

# Research on Mechanism of Application-Oriented Regional Colleges Based on City-Campus Symbiosis and Integration of Industry and Education

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**ABSTRACT.** Through combining with the national development strategy requirements for colleges and universities in the new era and learning from the successful experience of Silicon Valley and Stanford University in the United States based on analysis of current development difficulties of regional colleges and universities, this paper provides valuable reference for regional colleges and universities in exploring the application-oriented talent training and turning disadvantages into advantages on the basis of the development path of City-campus symbiosis and integration of industry and education.

**KEYWORDS:** Regional colleges, City-campus symbiosis, Integration of industry and education, Application-oriented

## 1. Introduction

In 2019, the gross enrolment rate of China's higher education exceeded 50%, entering the stage of popularization, which means that the development mode of higher education will have a significant change. Large scale, diversity, personalization and socialization will become the significant characteristics of development of higher education in the new era. At present, regional colleges and universities have accounted for half of China's higher education, which is an important part of higher education. The development of higher education cannot be separated from the development of regional colleges and universities. The level of regional colleges and universities directly affects the overall level of higher education.

Education Minister Chen Baosheng stressed at the National Conference on Undergraduate Education in the New Era that all kinds of universities should strive for first-class undergraduate education. "Building a strong country of higher education requires all kinds of talents. A large number of application-oriented colleges and universities in China should follow the development of times and serve the regional needs according to the school running tradition, location advantages and resource conditions, so as to develop their own characteristics and strive for the first-class in the cultivation of application-oriented talents." [1] It points out the direction and path for the development of training application-oriented talents in regional colleges and universities.

Based on analysis of current developing situation of regional universities, this paper studies and discusses the construction mechanism of application-oriented regional universities through combining with the development experience of foreign universities and characteristics of new era in China.

## 2. Development Status of Regional Universities

Regional colleges and universities refer to those undergraduate colleges affiliated to local governments, mainly supported by local finance, which serve the regional economic and social development and the needs of related industries. According to the data released by the Development and Planning Department of the Ministry of education, as of June 15, 2019, there are 2688 general institutions of higher education in China. The composition is shown in Table 1.

*Table 1 Composition of General Institutions of Higher Education in China*

School Level	Central colleges		Regional colleges		Total
	Quantity	Proportion	Quantity	Proportion	
Undergraduate	114	9.01%	1151	90.99%	1265

Specialty	4	0.28%	1419	99.72%	1423
Total	118	4.39%	2570	95.61%	2688

The development of regional colleges and universities, especially the newly-built ones, is not mature. Most of them are still in the primary stage of development, mainly in the following two aspects.

### 2.1 Survival in Crack

Regional colleges and universities, especially the newly-built ones, are at the bottom of the undergraduate education, facing the pressure of “double first-class” colleges and provincial key universities, the “squeeze” of old-brand colleges and the “push” of higher vocational colleges, and bearing the pressure of competition from various aspects. Most colleges and universities imitate the development track of high-level research universities, but lack “favorable time and position”, they often return without success, “lose themselves” or even fall into difficulties in the growing competition.

### 2.2 Insufficient School Resources

In the early stage of higher education development in China, the road of development was unbalanced. Through the national policy of supporting the strong and provincial government's key university plan, a number of high-level universities were built rapidly. Up to now, the resource allocation of higher education is still based on the country, the university classification system is not perfect, the relationship between universities and the government is in hierarchal arrangement, and the share of resources obtained by universities decreases with the level. Regional colleges and universities are limited to their own level and position, with the least competitive resources available. Their development is restricted by both systems and resources, and they are increasingly marginalized in the university community.

