

New Mode of Cooperative Education and Social Services under the Background of Industry-University-Research

Lijuan Sun, Yina Qu, Shu Li, Yue Xi, Shaoli Zhang

School of Information Science and Engineering, University of Jinan, Jinan, Shandong 250022

Keywords: Industry-University-Research; Talents Training; Social Services

Abstract: Industry-university-research(IUR) cooperative education is an important part of deepening the reform of the science and technology system. It not only pushes the mode of economic growth to be innovation-driven macroscopically, but also realizes the deep integration of universities and enterprises microscopically, and form a synergy of innovation. This paper mainly discusses how to explore and practice the new mode of talents cooperative training and education in universities under the background of the deep integration of IUR, as well as the reform and exploration of improving social service ability. Only deep integration can better serve the society and achieve long-term development.

1. Introduction

The report of the 19th National Congress of the Communist Party of China clearly states: "the technology innovative system of deep integration of IUR, enhancing the support for innovation of small and medium-sized enterprises, and promoting the transformation of scientific and technological achievements". This requirement marks the development of China's IUR from close cooperation to deep integration. IUR cooperative education is the inevitable result of higher education adapting to the requirements of social development and economic construction. It is the requirement and trend of higher education reform and development, and also one of the important measures and ways for universities to serve the society in China.

2. Analysis of Social Environment of IUR Cooperative Education

Since the reform and opening up, under the background of market economy, as the market gradually plays a decisive role in the resource allocation, the relations and ties among the government, enterprises, universities and scientific research centers in IUR cooperative education have also changed. In the initial planned economy, the government played a leading role, and IUR cooperative education relied on the government's mandatory plans. The graduates were uniformly distributed by the cooperative enterprises, and the scientific research projects of universities were also allocated by the three scientific research funds of the government, so universities were in an advantageous position. Subsequently, with the transformation of economic system and the change of government functions, IUR cooperation changed from government planning arrangement to independent contract signing. The employment of students has also changed from unified distribution to independent employment, and the advantageous position of universities has also changed^[1]. IUR cooperation once fell into a trough, and there was a phenomenon of "cold and hot" in universities and enterprises.

Then, how to improve the enthusiasm of universities and enterprises for IUR cooperation and turn passive to active is a test that this education faces.

3. Exploration of New Mode of IUR Cooperative Education

To improve the enthusiasm of schools and enterprises and achieve a win-win situation, the IUR cooperative education mode must be reformed and innovated. Jinan University is a comprehensive university jointly built by the province and the ministry. Shandong Province focuses on the

construction of the universities' main secondary schools. With reference to the advanced concepts of fraternal colleges, we have established the "IUR Cooperative Education Development Council" with enterprises, universities and industry experts. Schools can rely on the Council to introduce experts, enterprises and relevant departments to comprehensively participate in the whole process of teachers training, majors setting and training objectives' formulation, teachers' teaching plans, as well as students' internship and training process, graduation design and distribution. In this way, we can work together to train high-level, high-quality innovative talents.

To reform and innovate the IUR cooperative education mode, it is necessary to deeply integrate the cooperative parties, achieve mutual benefit and win-win situation, so as to achieve long-term development. Enterprises cooperate with universities by naming and other ways to train high-quality talents more suitable for the needs of enterprises. Meanwhile, universities provide the exhibition places and stage for enterprises, so that enterprises can propagate their products and concepts to students, bring their culture to students earlier and deeper, and maximize the propaganda effect. Thus, we have established joint labs with many enterprises, like national engineering education center and joint lab established with Inspur Group, Internet of things and intelligent electrical R & D center with Xiaoya Group, embedded and visual computing joint lab with Chuangheng Technology, network security joint lab with Simple Sunshine and network engineering joint lab with Cisco. Enterprises use college teachers, equipment and places for employee training and further studies to improve their theoretical knowledge and skills; Enterprises have priorities to select excellent graduates from universities, to inject new blood, and improve their market competitiveness^[2]; For universities, it also better solves the problem of students' employment with mutual benefits. Through the establishment of internship training bases and joint labs, and the setting of internship programs and projects, enterprises have provided guarantee for college talents training during the internship training session.

