Practical Exploration and Research on Industry-Education Integration in USST

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Abstract. This article summarizes the current research status of industry education integration at home and abroad, and explores the methods and achievements of cross industry education integration at Shanghai University of Technology. It analyzes the bottlenecks of university industry education integration and proposes several suggestions that can improve the energy efficiency of university industry education integration: universities need to analyze and grasp policy guidance, enhance cooperation between universities and research institutions, and interact with enterprises, Improve internal collaboration mechanisms and talent cultivation models.

Keywords: industry-education integration; medical-engineering interdisciplinary.

1 Foreword

The report of the 20th National Congress of the CPC stressed that we should promote integration of industry and education, science and education and promote the deep integration of innovation chain, industry chain, capital chain, talent chain. Generally, the initial integration of industry and education generally refers to school-enterprise cooperation and collaborative education, which is specifically aimed at vocational education. With the increasingly urgent need for industrial transformation and upgrading, the integration of industry and education has developed into the integration of industrial clusters and disciplinary clusters. The definition of "Education" in the Integration of Industry and Education is not only aimed at vocational education, but the entire higher education community has become an important participant.

In recent years, it has continuously issued a series of programmatic documents to promote the integration of industry and education in China: In December 2017, the General Office of the State Council issued Several Opinions on Deepening the Integration of Industry and Education[1], extending the integration of industry and education from vocational education to the entire higher education system; In September

[1] General Office of the State Council "Several Opinions on Deepening the Integration of Industry and Education", GBF [2017] No. 95, December 19, 2017: http://www.gov.cn/zhengce/content/2017-12/19/content_5248564.htm

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2019, six national ministries and commissions issued the Pilot Implementation Plan for the Construction of National Industry Education Integration[2], which regards deepening the reform of industry education integration as a strategic task to promote the structural reform of the talent supply side; In 2019, the State Council issued the Implementation Plan for Accelerating the Modernization of Education (2018-2022), proposing to improve the school-running mechanism of industry-education integration, adhere to the market-oriented, service-oriented development, and promote employment. It can be seen that the integration of industry and education in the new era is the integration of the national industry system and education system, and has become an important component of China's development strategy, including the transformation and upgrading of industrial structure The overall design and strategic considerations of higher education reform.

2 Research Status at Home and Abroad

In recent years, research on the integration of industry and education has become a hot topic in China. The author conducted a search on China Knowledge Network with the theme of integration of industry and education, and found that during the span from October 1, 2021 to October 1, 2022, a total of 3 753 academic papers were publicly published, including 2 315 papers on vocational education and 1 003 papers on higher education. Half of the papers on higher education are related to applied undergraduate education, while only a few research papers on this topic have been published, such as some "double top" universities in China, for example Xi'an Jiaotong University, Beijing University of Aeronautics and Astronautics, and Zhejiang University. Nearly 80% of the papers focus on theoretical and practical research in vocational education, skilled talent cultivation, and other aspects.

Due to industry demand and economic benefits, the foreign universities, especially private universities and colleges, focused more on the industrialization and socialization. Their scholars prefer mostly to the transformation of achievements. For example, Young Joo Lee's research on the transformation of industry and education [1], American universities' research on the social benefits of distance education and adult education [2], Elizabeth F. Ryder's research on the integration and transformation of disciplines when establishing community networks and developing open education resources [3], and Timo Aarrevaara's research on external stakeholders and internal practice content that are focused on when studying the teacher education system in European universities [4].

[2] National Development and Reform Commission "Notice on Printing and Distributing the National Pilot Implementation Plan for the Integration of Industry and Education", FGSS [2019] No. 1558, September 25, 2019:
https://www.ndrc.gov.cn/xxgk/zcfb/tz/201910/t20191009_1181933.html

3 Issues Arising from Research

Generally speaking, the depth of research on the integration of production and teaching varies among academic circles. We cannot ignore these practical issues, especially in terms of concepts, mechanisms, and evaluation, universities have been encountering new difficulties and challenges in reforming and exploring the integration of industry and education.

