Research on the Collaborative Innovation of University Discipline Construction and Scientific and Technological Transformation

Na WANG¹,² and Xu ZHAO²,*

¹Research Center for Philosophy of Science and Technology Northeastern University, Shenyang, China
²LiaoNing ShiHua University, Fu Shun, Liaoning, China
*Corresponding author

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**Abstract.** In the new economic normal condition, it’s urgent and necessary to realize the leap forward development of economy in China. It is necessary to promote the integration of the elements, collaborative innovation and form the power of innovation. In the past years of development, the innovation former "politics and research" cooperation model still has many deficiencies. Compared with shallow cooperation independent innovation, open innovation, collaborative innovation is the pursuit of political cooperation and integration, interaction between political research must remove obstacles, adhere to the "complementary advantages, mutual benefit and common development" principle. This paper takes a case study to serve the regional economic development model and analyze the specific approach, based on it to probe the reasons for success about the cooperative mode, providing important inspiration for political research to promote the adjustment of industrial structure, economic and social development.

**Introduction**

At present, China has made a lot of deployment on "Widespread entrepreneurship and innovation", and set off innovation and entrepreneurship hot in the whole society. However, the one that has pushed the continuing hot to upgrade and improve is not only the government, but enterprises, colleges and universities, research institutions and talents. The program of action "Made in China 2025" of the State Council released in May 2015 put forward: to establish" the enterprise as the main body, the market as the guidance, the political research collaboration innovation system of manufacturing industry innovation", only by lighting politics production engine, driving by innovation, "Widespread entrepreneurship and innovation" can achieve the lasting power. Cultivating talents, scientific research and social service are the three functions of colleges and universities. With the development of science and technology, the function of the colleges and universities to serve the society is getting more and more attention. Colleges and universities with the regional economy's interactive development has become an important trend of the development of higher education. Colleges should accurately grasp the requirement of era development and the trend of the development of higher education, know its mission, express its unique advantages, and actively serve the local economic and social development.

**The Dilemma on the Develop of the Traditional Political and Research Cooperation Mode**

**Problems Existing in the Traditional Industry-University-Institute Cooperation Mode**

Reform and opening up more than 30 years in China is a pioneering and enterprising history of innovation and Entrepreneurship. In recent years, government departments, enterprises and the community have made unremitting efforts to promote independent innovation, research and development spending growth rate remains at 20% high level, exceeding Japan rise to the second place in the world; R&D staff total is 3.2 million, which is the highest in the world. The social
resource allocation tilt to the independent research and development, providing a strong support to improve the ability of independent innovation in China. However, Conversion of scientific and technological achievements in the developed countries has been more than 70%, China is just about 10%, a large number of scientific and technological achievements are "sleeping" in the laboratory, causing a huge waste.

This kind of phenomenon's root cause lies in the insufficiency in production-study-research cooperative innovation, and a lack of innovation of endogenous power. For a long time, China's scientific research units of scientific and technological personnel, and the evaluation system of oneself, is not conducive to the transformation of scientific and technological achievements. Scientific research institutes to highlight the achievements of academic value, the lack of the understanding of the market, ignore market value, scientific research topic selection combined with market demand is not close. Individual research have good prospects of research also lack of pilot and secondary development funds investment; They lack of corresponding management department to once again the achievements in scientific research development and application management; In the process of cooperation with enterprises, involved in distribution, risk bearing, and intellectual property rights, there are many contradictions, and affects the smooth transformation of scientific and technological achievements, has become innovation-driven strategy and "Widespread entrepreneurship and innovation" bottleneck, reviled.

Therefore, the establishment of political production, is the implementation of innovative drive and open the "Widespread entrepreneurship and innovation" standard paradigm and practice way of vivid situation. In May 2015, member of the political bureau of the CPC central committee, vice President Mr Yuanchao Li went to guangdong research enterprise innovation mechanism and technology achievement transformation mechanism, pointed out that production-study-research cooperation mechanism should realize the organic integration of technology, capital, market, achieve "three win" of professor, university of enterprises Of shallow cooperation relative to the independent innovation, open innovation, policy integration of collaborative innovation of industry, the pursuit of it is the depth of cooperation, we must clear the obstacle of political interaction between production, adhere to the "complementary advantages, mutual benefit and seek common development" principle. We should form "field" of cooperation, make it a win-win benefit sharing mechanism, promote the development of political association study and the success of the "political industry-university-institute" cooperation. The key is how to find the consistency between the parties demand, form, complementary advantages, mutual benefit cooperation basis, and build a from theory to practice, from personnel training to training mode of practical application integration to win more.