To deepen the cooperative integration of IUR, universities need also conduct corresponding teaching reforms in talents training. For talents training, universities should try to meet the hopes and needs of enterprises, actively accept their opinions and suggestions, timely adjust and modify the teaching content, training plans and curriculum arrangement, reorganize the content and rewrite the teaching materials; Meanwhile, universities need also improve teachers' teaching methods and means^[2]. Thus, considering the needs of enterprises, our school specially formulates training programs for computer science and technology (cloud computing and big data technology), computer science and technology (intelligent technology and application), network engineering (Sino-foreign cooperation in running schools) and other majors. These changes are mainly to adapt to the deep integration of IUR cooperative education and better integrate the talents demand of enterprises with the employment of students. Besides, these are also to make better use of resources like classrooms, labs, internship training bases, and to truly achieve "seamless docking" between universities and enterprises. The new mode platform of IUR cooperative education is shown in Fig. 1.

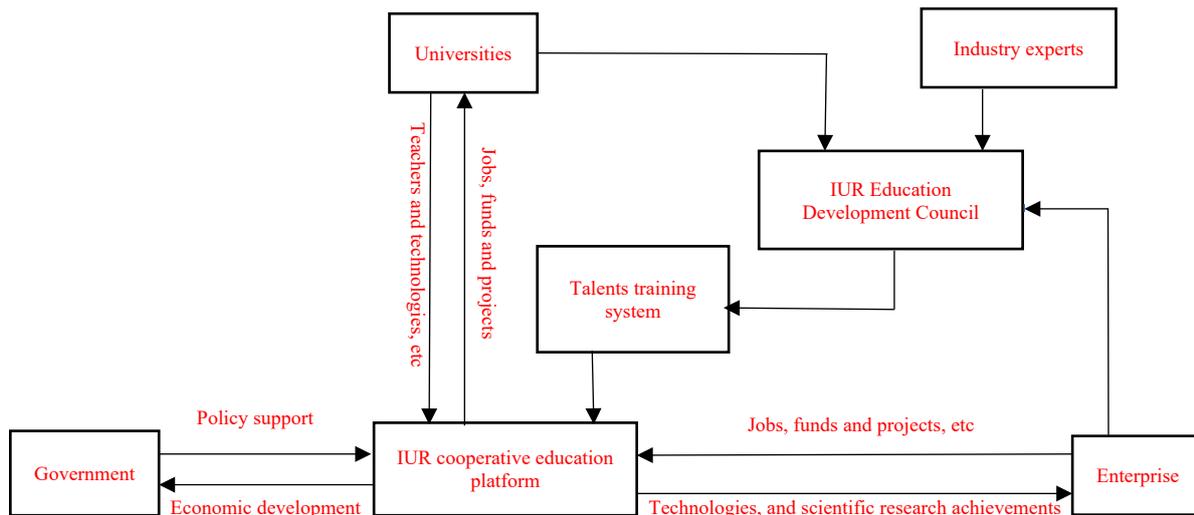


Fig. 1. New Mode Platform for IUR Cooperative Education

4. Social Services under the IUR Cooperative Education Mode

Universities are not only places to train talents, but also academic halls for scientific research. Meanwhile, they should also undertake corresponding social services. As institutions of higher learning, it is the urgent requirement of social development, the internal demand of their own development, and also the inevitable trend and choice of building a harmonious society to actively integrate into the society and serve the local.

To deepen the innovation-driven development strategy, fully realize the transformation and transfer of college scientific and technological achievements, the Ministry of Education and Science and Technology jointly issued the "Several Opinions of the Ministry of Education and the Ministry of Science and Technology on Strengthening the Transfer and Transformation of Scientific and Technological Achievements in Universities" (JJ [2016] No. 3). Its purpose is to promote the transformation and application of scientific and technological achievements that can support economic transformation and upgrading, and enhance their transfer and transformation ability of universities, guided by the needs of enterprises and relying on college talents and scientific research advantages.

