



Research on the interactive development of higher vocational education informatization and regional economy

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Abstract. As an important part of the higher education system, higher vocational education provides necessary talent and intellectual support for the development of regional economy and plays an increasingly important role in the development of regional economy. Through the informatization of higher vocational education, we can strengthen the linkage and interaction with regional economy, so as to realize the interactive development of higher vocational education and regional economy. It is the common goal and mission of higher vocational education. Summarizing and refining the development characteristics of China's vocational education informatization and exploring the leading direction of China's vocational education informatization are the inevitable requirements to accelerate the realization of education informatization and lead the modernization of education. This paper expounded the relationship between higher vocational education informatization and regional economic interactive development from four aspects: the necessity of higher vocational education informatization and regional economic interactive development; the current situation and problems of the interactive development of higher vocational education informatization and regional economy; the paths and Countermeasures of the interactive development of higher vocational education informatization and regional economy; the development trend of higher vocational education model in China.

Keywords: Informatization of Higher Vocational Education; Regional Economies; The contribution of higher vocational education to econom

1 Introduction

With the continuous development of China's economy, the form of higher vocational education has also received more and more attention. At the same time, regional economic development also has a certain impact on higher vocational education. As the cradle of the cultivation of professional talents, higher vocational education is the closest way to economic development in the education industry. Higher vocational

education is a form of education oriented to regional economy. With its characteristics of popularization and industrialization, it effectively promotes economic development, and has a great impact on improving the social and economic environment of higher vocational education and establishing a teaching system that matches it. In order to strengthen the balanced development of higher vocational education among regions, it is necessary to relax the restrictions on talents. Only in this way can we promote the common development of higher vocational education and regional economy. Strengthening the coordinated development of higher vocational education and regional economy is related to the development of labor employment and social security undertakings in a region, the process of economic and social development in a region, and the specific embodiment of implementing the scientific concept of development and achieving sound and rapid economic development. In view of this, it is timely and significant to study the interactive development of higher vocational education and regional economy.

2 Research on the necessity of interactive development between higher vocational education informatization and regional economy

2.1 Interactive development of higher vocational education and regional economy has become a national strategy

With the development of industrial economy, higher education takes the lead, among which higher vocational education takes the lead. The formulation of regionalization of higher education, first appeared in the 1993 "Chinese education reform and development outline" and "the implementation opinions," pointed out that "the system of higher education must adapt to the needs of economic development, and in the process of economic development to achieve self-improvement", "by 2020, to adapt to the transformation of economic development patterns and industrial structure adjustment, embody a concept of life-long education, secondary and higher vocational education the coordinated development of the modern vocational education system". In recent years, the development trend of Higher Vocational Colleges in China is good, and the development speed has exceeded that of Undergraduate Colleges (see Table 1).

Table 1. Number of undergraduate and higher vocational colleges in China from 2011 to 2019

particular year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Undergraduate Colleges (universities)	1129	1145	1155	1164	1176	1198	1202	1233	1265
Higher Vocational Colleges (institutes)	1280	1297	1302	1334	1368	1387	1396	1415	1423

Source: China Statistical Yearbook

Party's 18 from the height of the national strategy put forward the "speed up the development of modern vocational education" strategy, points out that the modern vocational education system is "system develop technical skills talents, establish national technical skill accumulation, inheritance mechanism, is the development of the real economy and emerging economies, the core of realization of growth factors, is the key to the strategic adjustment of economic structure the important pillar of support, social stability and harmonious development, is related to the well-being of hundreds of millions of ordinary workers".

Higher vocational education only seize this important national strategic opportunities, to regional industrial economic development as an opportunity to continuously promote the optimization of vocational education resources in the area of configuration, promote vocational education system to optimize the layout, promoting the optimization of talent training quality promotion, to improve technical skill talented person's social status, service and is subject to the strategic decision of the national vocational education system, higher vocational education itself is to be able to do bigger and stronger^[1].

2.2 The interactive development of higher vocational education and regional economy is the only way for regional economic development

The development of higher vocational education can provide talent support for regional economy. In terms of talent cultivation mode and specialty setting, higher vocational education is oriented to the actual needs of regional economy, and can vigorously cultivate professional technical and technical talents needed by regional economy in the first time, so as to promote the optimization and upgrading of regional economic industrial structure. Obviously, the technical skill level of laborers plays a vital role in the development of regional economy.

