scale and socialized service to strengthen a number of technical advice, technology assessment, technology transaction, venture financing, transformation service, international science and technology cooperation and protection of intellectual property core technology intermediaries, to provide full, comprehensive high quality service for the regional innovation and entrepreneurial activity.

(5) Establish and improve a platform for technology transfer to accelerate the transformation of scientific and technological achievements. With the national, provincial and municipal engineering technology research center linked around the common techniques the appropriate economic scale production needs, carry out the engineering of technology and system integration. Sticking to taking the project as the carrier, enterprise as the support, give scope to the comprehensive advantages and carry out services for the productization and industrialization of the technology results in Hubei Province and the enhance of the overall technology level in the industry.

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