

Research on the Construction Mechanism of Industrial College in Applied Universities under the Background of Emerging Engineering Education

Hengyi Yuan and Yi Li*

Jilin Engineering Normal University, College of Mechanical Engineering, Changchun 130052, China

**Corresponding author e-mail: lyi15@mails.jlu.edu.cn*

ABSTRACT. *It is an important way to deepen the integration of production and education in Application-oriented Colleges and universities. It is also a beneficial exploration of applied talents training mode and a powerful measure to promote the employment and Entrepreneurship of college students. The industrial college established by local undergraduate universities should focus on the development strategy, define the orientation of innovation ecosystem, grasp the basic requirements of construction, carry out exploratory practice in organizational structure and operation design, seek breakthrough and accumulate beneficial experience. From the perspective of collaboration, local universities should design the function of the Industrial College in the aspects of talent training mode, teaching practice environment, discipline construction, application-oriented teaching staff construction and applied science and technology research and development. According to the setting mechanism of the Industrial College of the application-oriented university, the appropriate governance structure of the industrial college should be formulated, and the organizational characteristics of the industrial college should be scientifically defined The operation mode and guarantee mechanism.*

KEYWORDS: *Emerging Engineering Education, Applied Universities, Industrial College, Mechanism Research*

1. Introduction

With the development of colleges and universities, the construction of high-level application-oriented universities has become the basic orientation of local universities. In order to realize the transformation and development to application-oriented in local universities, an important push is to establish industrial colleges. Under the background of the current national emphasis on "new formats" and "new

engineering", the "Fudan consensus", "Tianda action" and "Beijing Guide" point out that the construction of new engineering requires the construction of industrial college. [1] For example, the "Beijing Guide" puts forward the following points: "improve the multi-agent collaborative education mechanism, break through the institutional and institutional barriers of social participation in talent training, and further promote the combination of science and education, the integration of production and learning, and school enterprise cooperation. We will establish a multi-level and multi field alliance between schools and enterprises, and further promote the cooperation in running schools, educating people, employment and development through industry university research cooperation, so as to achieve win-win cooperation. We will promote organizational innovation in universities, explore the construction of a number of industrial colleges jointly built and managed by industrial enterprises, and build a number of regional shared talent training practice platforms integrating education, training and research. " [2] However, there are still some difficulties and puzzles about how to set up industrial colleges in many local universities. Some local undergraduate colleges that have established industrial colleges have problems in varying degrees, such as insufficient government support, strong administrative color, lack of modern governance methods, difficult to achieve win-win situation of school enterprise interests, lack of conflict resolution and market-oriented operation mechanism, unbalanced cooperation between school and enterprise at all levels, and the service ability of colleges and universities needs to be improved. Some local undergraduate colleges that have not yet established industrial colleges believe that the government and industrial enterprises in the northeast region still lack the awareness of cooperation with colleges and universities. There are no large-scale enterprises, no mature industrial foundation, and even no government support can not establish industrial colleges. Local enterprises or local governments prefer to cooperate with well-known universities in other places due to their lack of application-oriented research ability and less experience in service industry enterprises or local economic and social development. [3] Based on the above basic judgment, application-oriented colleges and universities hold a wait-and-see attitude towards the establishment of industrial colleges, and lack of confidence in building a good industrial college. Therefore, how to establish an industrial college has become a cognitive problem that some application-oriented universities need to solve at present.

