

## Countermeasure of Strengthening the Cooperative Innovation Power of Local Colleges and Universities to Serve the Economic Transition of Suzhou

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**Keywords:** local colleges and universities; economic transition; collaborative innovation; collaborative education; countermeasures.

**Abstract:** Although there are many local colleges and universities in Suzhou, their science and technology resources are not fully used; the cooperation between research and production is still in low level. The two parties of cooperation have different concepts; their collaboration is in low level and does not have enough depth. The professional settings of local colleges and universities cannot match with the needs of industry development; the scientific and technological achievements are out of line with the actual requirements. A relevant long-term mechanism has not yet been established. Thus, it is necessary to give full play to the macro-directive role of the government in the process of collaborative innovation, so as to improve the coupling degree of discipline and specialty setup with the regional economic development, and construct a long-term mechanism of collaborative innovation. Through these measures, we can actively respond to the needs of Suzhou in economic restructuring, and provide talents as well as scientific and technological supports for its industrial transformation and upgrading.

### 1. Introduction

The 13th Five-Year Plan period is a critical period for the adjustment of Suzhou's economic structure and the transformation of its development mode. It is also an important period for the city to build a national key independent innovation demonstration in southern Jiangsu. In the Outline of the Thirteenth Five-Year Plan for National Economic and Social Development of Suzhou, it is clearly stated that in the future, six development strategies will be implemented; innovation will be placed at the core of the overall development; innovation will become the first driving force for development. We should fully implement the policy innovation-driven development, accelerate the formation of an institutional mechanism to regulate innovation and development, promote the deep integration of research and production, build a long-term cooperation mechanism which is centered by enterprises, guided by market demands and guaranteed by the market mechanism, and accelerate the transformation of scientific and technological achievements into real productive forces.

Cooperative innovation is a kind of mode innovation for industry and university cooperation organizations. Its core is the fundamental change of the organizational form. It transforms the 'contract relationship' of traditional school-enterprise cooperation into a 'comprehensive partnership'; it changes the cooperation form from 'project-driven' to 'platform construction'. The process of innovation changes from 'one-way transmission' to 'multi-dimensional interaction'; the innovation system transforms from a 'single line' to the 'comprehensive partnership'. Relatively separated studies gradually integrate with each other. Research objectives change from single goal to pluralistic-development. Local colleges and universities should make full use of this opportunity, strive to improve the qualities and levels of personnel training, scientific research as well as discipline and specialty construction, and promote the reform and innovation of the school's internal management system and mechanism.

## **2. Problems Existed in the Cooperative Innovation Mode of Local Colleges and Universities at the Service of Suzhou**

### **2.1 Local colleges and universities' cooperation with Suzhou is not close enough**

At first glance, there are a lot of local universities and resources in Suzhou. But the fact cannot be avoided is that most of these schools are not affiliated to the government of Suzhou though they locate in the city. They do not have the dependence relationship. The government of Suzhou does not have financial rights or human rights; local colleges and universities have relatively high degree of freedom. On the other hand, most colleges and universities in Suzhou are higher vocational colleges. There are 17 higher vocational colleges in the 26 local colleges and universities, accounting for 65.3%. Most of these higher vocational colleges are upgraded from secondary vocational schools. Generally speaking, they have low science and technology levels and weak innovation abilities. The industry-university-research cooperation between Suzhou and colleges is not close enough.

### **2.2 The scientific and technological achievements of collaborative innovation cannot match with practical requirements**

Like universities all over the country, local colleges and universities in Suzhou are inclined to attach importance to theory rather than application in scientific research. Teachers in colleges and universities only consider their own research interests. For them, the purposes of scientific research are publishing papers, monographs and conferring academic titles. They stay in the study and refuse to research the market. The scientific and technological achievements have low applicability, so it is difficult for enterprises to commercialize these research findings. Because of the different interests of the two parties, the motive force and vitality of schools and enterprises are insufficient.

### **2.3 The level of collaborative innovation is not high; the depth is not enough**

At present, the cooperation between industry, university and research in Suzhou mainly stays at the low level of cooperation. Common modes include technology transfer, cooperative development and entrusted development. Some universities and teachers equate collaborative innovation with the traditional mode of cooperation between production and research. Moreover, most teachers and students lack the consciousness of collaborative innovation. They tend to work hard by themselves and do not have the sense of teamwork. They are not good at integrating and utilizing different kinds of resources. The types of collaborative innovation between enterprises and universities are limited to conventional technical consultation and contract commissioned development. High-level cooperation modes, such as the co-construction of research and development institutions and technology alliances, and the co-construction of economic entities integrating science, technology, industry and commerce, are not common seen.

