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The "Six Difficulties" and "Six Solutions" in the Construction of Chinese-Style Industry Colleges: An Exploration of Institutional Reform in Industry-Education Integration

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Abstract: ***Developing Chinese-style industry colleges is a pilot and breakthrough move for the deep integration of industry and education in national vocational education, and a major measure for the reform of the vocational education system and mechanism in China. By exploring the macro policies of Chinese-style vocational education industry colleges and deeply analyzing the current situation of the construction of industry colleges, the results show that there are "six difficulties" in the construction of industry colleges, namely, the contradiction between public welfare and private interests, poor independence, difficult to mobilize teachers' enthusiasm, unable to make ends meet, loss of state-owned assets, and poor operation flexibility. In response to the "six difficulties," "six solutions" for the construction of industry colleges are proposed, namely, coexistence of public welfare attributes and private interests, independent asset management, improvement of the evaluation and incentive system, innovation of the system and mechanism construction, clarification of property rights, and enhancement of independent operation ability. Through these "six solutions," it is beneficial to build a community with a shared future for multiple subjects of industry colleges and promote the high-quality development of Chinese-style industry colleges.***

Keywords: Chinese-style industry colleges, Industry-education integration, Vocational education, Institutional reform.

1. Introduction

Vocational education is an educational type that serves the national strategy and regional economic development. Its main feature is the integration of industry and education, and among them, industrial colleges are a beneficial attempt to deepen the integration of industry and education in vocational education. Industrial colleges with the characteristics of mixed ownership were first proposed in the "Vocational Education 20 Articles" issued by the State Council, and their characteristics were further clarified in the Action Plan for Improving Quality and Excellence of the Ministry of Education. Establishing industrial colleges with the characteristics of mixed ownership is a symbol of the deep cooperation between schools and enterprises to build a community with a shared future for schools and enterprises, and it is also a pioneering move in the reform of the vocational education system and mechanism.

Industrial colleges are vocational education institutions jointly invested by multiple parties including the government, industry, enterprises, and schools to achieve the integration of industry and education and the joint cultivation of students by schools and enterprises. They are a major measure in the reform of the vocational education system and mechanism in China. In order to understand the current situation and existing problems of the construction of industrial colleges and put forward relevant countermeasures and suggestions, the research group started from the perspective of vocational education and carried out the research of "Investigation and Suggestions on the Current Situation of Chinese Vocational Education Industrial Colleges" by comprehensively using methods such as policy analysis, literature research, and empirical research.

2. Exploration of Vocational Education Industrial Colleges Based on Mixed Ownership

After the reform and opening up, the non-public economy has developed and grown, and diverse forms of ownership have developed together, providing a basis for the reform of the mixed-ownership school-running system. In May 2014, the State Council issued the "Decision on Accelerating the Development of Modern Vocational Education", clearly putting forward the active exploration of the development of joint-stock and mixed-ownership vocational colleges, allowing factors such as capital, knowledge, technology, and management to participate in school running. The mixed-ownership school running has shifted from the "spontaneous exploration" stage to the "active exploration" stage. As an important manifestation of the mixed-ownership reform, the vocational education industrial college is also a carrier of the integration of production and education for higher vocational colleges to jointly run schools with different organizations such as enterprises, industries, and the government, providing support for mixed-ownership school running. Subsequently, in important documents such as the "Action Plan for the Innovative Development of Higher Vocational Colleges", the "Several Opinions on Deepening the Integration of Industry and Education", the "Measures for Promoting School-Enterprise Cooperation in Vocational Schools", and the "Implementation Plan for the Reform of National Vocational Education" issued by the Ministry of Education, the General Office of the State Council, etc., the basic requirements for supporting the mixed-ownership school running of vocational colleges are put forward, and the expression has changed from "exploring development" to "encouraging development". The "Operation Guidelines for Modern Industrial Colleges (Trial)" issued in 2020 further

clarified the construction principles and seven major construction tasks of industrial colleges. In 2022, the "Vocational Education Law" clearly defined incentive policies such as rewards and tax preferences for enterprises that deeply participate in the integration of industry and education and school-enterprise cooperation from the perspective of legislation, making the exploration of the system and mechanism for establishing industrial colleges clearer and more mature. The basic requirements for mixed-ownership school running in this series of important documents constitute the basic policies for the running of industrial colleges.