2. The Operation Mode of Industrial College in Applied University under the Background of Engineering

New engineering talents need to highlight the ability to solve complex engineering problems, to find the right path to solve problems scientifically and reasonably, and to take reasonable methods to effectively eliminate difficulties and solve problems in the cross integration environment of society, science and engineering. The construction of Industrial College in Application-oriented Universities promotes the innovation of new engineering talents training mode from the mechanism. [4] The disadvantages caused by the application-oriented

universities following the discipline construction mode of the old undergraduate universities have become increasingly prominent: on the one hand, the discipline development space that the newly-built undergraduate universities can expand is very limited, on the other hand, the professional characteristics are difficult to show. Through the establishment of Industrial College, colleges and universities, industries and enterprises can effectively integrate the characteristic resources, jointly expand the discipline development space, construct the community type specialty construction mode, and create the professional characteristics; According to the development trend of the industry, we should scientifically select the development direction of the discipline and major, set up a discipline construction team with the participation of school and enterprise elites, jointly construct the talent training system and application-oriented curriculum system, build the practical education platform, implement the personnel training link, and carry out teaching research and reform; It will lead the reform of internal governance mode and system in Colleges and universities, and then promote the comprehensive reform of specialty construction, which will play an exemplary role in the construction and reform of similar majors. [5]

2.1 Constructing the decision-making mechanism of "mutual benefit and win-win"

Correct decision-making needs to clarify the power relationship within the organization. As a new organization formed by the cooperation of many subjects, every decision must involve the interests of all parties involved in the cooperation. Therefore, the main body of power is the relevant parties of cooperation. In order to ensure the effectiveness of decision-making, it is necessary to decentralize the power, that is, to realize the democracy of decision-making. For example, under normal circumstances, in the industrial college without the establishment of independent corporate structure, the council system with the participation of stakeholders can be established to ensure the scientific and democratic internal decision-making. However, in order to realize the democratization of multi stakeholder decision-making, the efficiency of decision-making is often affected, The relevant parties shall, in accordance with the relationship of responsibilities and rights, clarify the decision-making rules, such as the structure of the board of directors, the time of the Council meeting, the procedure of deliberation and approval, and the contents of the decision-making, such as the development plan, annual development plan, annual development report, internal management rules and regulations, annual budget, personnel appointment, incentive plan, and inquiry of the board of supervisors.

2.2 Improve the organization mechanism of "multi cooperation"

Driven by the current economic situation, win-win cooperation and common development have become an inevitable requirement. Diversification means that the investment subject of industrial college should include both universities and

cooperative enterprises, and the equity proportion of both sides should be clear. As an important subject, the government should also participate in the formulation of rules in terms of rights, responsibilities and interests of all parties. Clear the specific content that each party needs to undertake and establish the system guarantee system. Generally, the Institute of technology will establish a project with the government, sign an agreement on cooperative education, and stipulate the rights and responsibilities of the three parties. The university is mainly responsible for the normal operation expenses of the industrial college. After the formal operation of the Institute, the government's tax incentives, financial subsidies and other forms to help the Institute to find excellent business partners. Both sides promote each other to realize the integration of production and education, and bring win-win results for both sides

2.3 benefit sharing and incentive mechanism of stakeholders in Industrial College

At the beginning of the establishment of the Institute of technology, the industrial college takes personnel training as its main goal, does not pursue economic interests, and the economic benefits generated are also applied to the development of the Institute itself, and does not distribute economic benefits to cooperative enterprises, thus effectively avoiding the economic disputes caused by it. The benefits of the industrial college to the cooperative enterprises are mainly that the enterprises can give priority to obtain the skilled talents needed for development from the college, and make use of the resources of the college to carry out multi-level staff training and continuing education, scientific and technological research, etc. At the same time, the government of the industrial agglomeration area actively guides the media to publicize the enterprises participating in the industry university research cooperation, setting an example for other enterprises, and encouraging them through project approval, taxation and commendation.

2.4 supervision and exit mechanism of stakeholders in Industrial College

In order to ensure the quality of running a school, the Institute of technology has established a supervision and management organization and a supervision and management system composed of multiple stakeholders to supervise and timely feed back the implementation of various systems, the improvement of teaching quality, the integrity of cooperative enterprises, and the use of teaching workshops. The safety problems of students' practice in enterprises are tracked and evaluated. The "exit mechanism" is introduced to the enterprises with problems and unqualified students in the enterprise learning. The enterprises that cooperate with the Institute to run the industrial college are also dynamically adjusted to ensure that the leading enterprises in the industry enter the cooperation scope of the industrial college.