## 3. Inspiration from Silicon Valley and Stanford University

Silicon Valley in the United States is the “Kingdom of electronic industry and computer industry in the world today. Although the United States and other high-tech zones in the world are growing, Silicon Valley is still the pioneer and center of high-tech innovation and development in the world. The venture capital in this region accounts for one third of the total venture capital in the United States, and the computer companies in Silicon Valley have developed to about 1500.” [2]

The brilliance of Silicon Valley cannot be separated from Stanford University there. It can even be said that without Stanford University, there would be no Silicon Valley today. In 1951, Professor Frederick Terman of Stanford University established the Stanford Industrial Park. The core purpose of the park is to make the research achievements of Stanford University, that is, the research and development and production of military technology and weapon system made by those laboratories close to the Stanford campus. On this basis, Silicon Valley has gradually developed into an ecosystem of scientific research, investment and entrepreneurship, laying the foundation of Silicon Valley's electronic industry. Therefore, Professor Frederick Terman is also known as the “father of Silicon Valley”. Stanford University was born in Silicon Valley, fully integrated into a good innovation and entrepreneurship ecosystem in Silicon Valley, and grow rapidly into a world-famous research university.

The common growth of Silicon Valley and Stanford University also benefited from the policy support and development opportunities at that time. “At that time, the state government of the United States paid great attention to the development of universities, not only supporting first-class universities, but also supporting some community universities and ordinary universities, so that they could engage in different levels of training and education, train technical personnel, and provide different labor force for the society. Another point is the relationship between industry and university. The University adapts to the needs of industrial development, and the industry promotes the formulation of the University's teaching plan. For example, the rise of semiconductor industry has changed the training plan of the whole university.” [3]

Stanford University breeds Silicon Valley, which also nourishes the innovation and development of Stanford University. Silicon Valley and Stanford University have become world-class model of City-campus symbiosis.

## 4. Construction of Application-Oriented Colleges Based on City-Campus Symbiosis and Integration of Industry and Education

With reference to the successful cases of Silicon Valley and Stanford University, the development of regional colleges and universities in China needs the joint efforts of the government, enterprises, universities and other

professional institutions to provide a good institutional environment and development space, and form a development mechanism of city-campus symbiosis and integration of industry and education, so as to get out of the development dilemma.

#### ***4.1 Taking Root is the Foundation of School***

“For the government, the development of the university itself must not be the only purpose of developing university. What's more, universities can't be run just because the area is good for university development, innovation and entrepreneurship; on the contrary, the university can be a means or method to balance the economic and social development and make up for the regional disadvantages.” [4] The higher education of prefecture level cities in our country is basically based on the layout of “One undergraduate, multiple specialties”. Regional colleges and universities are born and flourish because of local demand.

Only by changing the development ideas, taking root in the local areas, fully integrating into the local economic and social development trend, forming a symbiotic development community with the city, and transforming the regional industrial and cultural advantages into the advantages of running a school, can regional colleges and universities turn their disadvantages into advantages, turn their passivity into initiative, break through the difficulties in the supply of resources and systems, and rise in the service of national and regional development.

Regional colleges and universities are often the highest institutions in the city, many of which were “Huangpu Military School” that trained regional party and government cadres. Regional colleges and universities have the regional advantage of “waterfront towers, the first to catch the moon” (A person in a favourable position gains special advantages) in serving the local area. At present, they should cooperate with the local government deeply, dig into the regional spirit and culture, integrate the local development goals into the school running purpose through co-construction of public policy research institutes, regional cultural research institutes and other forms, coordinate the local government's support policies and economic support, and strive to become a “think tank” for decision-making consultation of regional government.

#### ***4.2 Service Industry is Fulcrum of Development***

At present, China's economy and society are in the historical stage of industrial transformation and upgrading. With the rapid development of information technology, if enterprises continue to use the old technology and talents, they will inevitably miss the development opportunities of the new era, making enterprise benefits no growth, but retrogression. “There is a contradiction to be reconciled between the needs of enterprises and the talent resources cultivated by schools, which has become an urgent problem to be solved in the current talent training and enterprise development.” [5]