Under the impetus of national policies, Various regions are exploring the construction of vocational education mixed ownership industry colleges in the field of vocational education. In order to accelerate the reform of mixed ownership and deepen the integration of industry and education, Shandong Province has been the first to issue the operable and standardized "Guiding Opinions on Promoting Mixed Ownership Education in Vocational Colleges (Trial)" in the national exploration of mixed ownership reform in vocational education. It has played an important guiding role in the mixed ownership education of vocational colleges in this province, and also demonstrated and led the development of mixed ownership education and related policies in other provinces and cities. In the mixed ownership education opinions issued in Jiangxi Province, it is proposed to establish a fault-tolerant and error correcting mechanism in accordance with the central "three distinctions" spirit, support and encourage vocational colleges to explore new models of school enterprise cooperation and industry education integration, combine the development of school undertakings with local industrial needs, and explore diverse, open, and integrated new models of education. Subsequently, Liaoning Province also proposed to encourage and support mixed ownership cooperation between enterprises and public vocational colleges, promote collaborative education between schools and enterprises, and provide technical and skilled talent support for the construction of a digital Liaoning and a smart manufacturing province. The introduction of policies on the integration of industry and education in various provinces has made specific requirements and standardized styles for the construction of mixed ownership industrial colleges that can be implemented.

3. Current Situation of the Construction of Chinese-style Vocational Education Industry Colleges

From the State Council's issuance of the "Decision on Accelerating the Development of Modern Vocational Education" in 2014, which clearly put forward the active exploration of the development of joint-stock and mixed-ownership vocational colleges, to the "National Vocational Education Reform Implementation Plan" in 2019, which clearly stated that "encouraging the development of joint-stock, mixed-ownership and other vocational colleges and various vocational training institutions", the state has begun to actively encourage mixed-ownership school running, and the mixed-ownership school running has entered a new stage of "encouraging development" from the stage of "active exploration". In order to break through the policy bottleneck, various provinces and cities have encouraged mixed-ownership school running with practical actions. Hebei and Shandong have successively issued the "Pilot Plan for Joint-Stock and Mixed-Ownership School Running in Vocational Colleges" and the "Guiding Opinions on Promoting the Mixed-Ownership School Running in Vocational Colleges (Trial)", standardizing the mixed-ownership school running from multiple aspects such as school running forms and school running management. At this time, Shandong Chemical Industry Vocational College has taken the step of the whole-institution mixed reform of public higher vocational colleges.

By sorting out the literature, the mixed-ownership school-running carried out by public vocational schools and social forces such as industry enterprises can be mainly divided into three categories. The first category is that vocational schools introduce social force capital such as industry enterprises to conduct an overall restructuring of the school and establish a mixed-ownership school with independent legal personality. For example, in 2020, Shandong Chemical Industry Vocational College launched a mixed-ownership reform. Shandong Water Conservancy Development Group Co., Ltd. "joined hands" with Shandong Chemical Industry Vocational College to conduct an overall mixed-ownership reform of public higher vocational colleges, which is also a breakthrough for large state-owned enterprises to participate in the overall reform of public higher vocational colleges [1]. The second category is that secondary institutions of vocational schools or a certain major are used as carriers to introduce social forces such as industry enterprises to establish a mixed-ownership secondary college (industry college) without independent legal personality. For example, Shandong Animal Husbandry Vocational College built an industrial chain professional group system of "from pasture to table" around the major, providing industrial support for professional construction. The third category is that vocational schools jointly build with enterprises using productive training bases or skill training bases. For example, Chengdu Industry Vocational College built a precision manufacturing in-school productive training base in the School of Equipment Manufacturing, introduced national high-tech enterprises with industry representativeness, provided the venue by the school and the equipment by the enterprise, established a R & D center independently operated and managed by the enterprise, with clear powers and responsibilities, and built a collaborative operation mechanism.