The development of higher vocational education can provide technical support to regional economy. The development of higher vocational education itself is based on technical skills and oriented by scientific research and innovation. Local higher vocational colleges have also carried out various technical cooperation with relevant regional enterprises. The talent support provided by higher vocational education to regional economy not only meets the needs of relevant technical talents in regional industries, but also plays an important role in industrial upgrading within the region.

2.3 The interactive development of higher vocational education and regional economy promotes the continuous optimization and improvement of higher vocational education system

Higher vocational education and regional economic development are mutually promoting and complementary. Higher vocational education provides necessary talents and technical support for regional economic development; Regional economic development provides necessary financial and material support for higher vocational education. In 1980, based on the development needs of regional economy, the state education commission established the first batch of higher vocational colleges in the

southeast coastal areas of China. It can be seen that higher vocational education and regional economic development are accompanied by each other [2].

Regional economy not only provides necessary financial and material support for higher vocational education, but also restricts the development goal and institutional structure of higher vocational education. Only when higher vocational education is highly compatible with regional economy and adjusted with the structural adjustment of regional industrial economy, can it be improved with the continuous improvement of regional economic structure. In other words, regional economic structure, development model and other factors are closely related to the development of higher vocational education. The regional economic structure and development mode have been adjusted, and the specialty setting and personnel training mode of higher vocational education have also been adjusted and upgraded accordingly.

2.4 The interactive development of higher vocational education and regional economy promotes regional social harmony and stability

Regional social harmony and stability depend on the coordinated development of various industries in the region, such as science, education, culture and health, and the coordinated development of the industry depends on the rational allocation of resource elements, human resources and technical support, and the rational allocation of resource elements, human resources and technical support is closely related to the development of higher vocational education.

In the development of regional economy, it is inevitable that some new industries and new jobs will emerge continuously. The technical and talent support for these new industries and new jobs is the premise and guarantee of industrial innovation and development. Relying on regional economy, vocational colleges and universities should innovate the mode of running schools and the mode of school-enterprise cooperation to provide better talents and technical support for regional economy, which is the foundation of promoting regional social harmony and stability. The development of higher vocational education plays a positive role in solving regional employment and regional social stability.

3 Current situation and problems of interactive development between higher vocational education informatization and regional economy

After years of development, higher vocational education in China has gradually become an important part of higher education from the auxiliary and supporting position of higher education, and become the new force to realize the popularization of higher education in China, and the main force of training high-quality skilled talents urgently needed for China's economic development and industrial upgrading. As an irreplaceable part of the development of higher education in China, it plays an increasingly important role in China's higher education and regional economic and social development, and plays an increasingly important role.

3.1 The present situation of the development of Higher Vocational Education in China

First, the scale of higher vocational education has expanded rapidly. Under the guidance of the policy of vigorously developing higher vocational education in China, the pattern of setting up at least one higher vocational college in each city has been realized. The higher vocational college has become the most direct and close higher education with the local economic and social development and the interests of the people. The number of students enrolled, students in school and the number of graduates have steadily increased. It has initially realized the transformation of higher education from elitism to popularization in China, and created a miracle in the history of the development of higher education in the world.

Secondly, the management system and operation mechanism of higher vocational education have undergone great changes. The higher vocational education in China has gradually formed a two-level management system, which is mainly local management, which is mainly controlled by the state and controlled by the state. In terms of operation system, it broke the single government running pattern, initially formed a diversified school running pattern with the government leading, the participation of industry, enterprises and social forces and market-oriented. Especially the rapid and healthy development of private colleges and universities has injected new vitality into higher vocational education.

Third, the development trend of interaction between higher vocational education and regional economy is further strengthened. As an important part of higher education system, higher vocational education provides necessary support for regional economy development, provides necessary talents and intelligence support, plays a more important role in regional economic development, and strengthens the interaction with regional economy, thus realizing the interactive development of higher vocational education and regional economy is the common goal and mission of both. In recent years, the contribution of higher vocational education to the regional economy has continued to rise, and has fully caught up with and surpassed undergraduate colleges and universities (see Table 2).

