

Research on The Realization Path of Industry-education Integration to Promote Regional Industrial Transformation and Upgrading

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Abstract: The integration of industry and education has become the only way for the country to promote industrial transformation and upgrading, drawing on Bourdieu's field theory to analyze the coupling relationship between industry-education integration and industrial transformation and upgrading, and by analyzing and comparing the current situation of higher education and industrial structure development, find the practical problems of education in the transformation and upgrading of the service industry, and then put forward the realization path of industrial transformation and upgrading from the aspects of regional layout, hierarchy and professional subject category of higher education.

Keywords: Integration of industry and education, Industrial transformation and upgrading, Higher education.

1. Introduction

In the face of the global development trend and the practical needs of economic and social development, China has successively introduced a series of major reforms and strategic decisions to guide and encourage enterprises to achieve technological innovation and industrial transformation and upgrading under the new normal of the economy, and improve their core competitiveness. The knowledge structure, ability and quality of the worker group are the necessary factors for enterprises to improve their core competitiveness and production efficiency, determine the development speed and quality of industry enterprises, and directly affect the effectiveness of industrial transformation and upgrading. As the main window for the export of social talents, higher education is also facing reform and innovation in the talent training model in the face of the new requirements of industrial development, so as to match the upgrading and development of the industry and provide strong talent support for industrial transformation. In this critical period, the integration of industry and education has become the only way to optimize the vocational education system, innovate the talent training model, improve the technological innovation system, and then promote industrial transformation and upgrading.

2. The Coupling Relationship Between the Integration of Industry and Education and Industrial Transformation and Upgrading

In October 2021, the "Opinions on Promoting the High-quality Development of Modern Vocational Education" issued by the state put forward "requirements to adhere to the integration of industry and education, school-enterprise cooperation, innovation of institutional mechanisms, and the formation of a development pattern of benign interaction between education and industry, and complementary advantages of schools and enterprises". The integration of industry and education is not only the main direction of high-

level and high-quality development of modern education, but also the inherent requirements of industrial transformation and upgrading in the new era, and the effective way to achieve the integration of industry and education is to break through the traditional path, explore the organic connection between professional chain and industrial chain, talent chain and innovation chain, and promote the linkage development of education and industry.

The field theory proposed by French sociologist Pierre Bourdieu mainly studies the analysis of the related phenomena of differentiation and integration of multiple fields from the perspective of different disciplines, where the field is essentially the power relationship formed by the competition of various types of capital, its boundaries are changeable, and the formed relationship is dynamically developed. It is borrowed from the construction of industry-education integration, and by analyzing the field attributes formed by industry-education integration, the essential characteristics and practical difficulties are analyzed, which is helpful to realize the construction path of industry-education integration to promote industrial transformation and upgrading. According to Bourdieu's field theory, the field formed by the integration of industry and education is mainly the educational field where universities are located and the economic field where enterprises are located, and the value added in the process of integration of production and education is realized by building a community of interests between the two. As a social system engineering, the integration of industry and education is a cooperation mechanism established between the two major systems of industry and education for their own development, such as demand docking, complementary advantages and resource sharing. The economic capital of the industrial system and the academic capital of the education system are exchanged, satisfied and integrated with each other to form a new heterogeneous field of industry-education integration, so as to realize the appreciation of capital. The fundamental driving force of the integration of industry and education is to realize the demand for capital appreciation on both sides of education and industry, through the conversion and reprocessing

between different capitals in this field, enterprises will invest economic capital in colleges and universities, so that the school's teaching facilities, scientific research equipment, and education environment have been improved, the quality of talent training has been continuously improved, and the total amount of students' knowledge and technology capital reserves has been increasing, so as to achieve the continuous appreciation of economic capital and academic capital through the transformation of capital form, forming a virtuous circle. It not only enhances the ability of the education service industry, but also enhances the strength of the industry's own development.