3.1 Conceptual Issues

There are generally two stereotypes regarding the connotation and extension of the integration of industry and education.

Firstly, industry-education integration is still regarded as the exclusive development mode of vocational education and applied undergraduate education, which has not yet been extended to the entire higher education. For example, the "14th Five Year Plan" of Shanghai [5], Zhejiang [6], and Jiangsu [7], as well as the 2035 Vision and Goal Outline, without exception, only regard "integration of industry and education" as an exclusive chapter for the modern vocational education system and the cultivation of technical and skilled personnel.

Secondly, the integration of industry and education is still understood as "school enterprise cooperation", and has not yet been upgraded to "the integration of the industrial system and the education system". In practice, the cognition of various parties to the integration of industry and education remains at the initial stage of school-enterprise cooperation and collaborative education, and based on this, the development of industry-education integration plans is limited to point-to-point integration, namely, such integration forms as a project docking project, a school docking one or several enterprises, and a discipline docking with the industries associated with it, It is difficult to establish an integrated form of industry and education within the framework of economic and industrial belts, and the effectiveness of industry and education integration is limited. [8]

3.2 Mechanism Issues

Both industry and education have not yet fully established an effective integration mechanism and operation mode.

There are many typical models of industry-teaching integration in foreign universities, such as the “cooperative education” model represented by the European Institute of Technology in the United States and the University of Waterloo in Canada, the “future factory” model represented by the University of Sheffield in the United Kingdom, and the “entrepreneurial university” model represented by Stanford University in the United States, In China, there are also “Innovation and Entrepreneurship Circle around Universities" (IECaU) represented by “Knowledge Economy Circle” by Tongji University, “Innovation Corridor” by Fudan University, and “Zero Bay” by Shanghai Jiaotong University. Universities have driven regional industrial transformation and development through knowledge spillovers and radiation. These success-

ful cases have all explored the coordination, linkage, operation, restriction, and security mechanisms between industry and education, and the cooperation between industry and education has expanded from point to line and surface, the vivid situation of "you have me, I have you" has been formed.

However, we should also note that the phenomenon of "two skins" between industry and education is still widespread. According to the relevant report of the Higher Education Teaching Evaluation Center of the Ministry of Education, at present, the depth of cooperation between industry and education in China's higher education is not enough, and cooperation remains mostly superficial. In terms of curriculum design, training program formulation, and providing engineering practice opportunities for teachers, the participation of enterprises is generally very low. [9] The educational system and the industrial system have different natures and operating mechanisms. The former aims at educating people and emphasizes long-term social benefits, while the latter aims at making profits and pursuing short-term economic benefits, resulting in the phenomenon of "hot schools and cold enterprises" in the process of industry-education integration. Although the two sides have established cooperative relationships, this contradiction cannot be reconciled, and enterprises often resort to speculative and short-sighted behavior, which puts universities in a dilemma., Cooperation has fallen into an awkward situation of survival. Building a long-term mechanism is the cornerstone for "integration of industry and education" to play a substantive role and promote systematic reform of higher education. [10] Some scholars pointed out that, "Contractual trust that relies on instrumental rationality is difficult to move towards deep cooperation. Only by establishing cooperative trust that emphasizes mutual benefit can we transcend shallow contractual cooperation and move towards deep integration and development." [11] It is the lack of mutually beneficial cooperative trust that leads to the inability of both industry and education to establish a long-term and sustainable integration mechanism and to form a strong relationship of active integration.