Table 2. contribution of national and Beijing education, higher vocational education and undergraduate education to regional economy from 2011 to 2019 (%)

region	The contribution of education to the economy	The contribution of higher vocational education to economy	The contribution of undergraduate education to economy
whole country	7.31	0.36	0.23
Beijing	2.63	0.27	0.08

Source: China Statistical Yearbook

3.2 The social consensus has been formed between the interaction between higher vocational education and regional economy

Higher vocational education and regional economic development are mutually promoting and complementary. Higher vocational education provides necessary talents and technical support for regional economic development; Regional economic development provides necessary financial and material support for higher vocational education. In 1980, the National Education Commission, based on the development demand of regional economy, first established the first batch of Vocational Colleges and universities in southeast coastal areas of China. Therefore, higher vocational education and regional economic development are related [3].

Regional economy provides necessary financial and material support for higher vocational education, and also restricts the development goal and system structure of higher vocational education. Only when higher vocational education is highly compatible with regional economy and adjusted with the structural adjustment of regional industrial economy, can it be improved with the continuous improvement of regional economic structure. That is, the regional economic structure, development model and other factors are closely related to the development of higher vocational education. The regional economic structure and development mode have been adjusted, and the professional setting and talent training mode of higher vocational education should be adjusted and upgraded accordingly.

3.3 The interaction between higher vocational education and regional economy

First, some vocational colleges and universities are not clearly positioned and fail to form their own characteristics. In the process of higher education reform, some vocational colleges have unclear positioning of themselves, overemphasizing discipline in the process of running a school, but not paying attention to skills training, and blindly climbing up and running to the subject type. Some colleges upgraded from secondary vocational colleges to higher vocational colleges will be promoted to undergraduate courses and run disciplinary higher education once they have full wings. This tendency not only deviates from the original intention of vocational education, but also makes vocational education lose its proper characteristics. Some higher vocational colleges basically refer to the traditional undergraduate and specialized mode, and carry out teaching according to the curriculum of ordinary undergraduate colleges, which can not reflect the characteristics of higher vocational education. Especially for the higher vocational colleges, the content of the course has become the "compressed biscuit" of the general higher education.

Secondly, the mode and idea of running a school can not adapt to the coordinated development of regional economy. Compared with other general education, the employment purpose of students is clear, and the development of the school depends on the good teaching quality. The quality of students' training determines the popularity of the school in the market enterprise. Therefore, the teaching concept of vocational schools must aim at improving the teaching quality, strengthening the teaching reform, and promoting the upgrading of school running concept with efficient teaching man-

agement. The school should pay great attention to the construction of teaching and training base, and take the market demand as the guidance in the construction of the training base. To strengthen the promotion of cooperation between school and enterprise, order training and other ways, through optimizing teaching procedures and changing teaching mode to improve the quality of talent training, the school can formulate the talent training plan according to the cooperation and training agreement signed by both sides. The school will teach theoretical courses and preliminary skills training, and carry out professional skills operation practice based on the actual production process of the enterprise, so as to strengthen students' understanding and application of professional knowledge. In addition, in terms of professional setting, schools should follow the demand of regional economic development and social labor supply and demand, carry out teaching reform according to the current industrial orientation and the talent demand of regional economic development, and strengthen the cultivation of talents. In these aspects, many vocational colleges obviously did not follow up on the innovation of school running mode and teaching concept.

Third, the current higher vocational education and regional industry enterprises are not closely related, mainly manifested in:

1) the enthusiasm of industry enterprises to participate in higher vocational education is not high. Because vocational colleges and industry enterprises are different organizations, they have different organizational goals and interests pursuit. There is a clear interest boundary between them, which leads to the lack of motivation for industry enterprises to participate in higher vocational education.

2) The depth of the participation of industry enterprises in higher vocational education is not enough. There is always the participation of industry enterprises in the higher vocational school system, but there is a dislocation between them. For example, enterprises need a large number of high skilled complex talents, and graduates of higher vocational colleges can not find suitable employment positions. This shows that the depth of integration of the two in some links and areas is not enough to achieve seamless connection^[4].