The "Six Difficulties" of Chinese style Vocational Education Industry Colleges

4. The Industrial College does Not have Independent Legal Personality, and as an Independent Entity Structure, There are Many Problems in Its Operation

4.1 The Contradiction Between the Public Welfare and Private Interests of the Industry College

Chinese-style vocational education industrial colleges have emerged under the strong promotion of governments at all

levels to facilitate the rapid transformation and upgrading of local economies and improve the quality of technical and skilled talent cultivation. In public vocational education, the government is the main sponsor, and the proportion of government investment is relatively high. Therefore, through government administrative intervention, the educational interests of industrial colleges are allocated and adjusted. The basic attribute of industrial colleges is public welfare, but with the entry of social capital and the involvement of enterprise-related transactions and cooperation, with the introduction of government financial funds and social capital, there must be a division of property rights and a clarification of the returns of state-owned assets and private capital. Once the public welfare of industrial colleges conflicts with the private interests of enterprises and the legitimate demands of all parties are not properly resolved, the enthusiasm of participating entities will be weakened, restricting the development of industrial colleges. In the operation of industrial colleges, all parties, including the government, industry, and enterprises, have different roles, functions, and practical needs. How to form a diversified interest system and coordinate the demands of different interest entities is an issue that must be considered.

4.2 Once the Assets of Industrial Colleges are Incorporated into the School, it Will Affect Their Independence

Generally, higher vocational mixed-ownership industrial colleges are organizational structures with independent operation capabilities jointly funded by schools and enterprises under the organization and leadership of local governments and education administrative departments. Industrial colleges are entity organizations with independent operation capabilities. Therefore, the independence of their operation needs to be guaranteed, which not only requires them to have the ability to operate independently but also requires them to have autonomy in asset management. At present, most industrial colleges are secondary colleges or internal institutions of schools and do not have independent legal person status. The assets of industrial colleges are often incorporated into the school's general asset account. Although many industrial colleges have operating organizational structures and corresponding rules and regulations, once their assets are incorporated into the school, the independence of their operation and decision-making will be greatly weakened. Enterprises are the material and financial guarantees for the long-term development of industrial colleges. The lack of independent operation ability of industrial colleges has, to a certain extent, weakened the motivation of enterprises to participate.

4.3 It is Difficult to Mobilize the Enthusiasm of Teachers within the Existing Institutional Framework of industrial Colleges

In the process of the construction of industrial colleges, teachers play a key role in talent cultivation, scientific research, curriculum development, and social services. Therefore, teachers in industrial colleges are crucial to the functioning of industrial colleges. Currently, the teaching staff of vocational education industrial colleges mainly consists of vocational education teachers, enterprise teachers, and industry teachers, among which school-based teachers are the focus. School-based teachers lack enterprise experience and practical abilities. In connecting school-enterprise courses, their teaching methods still follow those of higher vocational colleges and cannot teach students in accordance with their aptitude for the students in industrial colleges. Currently, some higher vocational industrial colleges include their teaching staff in the total number of school teaching staff and still manage the teaching staff uniformly according to the management regulations of secondary colleges, without forming an assessment and evaluation system for the teaching staff of industrial colleges. Generally, industrial colleges take the scientific research achievements of school-based teachers as the main indicators for year-end evaluation, professional title evaluation, etc. Therefore, teachers devote their energy to scientific research and have low enthusiasm for the integration of production and education. Although some industrial colleges have introduced corresponding incentive policies, they have not effectively improved teachers' enthusiasm for participation.

4.4 Generally, Industrial Colleges Cannot Achieve Self-sufficiency and Have Insufficient Momentum for Sustainable Development