The Current Defects in "Production" Politics Cooperation Models

Government, enterprises, schools, research institutes and other systems of the system cooperation. Among them, the local government brings together a large number of important information of the economic and social development, is an important force to promote scientific and technological innovation; enterprise is the first line of production, is based on commercial activities and research and development based on customer demand providers; universities and research institutions gathered a large number of senior professionals, with excellent teaching and research environment in personnel training, scientific research and the dissemination of information has unique advantages. In the process of cooperative innovation, each participating subject can maximize their own interests by taking different actions. The enterprise is the pursuit of the maximization of cost minimization, the development level of interest; reasonable allocation of local resources, the pursuit of economic government in the process of improving and improvement of environment; Research Party's goal is to maximize the conversion of technological achievements, scientific research facilities complete and the increase in the number of published. Due to the different needs of the parties, leading to the scientific and research institutions and the local economic and social development of the urgent need to solve the problem can not be effectively docking. Although in recent years the political research with practice extensively, but many still remain in the universities
and research institutions, enterprises and local governments signed a cooperation agreement, to carry out the base construction level, lack of supervision and assessment mechanism for the operation of cooperation projects, "not only flowering fruit", eventually leading to a lot of cooperation become paper project”.

In the current economic development of the new normal innovation under the condition of demand and development direction of industrialization based on the significance of this is that the collaborative innovation is more close to the reality and the market, which requires collaborative innovation must take the enterprise as the core. Therefore, under the new economic norm of political research collaborative learning mechanism of innovation is the enterprise as the core, the user based learning system, the purpose is to improve the innovation team learning consciousness, enhance team learning effect, create innovative team learning atmosphere, to provide guarantee for the innovation of team learning. \(^{[2]}\) "Political research" how to combine to get a good, close, and the economic and social development to produce a real role in promoting, is the urgent need to study and solve the problem. Through the cooperation between government and industry, to give full play to the scientific research, talent, information advantage, and promote local economic and social development, is the inevitable requirement of China's deepening reform. The cooperation of University and City Political Research Alliance and many other units in this area has been carried out, has achieved initial success, the service area economy in Liaoing province has been extensive media attention and coverage. This paper attempts to Liaoing Shihua University as a case, analysis of the specific practices, on the basis of the model to try to summarize the reasons for the success of political research cooperation so as to effectively promote regional economic and social development to provide inspiration.

An Overview of the Economic Situation of the Service Area in Liaoing Shihua University

The Background of the Implementation of the Service Area Economy

Liaoing Shihua University has always had a fine tradition of the implementation of the service area economy, which has done some beneficial explorations and attempts around serving the revitalization of northeast old industrial base, and has achieved some positive results. From the beginning of 2010, the university signed a cooperation agreement on science and technology with the local enterprises and public institutions in order to carry out “the action of science and technology personnel serving enterprise”, and listed the service of regional work into the "13th Five-Year" enterprise development plan of the school, expecting that it could assist in the new round revitalization of Liaoing old industrial base by means of the service of local economic and social development. During the period of "12th Five-Year", the school and the Fushun Municipal People's government, Fushun high tech Zone, Dalian West Island Petrochemical Industrial Park, etc. signed a strategic cooperation framework agreement or industry-university-research cooperation framework agreement; it signed a cooperation agreement on science and technology with Fushun petrochemical, Liaoayang petrochemical and other more than 50 enterprises, and set up fine chemical research and development center and new energy research and development center; it established a "Joint Laboratory of Petroleum Industry" with Fushun Petrochemical Research Institute and China Global of Liaoning Branch.