3.3 Evaluation Issues

Currently, there is still a tendency of "thesis oriented" evaluation of talents in universities. Colleges and universities often measure the external characteristics of a series of academic works, such as teachers' academic papers, influential factors or levels of published journals, citation times and citation rates of papers, academic works and their publishing house grades, invention patents, and products, and make evaluation results based on them, becoming the core focus of the academic evaluation in the field of higher education. [12] For example, in the field of materials in which Chinese technology is stuck, on the one hand, Chinese researchers have published numerous articles in world-renowned academic journals in the field of materials in the past decade; on the other hand, compared to American material manufacturing, we are in a generally weak position, with many functional materials and special materials needing to be imported. Under the baton of scientific papers, researchers are more enthusiastic about researching novel materials, and these achievements may be difficult to apply in industry for decades. [13] Numeric papers often become a common evaluation meth-

od due to their simple and quantifiable operation, while teachers' contributions to talent cultivation, promoting economic growth, and social development are not sufficiently valued and reflected in the evaluation. Therefore, college teachers' active participation in and promotion of industry-teaching integration inevitably lacks guidance, constraints, and incentives.

In the era of Big Health, facing the possible blockade of biomedical technology and supporting services imposed by developed countries, accelerating domestic substitution and independent innovation of high-end medical devices is particularly important and urgent. Universities should focus on the key areas of national science and technology strategy and refine scientific issues from the actual needs of the industry. The practice of medical and industrial intersection has proven that demand is the key to the integration of industry and education, and is the internal driving force for forming the integration mechanism of industry and education. The current changes and situation are giving the demands a rare window period: for universities, in the current surge of the new round of technological and industrial revolutions, there is often a phenomenon of knowledge inversion between universities and society, that is, new knowledge, new technology, new ideas, and so on are often first born from society, while universities have to keep pace with society and catch up with it.

Therefore, universities have a strong demand for reform, to solve the problem that the supply side of talent cultivation does not adapt to the demand side of industrial transformation and upgrading. For industries, in the context of fierce global strategic competition and intensified Sino American game, enterprises, as innovation entities, are increasingly realizing that key core technologies can only be held in their own hands without being stuck. Compared to the past, industries that have to deal with global competition have a stronger willingness to seek cooperation with universities. The needs of both industry and education have created unprecedented opportunities and possibilities for the integration of industry and education.

4 A Case Study of University of Shanghai for Science and Technology

The current integration of industry and education is only aimed at scattered multiple educational elements, lacking a platform based thinking of integrating and connecting industry, universities, and enterprise resources, and not achieving a true integration of industry and education. [14] In recent years, some universities in China have attempted some reforms based on the above three issues. The case of University of Shanghai for Science and Technology (USST) has a certain typicality.

The USST integrates advantageous disciplines such as optics, energy and power, machinery, and materials, and builds and develops biomedical engineering disciplines characterized by “medical devices”. It has more than 20 000 alumni in the medical device industry, teachers and students have directly participated in or led the establishment of a number of industry leading enterprises, including Micro Innovation, Mindray, Lianying, Anhan, etc. The USST faces the development of the biomedical industry in the new era Shanghai and the strategic needs of a healthy China, it pro-

motes interdisciplinary innovation and education across medical and industrial fields, and serves and leads the development of high-end medical equipment industry, and forms a vivid situation of industry-education integration. The USST use the following measures that taken in the case of medical and industrial cross integration.

4.1 Construct a Demand-driven Industry-education Integration Mechanism

In the pat a few years, the demand for innovation in the medical device industry continues to expand. The various schools of the USST have been involved in research in the field of medical devices. These schools have maintained close cooperation with major well-known hospitals in Shanghai and frequent communication with medical personnel, engineering in the hospitals. It seems that the hospitals have an urgent need for medical technology, such as surgeons who hope to develop domestically made circular needles for suturing skin; and the stemmatologists hope to develop instruments that quickly detect the type and quantity of oral bacteria; the anesthesiologists hope to have a method or machine that can measure the depth of anesthesia; meanwhile, the doctors of the military hospital hope to develop food that can be kept fresh for a long time for special combat readiness needs.