The positioning of industrial colleges is an independent operating entity jointly established by vocational colleges and enterprises. However, most industrial colleges in China are secondary units of vocational colleges and are generally set up as non-profit and non-corporate educational institutions. The construction goal of industrial colleges is to make the integration of production and education and school-enterprise cooperation closer, information more unblocked, and rights and responsibilities clearer, but little consideration is given to the issue of profitability. The income of industrial colleges generally includes per capita financial appropriation, tuition fees, basic salaries of school teachers, and financial support from cooperative enterprises, etc. After the operation of industrial colleges, as the demand for operating funds increases, industrial colleges cannot achieve self-sufficiency. The interest goals of both parties in jointly building industrial colleges are not completely consistent. Schools hope to obtain industry teachers, student internship positions, production management experience, technical support, etc. from enterprises, while enterprises hope to obtain professional talents, technological innovation, etc. The ultimate goal of enterprises is to pursue economic benefits. Therefore, the inconsistency of goals will lead to insufficient momentum for cooperative development. In the absence of direct economic benefits, the executive power of enterprises in the construction and operation of industrial colleges decreases and their attitude becomes passive. Compared with vocational colleges, without financial investment, it will be difficult to ensure the investment in teaching software and hardware facilities. Therefore, the inability of industrial colleges to achieve self-sufficiency will affect their sustainable development.

4.5 Once an Industrial College is Set Up Outside the School, There is a Risk of Loss of State-owned Assets

Industrial colleges are generally jointly invested and founded by public capital and non-public capital, including private

capital, etc. However, some industrial colleges are located outside the school, beyond the school's supervision, and the definition and protection of the property rights invested in the industrial college are issues that urgently need to be resolved. The investors in industrial colleges participate in running vocational education in the form of joint ventures, cooperation, etc. The asset elements invested by each organizer include tangible assets such as capital, land, buildings, facilities, and equipment, as well as intangible assets such as knowledge, technology, brand, patents, management, and talents. Although in most cases when higher vocational industrial colleges are established, the school and the enterprise sign contracts related to property rights in accordance with the principle of equal negotiation to restrain the behavior of both parties and protect their respective rights and interests, due to the multiple nature of the investment in the mixed-ownership industrial college, the definition of property rights is relatively complex. A complete property right protection system is an important guarantee for the sound development of industrial colleges. Although the state has intensively issued relevant policy documents to encourage the construction of mixed-ownership industrial colleges, the issue of property right protection for industrial colleges is rarely mentioned. Not only does the existing laws and regulations in our country lack provisions on the property rights of mixed-ownership school-running, but there is also no detailed plan for property right protection in the education policy documents issued by the state. The lack of a property right protection system for mixed-ownership industrial colleges not only causes losses to the property rights of enterprises but may also lead to the loss of state-owned assets.

4.6 Industrial Colleges Run Independently, but Most of Them Belong to the Secondary Colleges of the School, with Poor Operational Flexibility

Currently, most of the established industrial colleges in China belong to the secondary colleges of higher vocational colleges, lacking independence and autonomy in running schools, and the relevant governance mechanisms are not Healthy, resulting in poor operational flexibility. The biggest difference between industrial colleges and the traditional secondary colleges of higher vocational colleges lies in the different construction subjects and governance models. Industrial colleges generally involve multiple subjects such as government, school, industry, and enterprise, with distinct characteristics of mixed ownership. The secondary colleges of public universities are generally internal non-entity institutions subordinate to the school. Under the administrative leadership of the school Party committee, they carry out teaching, scientific research, and social services in accordance with the requirements of the school. The secondary colleges generally implement the dean responsibility system. At present, the actual governance of many industrial colleges is dominated by higher vocational colleges. The enterprises participating in running schools basically obey the school's arrangements and participate in relevant affairs. Although many industrial colleges have formed a governance model of council decision-making, the secondary college-style management makes the functions of the council Void in name, resulting in the lack of a sound governance organization for industrial colleges. The highly centralized first-level management system of secondary colleges is obviously not suitable for the multi-governance management model of industrial colleges. As an entity, industrial colleges are difficult to play their school-running functions and management powers, and it is even more difficult to mobilize the participation enthusiasm of different subjects, leading to a series of problems such as low governance efficiency and poor operational flexibility.