3) The scope of the participation of industry enterprises in higher vocational education is not enough. At present, the industry enterprises mainly participate in the development of training objectives, professional settings, curriculum reform, student practice and training base construction. However, as another main body of "school enterprise cooperation and combination of engineering and learning" in higher vocational colleges, industry enterprises should also participate in scientific research, service of society and cultural inheritance of higher vocational education, and promote the connotation development of higher vocational education, To realize the overall development of human beings and the improvement of talent quality.

In a word, from the current situation of higher vocational education and regional economy, facing the existing problems, integrating the interests orientation and dredging the mechanism system, can higher vocational colleges better serve the regional economy and promote the interaction between higher vocational education and regional economy^[5].

4 Paths and Countermeasures of interactive development between higher vocational education informatization and regional economy

Under the background of social transformation, economic structure adjustment and economic growth mode in China, vocational education has become an indispensable force to promote regional economic development. Therefore, we should form new interactive relations and rely on each other and drive each other in the development of the region. Specifically, we should start with the following aspects to carry out the work.

4.1 Forming consensus

The development of service regional economy is not only the responsibility of local vocational colleges, but also the basis for the survival and development of local vocational colleges. Only by adhering to the service to promote development and supporting by contribution can we win the best development environment and obtain the largest development space.

Vocational education aims at training skills applied talents, serving social development and economic construction. The effective development of vocational education is an important factor to promote regional economic development, and it is closely related to economy in regional development. Vocational education needs to deal with a series of problems brought by the adjustment of industrial structure and the acceleration of urbanization in the development of regional economy, and interact with regional economy in a benign way to promote the development of economy in order to promote the effective development of vocational education. Vocational schools should understand and master the needs of the regional economy, society and enterprises for the first-line skills application talents, as well as the requirements for the training of vocational education talents. Meanwhile, it should play the economic function of modern education, so that the relationship between vocational education and regional economy has a new era connotation ^[7].

4.2 Resource sharing

With the organization and support of local government, vocational colleges should actively serve regional economy, fully tap the potential of existing educational resources, rely on vocational college education and scientific research forces, and carry out vocational training for enterprise employees according to the needs of enterprises, in order to meet the talent needs of local enterprises and the talents needs of employees. For example, the school can be sent to the door and served to the enterprise to carry out joint training with relevant enterprises. The training mode of sending and learning enterprises reflects the mode of close combination of production, learning and research, giving full play to the advantages of school enterprise cooperation, complementing the advantages of two different educational resources between schools and enterprises, and

integrating the educational resources of both sides in depth. On the one hand, we can carry out regular teaching according to the training mode and requirements of vocational colleges; On the other hand, it can also set up courses according to the actual needs of enterprises. Therefore, vocational colleges should adhere to the regional basis, actively carry out vocational education training, technology research and development and services, and become an important education service base for regional economic development [6].

4.3 Optimize structure

The structure of higher vocational education is influenced and restricted by all aspects, but the most important is restricted by economic structure. Therefore, the economic structure directly determines the direction of the adjustment and reform of the higher vocational education structure. Higher vocational education serves regional economy directly. The adjustment and reform of regional economic structure, especially industrial structure and technical structure, have great influence on the reform and development of the professional structure of higher vocational education. On the contrary, the industrial structure and technical structure in regional economy are the main basis for the adjustment, reform and development of the professional structure of higher vocational education. Therefore, the adjustment and promotion of the professional structure of higher vocational education must consider and study the regional professional structure from the overall situation of industrial structure adjustment and development. In the aspect of professional structure, we should consider not only the advance of running a school, but also the characteristics of the development of regional industrial structure; It is necessary to obey the requirements of regional economic development level and to better serve the development of regional economy through the optimization of its own structure.

Higher vocational education is to cultivate the talents of higher technology application, which is a kind of education type and specification which is different from traditional subject education in higher education, and pays more attention to the cultivation of Vocational and technical application ability. Therefore, the professional setting of this kind of education cannot be restricted to the discipline category and discipline system, nor only from the teachers' own experience and preferences, but should be guided by the local economic development and the market of vocational demand, and the professional classification as the framework. Through understanding the basic needs of talents in various pillar industries and emerging economic fields in the next 51-10 years of local economy, we can understand the occupational ability elements of the groups of similar professional posts in these fields. Understand the theoretical knowledge points and technical application ability points reflected by these elements, and then ask experts (including industry experts) from inside and outside the school to demonstrate according to the rules of education itself.