In March 2014, in Liaoing Province, the action on “thousands of academicians and experts went into thousands of enterprises” started. It accelerated the process that school services local economy, and accelerated the pace of school services local economy. By the end of 2014, the school put forward the "scientific and technological innovation promote the project", focusing on the key issues on our province petrochemical industry generic, the critical technology, regional economic and social development. It made full use of existing resources to promote the transformation of the way that services local areas, building a “political research” service platform that promoted the school to carry one the in-depth cooperation with business. The school has accelerated the pace of local services, set up a local service office and issued on the files that would strengthen local implementation measures, opinions of professors and doctors to serve the local
area, and it would highlight the "service" to promote the transformation of old industrial base as well as upgrading of power.

The Implementation of Serving for Regional Economy

Do a Good Job of Organizational Support and Strengthen the Coordination of the Work of Local Services

First, establishing the leading institutions. The School established a “serving local work” leading group which consists on the party secretary of the school and the principal served as head of the local work. They were responsible for the overall coordination of the work of the important issues of local work to ensure the smooth flow of school and local communication channels. All functional departments shall base on their respective duties and the actual situation to put the service local work into the daily work, such as into the teaching, scientific research, personnel training, discipline construction, achievement transformation and other fields of the work.

Second is to set up the work organization. In order to better serve the local economic and social development, the school set up to serve the local office and be responsible for liaison with the local Party committees, government departments, and promote the comprehensive cooperation; connect the relationship of key enterprises, promote school-enterprise cooperation; to guide teachers to contribute to local economic and social development; coordination of relevant departments to do a good use of social resources and service work.

Establish a Complete System to Mobilize the Enthusiasm of Teachers to Participate in the Local Service

System construction is the key to ensure the effectiveness of the school service local work. To strengthen the guide of serving the local work in the design of the system, the school focused on the system’s level and facilities, in the planning from the macro and micro level and operation level, guide to planning, forming “an opinion”, "one way" working mechanism.

A comment: "on the further strengthening of local service work opinions” make requirements from the perfect service work incentive policy, innovative services of local talent guarantee mechanism, build for local and industry service platform to realize the double promotion of local service and school development. To adhere to the teaching and scientific research performance evaluation service to the economic and social development of great demand and cultivation of innovative talents to conducive to the formation of personnel training, technological innovation, social service which are oriented performance evaluation, the teacher's innovation lies in fully inspired vitality.

One way: "The implementation method of Professor, Dr. serving the local work " on teachers service the local work, ways of accredited enterprises and assessment objects have made specific provisions, they solves some problems in the work of local services. For example, the relevant treatment undergo teaching, travel allowance, service achievement’s identification ,assessment, evaluation mechanism and the related treatment after service , and so forth.

These two system files from the macro idea to the specific measures make the objectives and requirements refined and they ensure that the work of the school service have worked.

Carrying out the Interaction between Schools, Speeding up the Construction of Serving Local Economy and Society

Implement conference linkage. Take the initiative to invite local relevant personnel to participate in our school to serve the local mobilization, talks, seminars, training and take the positive publicity to the outside of school scientific research and talent information transfer cooperation. At the same time, the school has participated in the relevant meetings of the resident party and government organs, in a timely manner to understand the resident industrial policy and enterprise technology needs, and promote the cooperation of various forms of political research.

Strengthen research interaction. Service enterprises, first of all need to understand the enterprise, two years, the school actively organize experts to conduct on-site investigation and research local enterprises, visited the enterprise nearly a hundred. The local government organizations, the relevant departments matchmaking, ask the school to help enterprises develop new products; and
enterprises to take the initiative to invite experts to the school research, help to solve technical problems. Through visits to research, so that teachers can not only understand the needs of enterprise technology and talent, but also familiar with the production, technology, technology, equipment, the status quo, reached a number of cooperation intentions.

Speed up the promotion of docking. With the slowdown in Liaoning's economic growth and a number of policies to boost the economy, the school to speed up the pace of docking with the enterprise. Carry out the "100 Professor Dr. Fushun action", as of June 2016, there were 73 by Prof. Dr. attachment, consultant (Part-time), post service team, etc., to carry out scientific and technological services into the province's 45 enterprises, and gradually build up a mobile, flexible and flexible platform for enterprises to gather talents, speed up the completion scientific and technological achievements and provide strong talent support and intellectual support transformation.

In addition, in order to build a cooperation platform, to further promote the work of our school to serve the local school in 2016 has the cooperation and innovation base and Wanghua District of Fushun high tech Development Zone, the establishment of school enterprise, held a strategic cooperation signing ceremony, and Fushun Xinlong chemical Limited by Share Ltd, Rui Xing Chemical Co., Ltd. 5 the enterprise signed a cooperation agreement in industry alliance enterprise collaborative innovation.