5. The Road to Solving the Difficulties in the Construction of Chinese Style Vocational Education Industry Colleges

5.1 Maintain the Public Welfare Characteristics of the Industrial College and Pursue a Value Orientation That Combines Public Welfare and Private Interests

Industrial colleges take the main responsibility of cultivating technical and skilled talents, and adhering to the public welfare attribute is their basic characteristic. At the same time, integrating social capital into industrial colleges and taking into account their profitability is an inevitable requirement to maintain the participation enthusiasm of each capital investor. Industrial colleges must meet the return requirements of investors in order to effectively absorb the increase of capital and maximize the public welfare of education. The compatibility of public welfare and private benefit is the basis for the sustainable development of industrial colleges. Therefore, to promote the collaborative governance of industrial colleges, There should be a perfect one information disclosure mechanism, actively release information on the public affairs of industrial colleges, and timely reflect the demands of various interest groups. There should be a improve interest conflict coordination mechanism. Under the interest conflict, each participating subject can form a third-party interest mediation mechanism to effectively resolve the contradictions between both sides. The government should strengthen its educational responsibilities, actively guide school-enterprise cooperation, improve systems beneficial to the interests of all parties, and promote long-term school-enterprise cooperation.

5.2 Implement Independent Asset Management to Ensure Its Operational Independence

Industry colleges are independent operating organizations, with strong independence and autonomy in terms of investment entities, talent cultivation, technological innovation, operation management, etc. Therefore, in terms of asset management, industry colleges should be given independent asset management rights, and corresponding asset management rules and regulations should be formulated, implementing the asset management regulations of mixed - ownership units stipulated by the state. Industry college asset management includes fund management and the management of training equipment, office equipment, low - value consumables, etc. The school should set up an independent account for the industry college, and the school's financial department has the right to inspect, guide, and supervise the income and expenditure of the industry college's funds. The income obtained by the industry college according to the articles of association should be deposited into the school's independent account, and it enjoys the right of use in accordance with the regulations on the management of fund

use. Any changes in the assets invested by all parties should be deliberated and decided by the board of directors. Therefore, implementing independent asset management is the key to ensuring its operational independence.

5.3 Improve the Evaluation and Incentive System to Increase the Participation of the Teaching Staff

With the promulgation of the "Several Opinions on Deepening the Integration of Industry and Education", the state has intensively introduced various policy documents, encouraging full - time teachers in higher vocational colleges to go deep into the front line of industries and enterprises for practice activities, and at the same time attracting industry mentors to enter the classroom for teaching. The goal of talent cultivation in industry colleges is to cultivate high - quality technical and skilled talents highly compatible with the regional industrial chain, and the requirements for teaching staff are strictly different from those of general higher education. Therefore, industry colleges should establish an effective evaluation and reward and punishment mechanism for teaching staff. Starting from school management, diversify the evaluation methods, encourage full - time teachers to enter enterprises and training bases, and optimize aspects such as employment forms, performance appraisal, professional title evaluation, and class fee standards. At the same time, taking into account the economic benefits of enterprises, explore ways and measures suitable for the construction of teaching staff in industry colleges. Optimize the salary structure, establish a flexible salary distribution mechanism linked to the comprehensive school - running benefits, and salary can be paid in ways such as negotiated salary, project - based salary, and annual salary system to mobilize the enthusiasm and creativity of teaching and administrative staff.

5.4 Innovate the Institutional Mechanism Construction of Industry Colleges and Create a Market - oriented Profit Model

The sustainable development of industrial colleges requires continuous investment in human, financial, and material resources. Therefore, it is necessary to actively explore a market-oriented profit model, improve the management ability of industrial colleges, form the self-blood-making function of industrial colleges, and create a pattern of sustainable development. Most of the colleges and universities in industrial colleges are public institutions, and their financial income mainly comes from government appropriations, without the experience and awareness of enterprise operation. Therefore, it is necessary to innovate the institutional mechanism of industrial colleges, enhance their awareness of market competition, innovate the development mechanism, guide industrial colleges to further carry out the reform of mixed ownership, further optimize the capital structure, and encourage capital, technology, talents, etc. to participate in income distribution. Eliminate institutional barriers and encourage industrial colleges to take the initiative to create a profit model suitable for themselves. For example, income can be increased by carrying out social training and launching various chargeable training programs at all levels; by undertaking projects and providing technical services with their professional level. Only when the sustainable development of industrial colleges shows its return on investment to all sectors of society can it attract more capital to participate in the construction of industrial colleges. Therefore, in the development stage of modern industrial colleges, we must implement the new development concept, form a community with a shared future for school-enterprise cooperation, and create a market-oriented profit model.