2.5 innovation and development of operation mechanism

At present, in response to the requirements of the Ministry of education for the promotion of innovation and entrepreneurship education and the improvement of the system, the cooperative enterprises are committed to helping universities improve the management and operation system of the industrial college, upgrade the innovation and entrepreneurship education continuously through the construction of characteristic industrial parks by colleges and enterprises, and provide entrepreneurship platform for college students. Industrial entrepreneurship platform takes college students' industrial entrepreneurship as the main line of operation, integrates industrial entrepreneurship education resources, enterprise commodities, project resources and third-party service resources, so as to promote college students to improve their comprehensive entrepreneurial skills through the combination of theory and practice. Through the rich enterprise resources, teaching resources and management resources provided by the entrepreneurship platform, colleges and universities can realize the deep integration and joint construction of universities and cooperative enterprises, so as to improve the new school running institution of school enterprise integration. We should establish a cooperation mechanism of specialty co construction, talent co education, resource sharing, internship and employment promotion, and joint innovation, constantly pursue progress and open up a broader development space.

3. Conclusion

The sustainable development of the Institute of technology is inseparable from the sustainable acquisition of the interests of all parties. First, the local government should implement the relevant national policies to promote the integration of industry and education in light of local conditions, formulate operational implementation measures for the integration of industry and education, and provide preferential tax, land use, finance, loans and other aspects to enterprises participating in running schools in terms of evaluation and incentive. Second, the government should reduce pressure for schools. Before the state introduces the system design of mixed ownership, the local government should give overall consideration to the development of Vocational Education in regional industrial development planning, encourage and support vocational colleges to explore mixed ownership based on the original intention of improving the quality of personnel training, and establish the negative list system of school enterprise cooperation, fault tolerance and error correction system To stimulate the vitality of the school. Third, schools and enterprises should establish corresponding incentive mechanisms. For the development evaluation results are good, the management team should be rewarded in time. The fourth is to establish the internal incentive mechanism of the industrial college. By providing technical and training services to the society, the industrial college can obtain a certain amount of income and control the income with compensation. As a new mode of school enterprise cooperation in running a school, the Institute of industry offers professional courses according to the post demand and jointly cultivates the professional talents urgently needed by the society. Through learning skills and entering the post practice, the graduates have cooperative enterprises responsible for recommending employment. The

implementation of this process is inseparable from the innovation and development of diversified investment mechanism, management system based on Management Committee, optimization of resource integration mechanism and operation mechanism, so that universities and cooperative enterprises have no worries, actively carry out the integration of production and education, and complete the new challenges of national scientific and technological progress and rapid economic development to universities and enterprises. With the continuous development of the economic situation, the school running mode of the industrial college also requires colleges and enterprises to constantly adjust and advance hand in hand according to their own situation, which will eventually open up a new road of innovation and development.

Acknowledgements

Supported by The subject of the 13th five year plan of Jilin Education Science in 2020 (Research on the construction mechanism of Industrial College in Applied Universities under the background of Emerging Engineering Education)

References

- [1] Abstract of important vocational education documents of the State Council, Ministry of education and other relevant departments (second half of 2017) [J]. *Technology and education*, 2017, 31 (04): 44-63
- [2] Xuan Kui, Wang Hongcai. The basic elements of the core competitiveness of College of technology and the improvement path [J]. *Jiangsu higher education*, 2018 (9): 21-25
- [3] Wang Liangfen, Zhao Sainan. Discussion on talent training mode of strategic emerging industries [J]. *Science and technology of Chinese universities*, 2018 (11): 57-59
- [4] Cui Yanqun, Xu Liqing, Li Guosheng. An Empirical Study on generative curriculum in local applied universities [J]. *Chinese university teaching*, 2017 (5): 81-84
- [5] Liu Fucui. Analysis on the construction of Vocational College under the background of industry education integration [J]. *Journal of higher education*, 2019 (23): 64-66