In Report of the 19th National Congress, President Xi Jinping pointed out that we should deepen the integration of industry, education and cooperation of school and enterprise to realize the connotative development of universities. Regional colleges and universities should make full use of their perceptive advantages of “The duck knows first when the river becomes warm in spring.” (People in the industry are the first to know its changes.) for regional industrial demand, take the integrated development with regional industry as the fulcrum of their own development, and effectively serve the development needs of enterprises. On one hand, it is necessary to have a deep understanding of the needs of enterprises in product research, development and technical breakthrough, and support the innovation-driven development of enterprises through the joint construction of technology research centers, collaborative research on high-tech and industrial generic technologies, decision-making consultation and other forms. On the other hand, according to the talent demand of industrial enterprises development, we should optimize and adjust the professional layout, improve the talent training program, invite enterprises to build innovation labs and student internship training bases, promote the organic connection of education chain, talent chain, industrial chain and innovation chain, promote the structural reform of the supply side of human resources, provide enough talent guarantee for enterprises, and become the “main producing area” of regional applied talents.

#### ***4.3 Developing Characteristics Are Source of Innovation***

Although regional universities belong to the jurisdiction of local government, they generally have greater autonomy, which provides a broad institutional space for the reform, innovation and characteristic development of universities. Through innovative ideas, regional colleges and universities overcome the problems of homogeneity in running mode and standards, adhere to characteristic development and integrated development, and strive to become a “reservoir” for gathering high-level talents.

Keep up with the trend of the times and lay out new majors. Regional colleges and universities can make full use of the innate advantages of “small ships are easier to turn”, deeply understand the concept that the small logic of professional development obeys the big logic of economic and social development, and closely follow the needs of social and industrial upgrading. The “four new” educational concepts of new engineering, new medicine, new agriculture and new liberal arts are integrated into the whole process of talent cultivation. The methods of optimization, adjustment, upgrading, generation change and new construction are adopted to meet the needs of future technological innovation and industrial development, and the scientific exploration and talent cultivation of multi-disciplinary integration are further strengthened. In 2018 and 2019, in order to implement the national strategic deployment, the Ministry of education will support colleges and universities to establish urgently needed and emerging majors. See details in Table 2.

Table 2 Statistics of New-Added Majors in 2018 and 2019

Major Name	2018	2019
Cyberspace Security	25	19
Integrated Circuit Design and Integrated System	4	4
Artificial Intelligence	35	180
Data Science and Big Data Technology	196	138
Intelligent Manufacturing Engineering	50	80
Virtual Reality Technology	-	4
Industrial Intelligence	-	1
Blockchain Project	-	1
Preventive Medicine	4	1
Rehabilitation of Traditional Chinese Medicine	4	4
Contingency Management	-	1
Pension Service Management	-	2
Cross-border E-commerce	-	7
Intelligent Perception Engineering	-	4
Energy Storage Science and Engineering	-	1
Smart Agriculture	-	2
Agricultural Intelligent Equipment Engineering	-	2
Development of Sports Ability	-	1

Innovate the operation mechanism and explore the modern industry college. Modern industry college is a new type of university running mechanism, which is driven by the new demands of talents brought about by the new round of scientific and technological revolution and industrial reform. With the concept of facing the demands of modern industry talents and the goal of improving the ability of universities to serve specific industries, it promotes the industrial structure by integrating the resources of universities, governments, industries and enterprises, reforming the organizational system, innovating the training mode, and deepening the integration of industry and education. Modern industry college is mainly for application-oriented personnel training, which has the functions of students' entrepreneurship and employment, technological innovation, scientific and technological services, continuing education, etc. It has the characteristics of deep integration, functional combination, close to industry, multiple co-construction, etc. It is a multi-agent and deep integration entity school running organization form.

## 5. Conclusion

Regional colleges and universities are the main force of application-oriented universities in China. Without their quality, there will be no quality of higher education in China; without their powerful strength, there will be no powerful higher educational China. Regional colleges and universities will become the new force of China's higher education by changing their development ideas, turning short boards into advantages, turning potential advantages into competitive advantages, insisting on their own characteristics in their own fields, strengthening the application orientation of running schools, promoting the deep integration of industry and education, striving to build city-campus destiny, interests and struggle community, and striving to achieve rapid development.

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