5.5 Define Property Rights Ownership, Strengthen Property Rights Supervision and Protection

Industrial colleges are allowed to participate in school running 依法 with capital, technology, management and other elements and enjoy corresponding rights. Define the assets of each investor, including tangible assets such as land, capital, buildings, facilities, equipment, and intangible assets such as knowledge, technology, brand, patent, management, talent, and qualification. The co-organizers jointly entrust an intermediary agency with evaluation qualifications to legally evaluate the tangible assets, reasonably determine the amount of capital contribution according to the evaluation results, and record it in the property rights. The investment of intangible assets is negotiated by the co-organizers according to the principle of equality and is not included in the property rights. The property rights ratio of each organizer is determined by the investment ratio of the organizer. When a public vocational school is overall restructured into a mixed ownership, the school and the mixed ownership secondary college should be controlled by state-owned assets. The mixed ownership cooperation school-running project can be controlled by state-owned assets or non-state-owned assets. If a vocational school is invested by state-owned assets, it shall perform the approval procedures in accordance with the regulations, and the asset evaluation shall comply with the relevant regulations on the supervision and management of state-owned assets. The assets formed after the overall mixed reform of a public vocational school are the corporate property controlled by state-owned assets. The vocational school has the complete right of possession, use, and disposition and bears the responsibility; for the mixed ownership secondary college or the cooperation school-running project, the original ownership relationship of the assets invested by each organizer remains unchanged. After the assets are priced, an independent account is established in the general ledger of the public vocational school, and it has the right of use and disposition according to the articles of association and agreement, and is supervised by the relevant departments of the vocational school. In the current situation where the relevant laws on the property rights of the mixed ownership economy in China are not perfect, industrial colleges can standardize the property rights definition of school-enterprise cooperation in the form of document guidance, strengthen property rights protection, and prevent the loss of state-owned assets.

5.6 Empower and Enhance Efficiency, and Strengthen the Independent Operation Ability of Industrial Colleges

Clarifying the legal nature and status of the industrial college as an operating entity and endowing it with an independent legal person status is the key to forming a multi-governance system with deep participation from all parties. It is necessary to follow the laws of vocational education and the market economy, give full play to the role of important

school-running entities such as industry enterprises, abandon the top-down administrative model in the university management system, and establish a governance system with deep participation from multiple parties. By establishing internal systems to avoid traditional governance models, implementing the president responsibility system under the leadership of the council, improving the management model of the independent operation of the industrial college, establishing an independent governance institution outside the higher vocational college, and fully endowing the industrial college with the right to run schools independently. Solve the key problems of decision-making, organization and supervision in the operation of the industrial college, optimize the member structure, ensure that decisions take into account the interests of all parties, form a power restriction and supervision mechanism, reach a governance consensus, avoid possible differences in the cooperation process, and establish an operation governance framework with independent decision-making and efficient execution that conforms to the essential attributes of the industrial college.

6. Conclusion

Vocational education industrial colleges are born to meet the rapid transformation and upgrading of local economies and improve the quality of technical and skilled personnel training. At present, there are some problems in the construction and operation process. However, as long as multiple parties pool their ideas, solve the problems, build a community with a shared future for multiple parties in industrial colleges, and jointly participate in the process of economic development and technical and skilled personnel training, and improve in development, they will surely promote the high-quality development of Chinese vocational education industrial colleges.

References

[1] Huang, S. (2021). The reform of mixed ownership in vocational education in Shandong is entering the deep water area. *Educator*, (51), 10–11.

[2] Cui, P., Xu, Q., Zuo, H., et al. (2022). Evaluation of the effectiveness of innovation and entrepreneurship education and training based on the pyramid spiral model: Taking Shandong Vocational Animal Science and Veterinary College as an example. *Shandong Journal of Animal Science and Veterinary Medicine*, 43(12), 79–82.

[3] Yin, W., Sun, J., & Li, D. (2021). Research on the construction path and guarantee of industrial colleges in vocational colleges: Based on the case analysis of Nanjing City, Jiangsu Province. *Chinese Vocational and Technical Education*, (25), 22–27.