As the gathering place of innovative talents and the source of innovative achievements, how can universities improve their social service ability and promote social and economic development with high-level innovative achievements and high-quality innovative talents?

(1) Relying on the local and serving the society

Universities need to determine the social services they provide according to social needs and their own conditions. They must be based on the local, accurately find the entry point of social and economic development services, and actively devote themselves to serving local enterprises. They should do scientific research guided by market demand, so that the transformation of scientific research results can better serve the social economy. In this way, while serving the society, it will correspondingly enhance the strength of universities, expand their own development space, and better train talents and develop scientific and technological achievements in various types and levels^[3].

This paper takes the School of Information Science and Engineering of Jinan University as an example. Since 2016, relying on its own disciplinary advantages, the school has completed more than 80 projects of "industry-university cooperative education project of Ministry of Education", with a contract funding of nearly 20 million yuan. While improving its ability to transform scientific and technological achievements, it also better fulfills its functions of serving the society.

(2) Deeply integrating IUR cooperation

1) Deepening cooperative content. General Secretary Xi Jinping clearly states in the report of the 19th National Congress of the Party, "to deepen the reform of the scientific and technological system, establish a technological innovative system with enterprises as subjects, markets as the guide and IUR deep integration, enhance innovative support for small and medium-sized enterprises, and promote the transformation of scientific and technological achievements". For this requirement, the social service function of universities has changed fundamentally. It has expanded the new connotation and the extension, changed from the single training and transportation of talents to provide services for the society in politics, economy, science and technology, culture and other aspects. Thus, universities need fully play their discipline advantages, integrate and optimize resources, adjust the new discipline layout, and build discipline platform for the changes. As a result, it eventually forms a strong, distinctive and advantageous discipline and a new discipline that adapts to the social development.

Our school is a national and provincial first-class undergraduate major in computer science and technology and network engineering. We have made use of our own disciplines to meet the needs of the social market, and have newly added and been approved the establishment of a cyberspace security major. In 2019, we have started the first enrollment.

2) Enriching cooperative mode. A long-term, stable and efficient cooperation model is established through the forms of school-enterprise joint R&D and production consortium. Combining the advantages of talents and scientific research of universities and the market advantages of enterprises, the two sides cooperate to achieve a win-win situation. We should rely on universities to establish scientific parks to incubate high-tech enterprises and provide enterprises with bases for technological innovation; Governments, universities, and enterprises set up research centers to innovate IUR cooperative mode; Guided by market, we concentrate our superior resources and conduct technological innovation of intellectual property rights, so as to truly "promote research with industry and industry with research"^[3].

In the process of exploration, we rely on the advantage of high-level teachers to send professional teachers or teams to enterprises to take a temporary position, guide or help them to tackle technical problems and increase productivity; We also involve backbone teachers in enterprises' activities, help them solve substantive problems, and set up projects based on the actual situation and development of enterprises.

3) Establishing a long-term mechanism. To ensure the sustainable development of IUR cooperation, it is necessary to establish a long-term and effective cooperative mechanism between schools and enterprises led by the government. The long-term mechanism can be said to be the driving mechanism for the integrated development of IUR cooperative education, which covers all aspects of IUR cooperative education. For instance, to achieve seamless docking between schools and enterprises, an organizational coordination mechanism needs to be established; To coordinate the work in education, scientific research, and economy, it needs to establish a policy support mechanism^[4]to promote the deep integration of "IUR"; To optimize the allocation of resources between schools and enterprises and to divide and cooperate scientifically, reasonably and effectively, it needs to establish a division mechanism based on the principle of "right, responsibility and interest"; To guarantee the interests of all parties fairly and objectively, it needs to specify a scientific interest distribution mechanism to ensure that the contributions of all parties are consistent with their interests. The diagram of IUR dynamic mechanism is shown in Fig. 2.