4.4 Collaborative innovations

Higher vocational colleges should give full play to their own advantages and clarify the scientific research orientation, take the technology research and development and product upgrading of small and medium-sized and micro enterprises as the grasp, take the development road of combining production, learning and research, promote the synchronous improvement of talent training quality and social service level with scientific and technological innovation, and vigorously promote the transformation and upgrading of regional economy. First, give full play to professional advantages and establish various application-based research teams, such as industrial design center, Mechanical Research Institute, home decoration design center, Intellectual Property Center, etc., to provide scientific and technological services directly for society, enterprises or individuals; Secondly, we should give full play to the effect of famous teachers and set up various skill master studios to provide technical consultation and customized training for the society, and speed up the training of young teachers with old and new ones; Third, while vigorously promoting the transformation of scientific and technological achievements, we should be good at absorbing new technologies and new technologies emerging in enterprises, and apply them to the process of talent training, and pay attention to the accumulation and innovation of technical skills.

The purpose of technology research and development is to transform it into real productivity, invest in enterprise production and serve the development of regional economy. Therefore, we should encourage higher vocational colleges to establish creative and entrepreneurial parks, establish scientific and technological intermediary institutions widely, publicize and promote scientific research results by exhibition, form "incubation" base of high-tech achievements in higher vocational colleges, accelerate the transformation of technological achievements and provide technical support for regional economic development.

5 Development trend of higher vocational education model in China

After the reform of higher vocational education, the idea of development is more clearer, and the ability to actively serve the economic and social development is significantly enhanced. After the exploration in recent years, with the strong support of the state and the government, the idea of the reform and development of Higher Vocational Education in China is increasingly clear. The Ministry of education has clearly put forward the idea of promoting the transformation of higher vocational education; Following the talent training idea of "taking service as the purpose, taking employment as the guidance, taking the combination of production, study and research as the way, and taking the cultivation of high skilled professionals meeting the needs of production, construction, management and service as the goal"; Adhere to the interaction and organic combination of theoretical teaching and practical teaching, teachers and students, first classroom and second classroom, school and society, and strive to improve the quality of education and teaching; Adhere to the school running policy of higher

vocational education, and actively promote the transformation of Higher Vocational Education from planned training to market driven, from government direct management to macro guidance, and from the traditional orientation of higher education to employment; We will promote the close integration of higher vocational education teaching with production practice and technology promotion, and social services, so as to promote higher vocational colleges to run schools better to the society and market. These ideas of running higher vocational education have gradually become the consensus of governments at all levels and higher vocational education circles, and guide higher vocational education to deepen the reform and innovation of system, operation mechanism and education ^[8].

6 Some beneficial attempts on the running mode of Higher Vocational Colleges

In recent years, some higher vocational colleges have made some beneficial attempts in school running mode. For example, Beijing Vocational College of Electronic Science and technology took the lead in implementing the project of "high end technical and skilled talents through training experiment" in 2015. This project adopts the "2 + 3 + 2" seven-year new through talent training mode. Among them, "2" refers to the completion of high school education in two years "3" refers to using three years to complete technical education to adapt to high-end industries" "2" refers to the undergraduate education after the completion of technical education. This is another major measure of Beijing's education reform, which breaks the traditional concept of "going to senior high school - going to University - looking for a job". Entering the project learning can achieve "one-step" education with high quality, high skills, high technology and high academic background, and achieve the purpose of cultivating international professional talents.

7 Conclusion

In short, the construction of regional economy in Colleges and universities needs to take the correct concept as the guide, rely on various platforms, strengthen the benign interaction with the region, and carry out rich content and diversified forms of service activities based on their own advantages. The more reform is pushed forward, the deeper the conflict is touched, the more complex the interests involved, the greater the resistance encountered, and we are facing a key battle of reform. How to adapt higher vocational education to the development of regional economy and how to improve its contribution to regional economy through higher vocational education is a difficult problem in front of us. As long as we firmly believe in this and adhere to the principle of serving the regional economy, we can make the regional economy and higher vocational education develop better.

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