3. Analysis of the Situation of Higher Education and Industrial Structure Development

3.1. The structural proportions of the three major industries tend to be balanced

In recent years, with the transformation and upgrading of the industry, the proportional relationship between the three major industries in the industrial structure and within the industry has been continuously adjusted. From the overall perspective of the 13th Five-Year Plan period, the proportion of the primary industry in China's industrial structure while maintaining its basic position in the national economy has slowly decreased year by year, accounting for 8.6% in 2016 and 7.7% in 2020; Although the proportion of the secondary industry fluctuates, it is basically stable at about 40% and still occupies a relatively important position; The proportion of the tertiary industry has remained above 51% and has shown a rising trend. From the perspective of the employment structure of the tertiary industry, from 27.4:29.3:43.3 in 2016 to 23.6:28.7:47.7 in 2020, the overall trend is that the number of employees in the primary and secondary industries is decreasing, and the number of employees in the tertiary industry is increasing. In 2020, the GDP of the primary, secondary and tertiary industries will be 7.78 trillion yuan, 38.43 trillion yuan and 55.40 trillion yuan respectively, and the proportion of the primary, secondary and tertiary industries in the three major industrial structures will be 7.7%, 37.8% and 54.5% respectively, the contribution rate will be 9.5%, 43.3% and 47.3% respectively, and the number of employees will be 177 million, 215 million and 358 million respectively. Compared with industries above designated size in 2020, the added value of high-tech manufacturing, the operating income of strategic emerging service enterprises, and investment in high-tech industries in 2021 all increased

by more than ten percentage points over the previous year.

3.2. The proportion of junior college enrollment is on the rise

According to the data analysis of the "China Statistical Yearbook 2021", from the education level, there will be 2,738 higher education schools in the country in 2020, including 1,468 higher vocational colleges, with a higher education enrollment of 9.675 million and a number of graduates of 7.972 million, of which 5.243 million are enrolled in higher vocational colleges and 3.767 million are graduated, more than half of the total scale of higher education. In terms of the change in the total number of general college enrollments, in the past five years from 2016 to 2020, the growth of the overall scale of undergraduate enrollment is not significant, with an increase of only 9.32%, far lower than the increase of 52.77% in the same period. It can be seen that during this period, the growth of the enrollment scale of ordinary colleges and universities is mainly reflected in the growth of the number of junior college enrollments. The ratio of undergraduate to junior college enrollment dropped from 1.18 to 0.85, and the proportion of junior college enrollment increased significantly, and the dominant position of the proportion further expanded.

3.3. The proportion of discipline enrollment corresponding to the tertiary industry is dominant

Universities are places for the development of industries to cultivate professional talents, although the professional settings of colleges and universities do not strictly correspond to industry-related disciplines, and the talents of different disciplines are usually free flow employment in various industries, but it is undeniable that the professionals trained by colleges and universities are indispensable human resources in the three major industries. If we assume that the professional talents of each discipline cultivated by the university are highly matched with the corresponding industrial job types, the corresponding three major industries of the university can be divided into their respective related disciplines, and the structure of higher education disciplines can be obtained (as shown in Table 1). According to the data of the 13th Five-Year Plan period, the tertiary industry accounts for the largest proportion of enrollment in the enrollment of related disciplines (professional categories) in the primary, secondary and tertiary industries, all of which are above 50%, and the primary industry accounts for the least,

Table 1. Tertiary industry classifications corresponding to higher education disciplines

Tertiary industry	Corresponding disciplines (undergraduate, postgraduate)	Corresponding major categories (junior colleges)
Primary	agronomy	Agriculture, forestry, animal husbandry and fishery
Secondary industry	Science, Engineering	Resources, environment and safety, energy, power and materials, civil engineering Construction, water conservancy, equipment manufacturing, biology and chemical industry, light industrial textile Weaving, food, medicine and food, transportation, electronic information
Tertiary industry	Literature, Philosophy, History, Education, Economics, Management, Medicine, Law, Art	Medicine and health, finance and commerce, tourism, culture and art, news and communication, education and sports, public security and justice, public management and services

which has not exceeded 2%. In 2016, the enrollment ratio of primary, secondary and tertiary industry-related disciplines (major categories) was 1:24:32, and in 2020, the enrollment ratio was 1:23:29. From the perspective of the enrollment of undergraduate disciplines, the top three enrollment in 2020 are engineering, management and art, accounting for 34.53%, 14.87% and 10.13% respectively. From the perspective of professional categories, finance, commerce and trade, electronic information, medicine and health 17.74%, 14.83%, 12.96%. The enrollment of tertiary industry-related disciplines (professional categories) in junior colleges dominates.