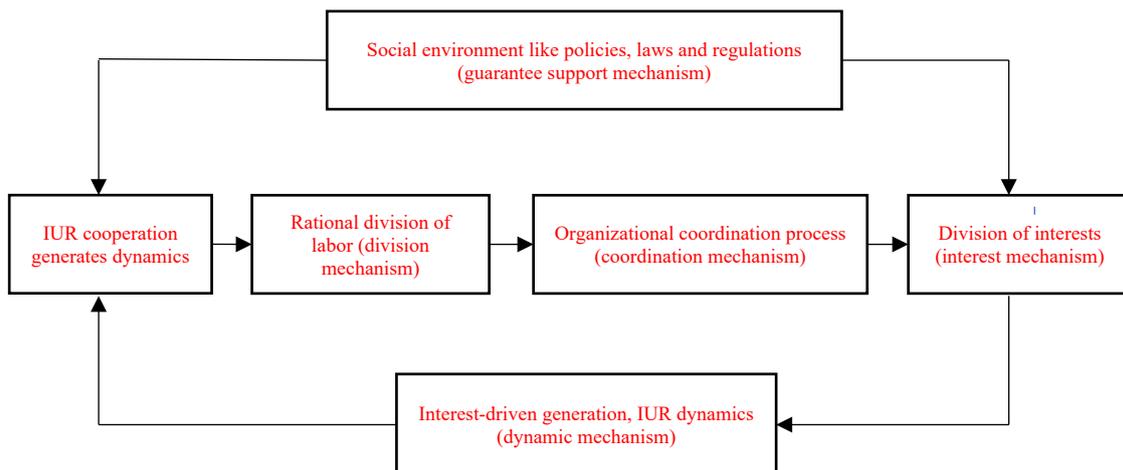


Fig. 2. Diagram of IUR Dynamic Mechanism

4) Establishing a strategic alliance and economic interest community. IUR requires deep integration. This requires us to establish an "IUR" strategic alliance that is guided by the needs of industrial development, enterprises as subjects, and college scientific research as the technical support, and build an economic community with shared risks and interests^[4]. Only in this way can we improve the enthusiasm of all parties, achieve mutual benefit and long-term development.

Our "IUR Education Development Council" is a strategic alliance established under this background. Its establishment not only improves the running level of our school, but also realizes goals of discipline construction, talents training, transformation and innovation of scientific and technological achievements^[5]. Meanwhile, through the alliance cooperation, enterprises also reduce R&D cost, apply the scientific research achievements and technologies, improve the product quality, enhance competitiveness, and realize market values of enterprises.

5. Conclusion

IUR cooperative education can complement each other based on the shortcomings and differences of "industry, university and research". Thus, it has great potential and deeply attracts the active cooperation of the government, universities and enterprises. After the deep integration of IUR, the innovative force will be formed to accelerate the innovative speed, improve the innovative efficiency and promote social development.

References

- [1] Lang Yaoxiu. Reflections on the Industry-University-Research Cooperative Education in the New Situation and Reconstruction of the Development Path--Based on the Perspective of Applied Talents Training in Local Colleges and Universities[J]. China Electric Power Education, 2011(5): 4-6.
- [2] Zhu Yixin, Ni Tianxiang, Chang Xiaoyong. Persisting in the Integration of Instruction, Production & Research to Training Practical Personnel[J]. China Higher Education Research, 2004(2): 47-48.
- [3] Wei Xiaolin, Jiang Lingling, Yang Duanguang. Promoting Social Service Function of University by Strengthening the Cooperation of Production, Education and Research[J]. SCI-TECH INFORMATION DEVELOPMENT & ECONOMY, 2009-19(6): 174-176.
- [4] Yao Chunmei . "Enterprise-University-Research" Cooperation: Improving Local University's Scientific Innovation Ability and Social Service Ability[J]. Journal of Hunan University of Arts and Science (SOCIAL SCIENCES), 2008,33(6): 110-113.

[5] Zhong Liping, Chai Mingqin, Zhang Wenfeng. Research on the Operational Mechanism of the Enterprise University and Scientific Research Alliances[J]. Science and Technology Management Research, 2010(4): 37-39,28.