**The Effects Achieved by Serving Regional Economy**

Only reformers entered, the only innovator can be strong. At present, the enterprise of teachers in the production practice to solve problems, accelerate the transformation of scientific and technological achievements, improve the development ability of the enterprise innovation products and other aspects have made great achievements, accumulated nearly 30 enterprises to solve the technical problems, provide technical consultation for more than 50 times.

Schools adheres to the school cooperation, mutual benefit and win-win development of the road, with the local enterprises and institutions to jointly declare the subject, jointly carry out scientific and technological research. In recent years, our school and Fushun Petrochemical Research Institute, China global Liaoning branch and Shenyang Research Institute of Coal Science Group Co. Ltd. cooperation more than 30 items, the contract amounted to more than 1 thousand yuan. In 2014 the University and the Fushun Petrochemical Research Institute, China global Liaoning branch build three petrochemical joint laboratory, to carry out the production process of alkylation technology joint research, has entered the stage of the trial.

For nearly five years, the school of transformation project in Fushun city of more than 200 items, and other provinces cooperation projects amounted to more than 500, the total contract amount of 100 million yuan. School independent research and development of nearly a hundred scientific and technological innovation, in the petrochemical industry and the provincial and municipal high tech Zone related enterprises to obtain the application, and achieved considerable economic benefits. Such as "heavy oil dry on-line monitoring technology of steam injection boiler, obtained the domestic first using the principle of fluid volume changes dry results of original monitoring, and is widely used in oil production, by direct or indirect economic benefits amounted to 228 million yuan; the batch polymerization process control and advanced production management system application in the oil Jinzhou petrochemical, every year for the company added about 15 million yuan of direct economic benefits; the result of studies on engineering technology of automatic control system of megaton ethylene plant has been applied in several sets of large-scale ethylene plant, each year for the enterprise to create direct economic benefits about 20 million yuan. "The research results of batch transportation of crude oil pipeline safety key technology research and application" project has been in the Northeast Petroleum Pipeline Company and Petro China Co Ltd Changchun oil and gas pipeline branch to obtain practical application, create economic benefits for up to 232 million yuan. In addition, there are a number of R &amp; D results in the oil, Sinopec, CNOOC owned enterprises, and the provinces and municipalities to obtain the application of high-tech zones.
The Analysis of Successful Experience about Cooperation Mode among Industry-University-Research Cooperation

A Win-Win Benefit Sharing Mechanism is the Basis of Cooperation

At present, enterprises, universities, government cooperation between the three, there are differences between the value of the concept of enterprise is for the purpose of profit, nature is the pursuit of profit maximization; University in research and education, pay attention to the development of scientific research and education to improve the performance of the government; the social service sector, to social welfare as the main target. This disagreement is not to be eliminated. So in the face of such differences, we must establish a win-win benefit sharing mechanism, it would have to do is to "seek common ground", based on respect for the parties to the pursuit of goal difference, seek balance between the interests of all parties, make use of the advantage of the parties, the establishment of mutual trust between each other, mutual assistance, mutual support, resource sharing cooperation and win-win relationship. Enterprises can take advantage of universities and scientific research institutions in science and technology, talent, technology and other advantages, and constantly improve the core competitiveness of enterprises, control of market, industry influence; universities and research institutions to enterprises and government support, better transformation and practice of scientific research innovation ability, enhance the education and improve the quality of talent training, transformation the rate of scientific research achievements and social influence; at the same time, researchers also through cooperation, further realize the value of personal life and career pursuit. Therefore, should be based on cooperation, in the long run, the overall thought, from the strategic perspective of sustainable development, and coordinating the interests of all parties, sharing resources, multi-party cooperation and win-win situation, common innovation, steady improvement.