[4] Mi, L. (2022). Problems, attribute characteristics and construction paths of five-year higher vocational industrial colleges. *Hebei Vocational Education*, 6(6), 15–19.

[5] Zhu, Y. (2019). Practical puzzles and countermeasures in the construction of higher vocational mixed-ownership secondary industrial colleges. *Chinese Vocational and Technical Education*, (1), 61–67.

[6] Lai, M., Wang, H., & Zhang, W. (2022). Operational dilemmas and countermeasures of industrial colleges based on the integration of industry and education. *Journal of Fujian Polytechnic Normal University*, 40(4), 444–450.

[7] Yang, X. (2022). Research on the current situation and improvement path of the teaching staff construction in higher vocational industry colleges. *Journal of Hunan Post and Telecommunications College*, 21(4), 105–107.

[8] Zhu, J., & Zhang, W. (2021). Exploration of the profit model of industry colleges under the concept of sustainable development. *Chinese Vocational and Technical Education*, (31), 59–62.

[9] Su, Z. (2020). Current situation and reflection on the secondary management under the modern governance structure of higher vocational colleges. *Vocational & Technical Education Forum*.

[10] Lang, Z. (2023). Exploration on the construction of industry colleges in vocational colleges. *Hebei Vocational Education*, 7(1), 9–12.

[11] Chen, X. (2022). The connotative logic, operational constraints and development path of higher vocational modern industry colleges. *Education and Vocation*, (12), 28–35.

[12] Duan, M. (2021). Governance mode, problems and paths of higher vocational industry colleges based on the integration of industry and education. *Education and Vocation*, (16), 28–35.

[13] Chen, J., & Zhu, H. (2021). Construction of higher vocational industry colleges based on the mixed ownership reform: Value, problems and solutions. *Chinese Vocational and Technical Education*, (25), 28–34.

[14] Wan, W., & Zhang, F. (2020). Risks and control of mixed ownership vocational colleges. *Education and Vocation*, (3), 20–26.

[15] Lin, J. (2024). Construction of modern industry colleges: Analysis of major common problems and countermeasures. *Research in Higher Education of Engineering*, (1), 1–9.

[16] Wei, M. (2023). Realistic dilemmas and breakthrough paths in the construction of mixed-ownership industry colleges in higher vocational colleges. *Journal of Chengdu Normal University*, 39(1).

[17] Ge, G. (2025). Sustainable development of modern industry colleges in higher vocational education from the perspective of repeated games: Connotation, dilemmas, and strategies. *Research in Higher Education of Engineering*, (4), 144–148, 153.

[18] Qin, F., & Hu, C. (2024). Exploring the construction of a community with a shared future for industry colleges from the perspective of symbiosis theory. *Vocational Education Research*, (3).

[19] Zheng, L., & Zhao, Z. (2025). Research on the operating mechanism of industry colleges based on complex adaptive systems. *Journal of National Academy of Education Administration*, (12), 63–73.

[20] Zhang, X., Zhang, G., Qian, B., et al. (2021). Industry-education integration community in the industry college model: A case study of the School of Photovoltaic Technology at Changshu Institute of Technology. *Research in Higher Education of Engineering*, (5), 128–133.

[21] General Office of the Ministry of Education, & General Office of the Ministry of Industry and Information

Technology. (2020). *Guidelines for the construction of modern industry colleges (Trial)* (Jiao Gao Ting Han [2020] No. 16).

[22] National Development and Reform Commission, Ministry of Education, et al. (2019). *Implementation plan for national pilot projects of industry-education integration* (Fa Gai She Hui [2019] No. 1558).

[23] Xu, Y., & Li, X. (2023). Practical application research of industry colleges in higher vocational institutions: A case study of Kunpeng Industry College. In *Proceedings of the 2023 International Conference on Education, Management and Social Sciences*. Atlantis Press.

[24] Wang, L. (2024). Research on practical dilemmas and collaborative innovation paths of industry-education integration in higher vocational colleges. In *Proceedings of the 2024 International Conference on Humanities, Education and Social Sciences*. Atlantis Press.