4. Practical Problems in The Transformation and Upgrading of The Higher Education Service Industry

4.1. The spatial distribution of educational resources supply and industrial transformation and upgrading is unbalanced

Deepening the supply-side reform of higher education and optimizing the regional layout of education can better serve industrial transformation and upgrading. There are obvious differences in resource allocation and socio-economic development levels between eastern and western regions of China, between urban and rural areas, which also brings about an imbalance in the development level of higher education. The per capita share of higher education resources in the central and western regions is much lower than that in the eastern region, there is a huge gap in the number of schools, teaching resources, school-running environment, the number of students, the ratio of teachers and many other aspects, in areas with a high level of higher education development, the number of schools and scientific research institutions is relatively concentrated, the quantity and quality of high-tech skilled personnel trained will be relatively high, and the technological innovation achievements generated and transformed will be more. In turn, it will accelerate the transformation of regional industries from traditional high-consumption industries to high-tech low-consumption industries. It can be said that the level of development of higher education affects the process of upgrading the regional industrial structure. At present, the regional layout of China's higher education is not synchronized with the spatial migration of industrial transformation and upgrading, which is not conducive to the smooth completion of industrial transformation and upgrading and industrial transfer.

4.2. The structure of education and education does not match the demand for talents in industrial transformation and upgrading

The development of higher education has accumulated and exported a large amount of human capital for society, and is also an important force for promoting technological innovation. The enhancement of technological innovation capabilities will help improve the research and development of new processes and products, and realize the upgrading of traditional industries to high and new technologies. However, from the perspective of the development of higher education and changes in industrial structure in recent years, the supply

of technical skills cultivated by higher education cannot meet the actual needs of the transformation and upgrading of the three major industries. Although the number of higher education enrollment has been in a state of growth, especially the rapid and substantial growth of the enrollment of higher vocational colleges, but compared with the number of employment in the three major industrial structures, the human capital exported by higher education is still far behind, in the past five years, the proportion of college junior college, undergraduate and graduate education personnel in the national employment has increased from 9.58%, 7.71%, 0.78% to 11.3%, 9.8% and 1.1% respectively. However, the total supply of professional and technical skills required in the upgrading of the industrial structure is still seriously insufficient, especially the shortage of high-level human capital. Among the number of technical skills cultivated by higher education, the enrollment of agricultural majors is the smallest, the proportion is too low, and the proportion of secondary and tertiary industry-related majors is comparable, but there is also a problem of insufficient enrollment in scientific research fields such as equipment manufacturing, energy power, and biochemical engineering.

4.3. The setting of education majors is not synchronized with the market demand for industrial transformation and upgrading

In recent years, with the rapid development of social economy and technology, China's higher education, especially vocational education reform has been deepening and advancing, although education and industrial development are more and more closely integrated, but the contradiction of higher education professional structure and industrial transformation and upgrading is not coordinated, due to the industry development dynamics and college professional construction between the time gap, resulting in the supply of college professional construction is difficult to keep up with the pace of industrial transformation and upgrading in time, difficult to adapt to the requirements of market human capital demand. The state does not have clear and unified regulations on the professional subject setting of colleges and universities, resulting in the lack of overall scientific planning between colleges and universities and schools of the same level, and the dynamic adjustment mechanism of professional settings has not been established within colleges and universities, and it is inevitable that there will be phenomena such as lagging majors, superimposing homogeneous majors, and missing emerging majors. It further aggravates the disconnect between the professional supply side and the demand for industrial transformation and upgrading, resulting in an unbalanced and uncoordinated supply and demand relationship in the talent market.

5. The Integration of Industry and Education Promotes the Realization Path of Industrial Transformation and Upgrading

Industrial transformation and upgrading has brought about changes in the industrial structure, new industries and new technologies lead a new round of reform of China's social development, colleges and universities, as the main position for the training of industrial talents in the industry, are bound to bring a series of changes in professional construction, teaching methods, training programs and so on. As a product

of China's innovation-driven development strategy, the integration of industry and education is an important way to promote industrial transformation and upgrading, an important strategy to achieve high-quality development of college education, and a systematic project that requires the participation of multiple stakeholders.