Deepening the Reform of the System is the Link of Good Cooperation

Political research cooperation in order to achieve tangible results the most important is to have a strong system for the protection of. Before the political research collaboration is often based on the specific technology, products, projects and cooperation, the nature of the existence of a single, mainly reflected in the transfer of scientific and technological, scientific and technological achievements. Because of the differences between the parties in the pursuit of goals, based on the basis of the cooperation of its strong and durable, and it is difficult to carry out multi-level and deep cooperation. In order to ensure that all parties fully play their respective advantages, mutual coordination, to carry out various forms of integration objectives, balance of interests, requires the government to play a "commander" of the overall guidance and supervision role. It should adhere to the "people-oriented", deepen reform, improve policies, effective integration of industrial chain, chain link subject, capital chain, link and bridge to establish relations of cooperation between the parties to the communication and cooperation of government guarantee smooth development and further deepening. Deepen the reform of the system, and the cooperation between the mutual use of resources to revitalize the enterprises, universities and research institutions, let the enterprise from technology, results of single purchase into the deeper further through the introduction of talent introduction of technology and achievements, to achieve efficient transformation, promote enterprise technology upgrading and stability.

At the same time, the road to the service of colleges and universities to go steady, far, but also need a strong system for the protection of. University policy support and reasonable performance appraisal can help teachers to solve the worries, to better promote the university teachers to participate in the first line of practice. Universities and research institutions under the protection of the system, through the enterprise as a bridge, the better will be "personnel training, scientific research, service society" and "industry" for seamless.
Effective Communication and Management Mechanism Are the Guarantee of Cooperation

Political research involves many aspects of cooperation, because of the difference between the parties management system, so in the process of cooperation will inevitably lead to misunderstanding and friction, the reason is that the constraints posed on the difference between system and system. These differences and constraints mainly in personnel management, employing mechanism, evaluation and evaluation, incentive mechanism, scientific research organization, teaching organization, student training, and other aspects. An important problem facing the government, enterprises, universities and research institutions is how to avoid or reduce the restriction to the cooperation, really let the researchers worry about commitment to mutual cooperation, which requires more efficient communication, collaboration, innovation and breakthroughs in the management system. The government should be in the policy, legal, financial and other support, protection and tilt, create good environment foundation for political research; universities and research institutions focus on innovation, improve policies and personnel management system, encourage and support the scientific research personnel to the enterprise and employment, entrepreneurship and undergo post entrepreneurship, let researchers "willing to" "go"; the key is to establish the platform for attracting talent, establish a good incentive mechanism, combined with the construction of scientific research institutions and universities, enterprise innovation and feedback mechanism, make the teachers and the research team not only to "stay," well done, but also the formation of Colleges and universities seeking "long term" sustainable "cooperation mechanism.

Develop the Characteristics of the School to Shape the Brand Is the Driving Force of Cooperation

Political research in order to achieve good dynamic cooperation, the most direct source of consistency than the general goal and the fundamental interests of the various partners. Good cooperation of government, is based on the coordination of the government to actively build efficient and mutually beneficial cooperation in security management platform, and improve the cooperation mechanism of the government under the industrial field as the entrance, by the enterprise according to the need of cooperation with universities and research institutions to carry out scientific research collaboration, tackling and innovation, promote scientific and technological achievements, transformation to ensure the achievement of innovation of science and technology, service industry development. Political research collaboration, innovation and cooperation in the development of new models, new chain, and ensure that the universities and research institutions of scientific research from the industry to go to the industry, promote the enterprise in the market development the commanding point, shaping the industry brand, to achieve the enterprise's economic and social benefit as much as possible, to further promote political research collaboration cooperation and cooperation innovation cycle.

Political research cooperation dilemma lies in innovation cooperation mode. Liaoning Shihua University to carry out various forms of cooperation, in cooperation with enterprises as the main body, the effective combination of interests of the parties to the economic, social and other aspects, as in political research under the new economic normal development ideas, innovation and cooperation innovation mode of cooperation and further promote the school reform and innovation in teaching and research, and actively promote the cultivation of innovative talents in school. At present, China has entered the fifth period of innovation and entrepreneurship, "the new normal public entrepreneurship, innovation leading the economic construction, in the whole society of innovation and entrepreneurship upsurge, inspire the whole society's innovation potential and vitality, promote the diversification of the market development cooperation, promote the transformation of scientific and technological achievements in the market. Innovation driven to achieve the four comprehensive strategic layout, the Chinese nation's great rejuvenation of the Chinese dream, we set up a political research engine, boosting the tireless pursuit of innovation and entrepreneurship.
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