### **2.4 Specialties in local universities do not conform to industry demands**

Among key majors in local colleges and universities of Suzhou, some of them are set up in a lot of schools and learnt by a large quantity of students. About half of the students concentrate on about 20 majors. Although such major setup confirms the focus of industrial development in Suzhou, it also reflects the tendency of some schools and the phenomenon that students are blindly pursuing popular majors, which leads to a relatively high degree of professional homogenization. The professional characteristics of 'one school, one product' are not clear enough; the linkage of majors and industries needs to be strengthened; the ascending channel needs to be expanded; the professional layout needs to be further adjusted and optimized. In addition, while the professional layout actively adjusts to industry development, the structural contradiction is still prominent because of the traditional industrial transformation and the new professional construction brought by the rapid development of regional industry. We still need the guarantee of human and financial resources and other conditions.

## **2.5 The risk-taking and benefit allocation mechanism is not perfect in collaborative innovation**

For local universities, collaborative innovation is a kind of risk research and development; for enterprises, collaborative innovation is a kind of venture capital. Therefore, both universities and enterprises are afraid of the risks of project failure. It is especially true for the venture capital investment in the pilot phase of major projects, which lacks a reasonable risk sharing mechanism. In addition, the value pursuits of technology research and development are different in local universities and enterprises; the distribution of benefits and the goals of cooperation also vary. The imperfect benefit distribution mechanism often hinders and restricts the initiative of collaborative innovation.

## **2.6 There are barriers to resource sharing mechanism in collaborative innovation**

According to incomplete statistics, in recent years, the total amount of large-scale scientific research instruments purchased by our country even exceeds that of the European Union, but the utilization rate of these instruments is not high. The phenomenon of unused and wasted resources is serious. In some places, the utilization rates are less than 10%. Some major science and technology platforms, such as key laboratories and engineering technology centers in universities, are not fully opened and shared. Especially during the winter and summer holidays, the major science and technology platforms in universities are in a semi-open state, which makes it difficult to meet the needs of scientific research experiments and public services of enterprises and public institutions in time. At the same time, due to the different affiliations, it is difficult for universities and enterprises to share resources for collaborative innovation.

## **3. Strategies and Paths for Local Universities and Colleges to Strengthen Collaborative Innovation at the Service of Suzhou's Economic Transition**

### **3.1 Strengthen collaborative education to provide talent support for economic transition in Suzhou**

Local colleges and universities in Suzhou should keep abreast of the new technological revolution and the trend of industrial development, adapt to the needs of industrial restructuring in Suzhou, create and provide high-quality educational supply, accelerate the training of high-quality technical and skilled personnel urgently needed for the development of high-end manufacturing industry, modern service industry and strategic emerging industries, and further serve the innovation-driven strategy of Suzhou. In the next five years, Suzhou will become an innovative city, and its industrial structure will move towards high-end equipment manufacturing industries, modern service industries and strategic emerging industries. There is an urgent need for a large number of compound specialized talents with technical knowledge, market intelligence and strong application abilities. However, the traditional way of education is unable to cultivate this kind of applied compound talents. Therefore, local colleges and universities need to reform talent training mode to adapt the training requirements of innovative skilled talents, and pay more attention to the cultivation of students' innovative ability on the basis of paying attention to the training of students' basic vocational skills. We must step out of the campus and let the enterprises take the corresponding social responsibility of participating in the training of innovative skilled personnel. From the formulation of curriculum and professional teaching standards to the reform of personnel training mode and the implementation of specific training strategies, all links need the participation of enterprises and industries. Through the cooperation between 'school-enterprise alliance', 'school-government alliance' and 'school-land alliance', we can cultivate talents with theoretical knowledge and practical ability through the actual research, development and production practice in enterprises and institutes. The important content of strengthening collaborative innovation in local universities is to strengthen collaborative education. The core of collaborative education is to educate people; the key is to cooperate; the feature is cross-border. To effectively train technical skilled talents needed for the transformation and upgrading of Suzhou's economy, we need to break

down barriers between main bodies, establish a collaborative mechanism among the government, the industry, the school and the enterprise, and then innovate the system according to the principles of government leading, industry guidance, enterprise participation and school promotion, and fully release the vitality of resources and elements to realize the in-depth cooperation.

### **3.2 Dynamically adjust and optimize the structure of disciplines and specialties to enhance the compatibility of local colleges and universities with the economic transformation and development of Suzhou**