5.1. Optimize the layout of education space, balance the supply of educational resources, and meet the needs of industrial transfer

Industrial transfer is an important force to promote industrial transformation and upgrading, with the needs of industrial structure adjustment and transformation and upgrading, some industries in the eastern region of China are gradually transferred to the central and western regions, and the supply-side reform of higher education also needs to keep up, combined with the top-level design planning and regional distribution of industrial transfer, optimize and adjust the regional layout of college education resources, so as to serve the regional industrial upgrading well. First, it is necessary to scientifically and rationally plan educational resources according to the distribution of industrial transfer. As far as the speed of China's industrial development is concerned, the eastern region is much higher than the central and western regions, the industrial economy in the eastern region is relatively more developed, and the modernization level of education is also more demanding, and more attention should be paid to enhancing the level and gradient of talent training in the construction of colleges and universities, especially to improve the talent specifications required by emerging technologies and new industries. As an important undertaking area for industrial transfer in the eastern region, the central and western regions should strengthen the supply of high-quality educational resources, especially in the scale and quality of higher vocational education personnel training, increase the proportion of training bases for applied technical skill talents, and provide talent reserves for undertaking industrial transfer in the eastern region. The second is to introduce social forces and strengthen the sharing and complementarity of educational resources and industry and enterprise resources between regions. The basis for the effective integration of industry and education is to do a good job in top-level design and formulate implementable policies and measures from the government level, strengthen social forces to run schools, promote the complementary and mutual integration of resources of universities and industry enterprises, broaden education channels, and make up for the shortcomings of unbalanced regional education resources.

5.2. Through the education level system, form a talent training gradient, and strengthen industrial technology innovation

One of the primary tasks of deepening the integration of industry and education is to promote the integration of the education chain and the talent chain and optimize the education level system. Higher education shoulders the cultivation of social talents, and there are two main types: academic talents and applied talents. Application-oriented undergraduate colleges and vocational colleges mainly cultivate application-oriented talents. In the overall planning and construction of colleges and universities, a vertically connected and rationally structured hierarchical system has

not been formed, so that the training requirements and specifications of application-oriented talents are relatively low overall, which is also a main reason why the hierarchy of higher education supply does not match the needs of industrial transformation and upgrading. First of all, it is necessary to improve the hierarchy of application-oriented talent training and explore the advanced development of higher vocational education. Add undergraduate and graduate-level education to higher vocational education, support and guarantee the development of higher vocational undergraduate and higher vocational graduate education at the institutional level, and increase the channels and space for students in higher vocational colleges to further improve their abilities. Second, update the higher education system in a timely manner, extend the education period according to the needs of modern professional knowledge and technology, and improve the talent training education system. With the continuous emergence of emerging industries, the continuous updating of new technologies and new knowledge, so that the knowledge and technology of the information age have exploded, the traditional academic system can not meet the requirements of students to absorb and master professional knowledge and technology, appropriately extend the training period of higher vocational education, dock with the post standards and requirements of the industry, increase the proportion of students' technical skills training practical courses, and improve the talent training program.

5.3. Strengthen professional and accurate supply, adapt to market development trends, and create an industrial cluster effect

Professional construction is the fundamental embodiment of the efficiency and quality of education in colleges and universities, and it is also an important way for the transformation and upgrading of the service industry. The professional setting of colleges and universities should be scientific and reasonable, able to match the needs of industrial development, in the layout of disciplines and majors, we must adhere to the basic principle of setting majors according to the industry, relying on the professional setting of scientific research platforms, layout professional chains around the industrial chain, build an innovation chain according to the professional chain, promote the integration of the three chains of regional industrial chain, professional chain and innovation chain, so that college disciplines and majors can fully apply and gradually lead the change of industrial structure and industrial transformation and upgrading. On the one hand, colleges and universities should base themselves on the regional pillar industry innovation professional construction model, closely track the development trends of industries and industries, and start to build professional group construction. Modern industry has entered a stage of multidisciplinary and cluster development, colleges and universities should introduce industry enterprises to participate in professional planning and layout, jointly formulate professional construction standards and management mechanisms, optimize the structure of colleges and universities, set up scientific professional clusters around the direction of industrial development, and take the initiative to adapt to the dynamic development and changes of the industry in a timely manner. On the other hand, colleges and universities should innovate the professional governance model, establish a dynamic adjustment mechanism for disciplines, strengthen

the precise supply between majors and industries, promote the integration of professional construction and industrial demand, and avoid blindness and lag caused by departing from the market development trend in the process of professional setting.

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