It is needed to establish a committee to guide discipline and specialty construction. The committee members should include local universities, industries, enterprises, research institutions and other social organizations. They need to study on the discipline layout and specialty settings, so as to help local universities adjust their specialty settings dynamically. Educational authorities should break through the division of specialty establishment and management, regularly carry out research on the consistency between specialty construction and industrial structure, and strengthen the overall planning of specialty layout. We should also improve the professional early warning and withdrawal management mechanisms, carry out professional evaluation according to actual conditions of the human resources market and the salary situation, and regularly issue a ‘red, yellow and green’ professional list. Industries and enterprises should provide timely information on talent demands and early warning. Local colleges and universities should pay attention to industry orientation, adjust and optimize specialty settings, speed up the transformation of traditional specialties and adjust backward specialties in accordance with the development plan of high-end industrial structures and industrial agglomerations in Suzhou. In recent years, some majors have stopped or reduced enrollment. Examples include the dyeing technology major in Suzhou Institute of Trade commerce, the majors of metallurgical technology and textile decorative art design in Shazhou Professional Institute of Technology, the major of organic chemical production technology in Suzhou Chien-Shiung Institute of Technology, the major of aquaculture technology in Suzhou Polytechnic Institute of Agriculture, the major of performing art in Suzhou Vocational University, the majors of tourism English and business English in Suzhou Vocational Institute of Industrial Technology, the major of economic information management in Global Institute of Software Technology, the major of film and TV advertising in Suzhou Top Institute of Information Technology, as well as the majors of Korean and performing in Silicon Lake College. But on the whole, the intensity of adjustment needs to be further strengthened, and there is still a certain distance from the demand of industrial structure.

### **3.3 Actively promote the combination of production and research to promote the economic transition and industrial upgrading of Suzhou**

First, according to the industrial development needs of Suzhou’s 13th Five-Year Plan and the Outline of Implementing the Made-in-China 2025 Plan in Suzhou, multi-subjects should cooperate to build an inter-organizational science and technology innovation center. On the basis of dominant disciplines, the center can fully integrate talents, resources, information, technology and other elements within schools, establish a research and development platform with local characteristics, and build a new center on scientific and technological innovation in the certain field.

Second, we should strengthen the research and development of applied technology, encourage teachers to study regional economy and enterprise industry, guide scientific research topics to meet the strategic needs of the city and the core technological needs of industries, and strive to improve the transferring rates of scientific and technological achievements.

Third, we should give full play to the advantages of various research platforms, such as laboratories and research centers, and expand the scope of development and sharing of scientific and technological resources, so that local colleges and universities can truly become the source of knowledge innovation. By establishing a ‘strategic alliance between schools and enterprises’, we can strengthen the collaborative division of labor in the innovation chain. Local colleges and universities focus on knowledge innovation, while enterprises focus on technological innovation and market sensitivity. In the process of collaborative innovation, the upstream and downstream of

innovation chain can be connected seamlessly.

### **3.4 Constructing a long-term mechanism of collaborative innovation and strengthening the guidance function of system and policy**

The long-term mechanism of collaborative innovation between colleges and Suzhou should be established from the following aspects.

The first step is to establish a multi-agent coordination mechanism. Collaboration between the main bodies is not simple centralization or aggregation; it is  $1 + 1 > 2$ . To this end, the government should take top-level design and give an overall consideration, and focus on the common goal of collaborative innovation among the innovators. Within the framework of the collaborative innovation mode established by the government, schools and enterprises can give full play to their respective advantages in talent cultivation and technological innovation, and promote the collaborative innovation between industry and education.

The second measure is to establish a value integration mechanism. Through continuously promoting the formation of common value consensus between local colleges and universities and the other main bodies in Suzhou, and formulating corresponding laws and policies, main innovators can recognize that participation in collaborative innovation is a part of their own social responsibility and social value.

The third step is to establish a mechanism for distribution of interests. Win-win cooperation is the guarantee of collaborative innovation. Collaborative innovation in local universities involves the participation of multiple stakeholders. We must take full account of the respective interests of all parties involved. We can use the invisible hand of the government to gradually establish a profit distribution mechanism as well as a compensation mechanism in the process of collaborative innovation. Important policy levers such as tax, incentive and restraint regulations can be formulated at the top level of design. According to the claims of different subjects in different stages of collaborative innovation, we should constantly adjust and improve the mechanism of interest distribution.

Fourth, we should establish the information sharing system and an evaluation mechanism. An information sharing platform should be established to achieve the effective integration of technology information, market information, industrial information and other relevant messages. The scientific research evaluation system should also be built and improved; the traditional paper-oriented evaluation system for scientific researchers should be changed. Scholars should be guided to conduct in-depth research around major issues of Suzhou's economic and technological development such as common technology problems for industries and the inheritance of cultural heritage. We should give preferential treatment to scientific researchers who participate in collaborative innovation in terms of job title evaluation, the approval of scientific research projects, as well as the achievement awards and allowances.

## **4. Conclusion**

Collaborative innovation takes the added value of knowledge as its core. It is the deep integration of universities, scientific research institutes, enterprises and other innovative subjects. To carry out the 'collaborative innovation' program is not only the realistic requirement of Suzhou on local colleges and universities, but also the inherent need for the survival and development of these colleges and universities. Analyzing and studying local colleges' problems which are exposed in the process of serving the economic and social development of the city, and putting forward strategies and paths for strengthening the collaborative innovation power of local colleges and universities at the service of the economic transformation of Suzhou are of great significance for building a 'collaborative innovation' system and serving the economic and social transformation and development of Suzhou.

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