The teachers in USST are well aware that many pain points in clinical medical technology can be solved through engineering technology research and cooperation. The USST has condensed the clinical technical requirements proposed by doctors into projects, and organized professors and doctors to carry out docking. Through the integration and collaboration of multiple disciplines such as medicine, engineering, and science, the experts in medical and engineering areas could tackle clinical medical device problems, and work together to focus on consultation, such as high-end and mainstream medical devices or materials with high import dependency and urgent clinical needs. With the efforts of the both sides, the new groups have made some progress in the following projects, such as high-frequency surgical electrocautery, ultrasonic cutting hemostatic knives, disposable flexible cry ablation needles, to naked eye 3D display systems, magnetic controlled capsule endoscope robots, AI assisted image recognition and diagnosis systems, 3D printing biomaterials, a series of grounding gas, clinically urgently needed new medical device products and new medical technology tools have been produced.

In particular, after the outbreak of the COVID-19 in early 2020, the doctors of the Affiliated Hospital of Shanghai Jiao Tong University School of Medicine (SHSMU) proposed 39 urgent anti-epidemic projects. The group responded quickly and organized more than ten professor teams to carry out scientific research. Among them, the project of "COVID-19 and virulent pathogenic virus full-automatic detection system" completed the system prototype in three and a half months, realizing automatic nucleic acid detection from sample input to detection result output.

4.2 Establish a Collaborative Multi-party Industry Education Integration Platform

In order to promote the “medical industry intersection” industry education integration platform system, the construction of industry education integration platform is particularly important. University of Shanghai for Science and Technology has established a trinity platform through inter university collaboration, university enterprise cooperation, and technology transformation (can be found in Fig. 1).

(1) “2+X” mode cooperation platform

The USST and the SHSMU have established the Medical and Industrial Innovation Research Institute and the “Medical and Industrial Cross Graduate School”, and jointly established the Advanced Medical and Support Technology Research Institute with the Naval Military Medical University. On the basis of these two platforms, it has collaborated with the Shanghai Shenkang Hospital Development Center to further establish specialized research centers in the Yangtze-Delta region and first-class hospitals in Shanghai, for example, the Suzhou Branch of the Medical and Industrial Cross Innovation Research Institute, the Ophthalmology Branch of Shanghai First People's Hospital High End Medical Equipment, the Orthopedics Branch of Shanghai Sixth People's Hospital, the Smart Medical Optics Branch of Ruijin Hospital, and the 3D Printing Branch of Shanghai Ninth People's Hospital provide product clinical trial services for 10 incubating enterprises.

(2) Three supporting platforms. University of Shanghai for Science and Technology, together with the School of Medicine of Shanghai Jiaotong University, Shanghai New Micro Technology Group and the Institute of Microsystems of the Chinese Academy of Sciences, has built the Shanghai Medical Device Innovation and Transformation Platform, and has been approved as the Shanghai High end Medical Equipment Innovation Center and the Pharmaceutical Department Center of the CAE Member Academician Expert Achievement Transformation Center.

(3) "1+X" scientific and technological achievements transformation center. The USST use its own science park as the main body, then make medical device technology transfers and achievement incubation bases with local counties in Qingpu, Songjiang and Baoshan districts, etc. The operating mode of the platform system is to organize experts to condense the clinical needs proposed by doctors into projects, and then the teachers can lead graduate students to complete technical breakthroughs through interdisciplinary cooperation. On this basis, the platform then introduces government guided funds, enterprise investment, or private venture capital to projects with industrial value, facilitating the transfer and transformation of technological achievements and the incubation of start-up companies. Since 2019, nearly 300 projects have been launched jointly by doctors and professors, and 94 incubation agreements have been signed, of which more than 10 projects have completed enterprise registration within the construction period. Participate in 12 key industrialization projects of joint research and development through expert argumentation and financial support. Among the five medical and industrial cross achievement incubation compa-

nies that have been established, one company has completed two rounds of financing within less than a year of its establishment, with a valuation of 150 million yuan.[3]

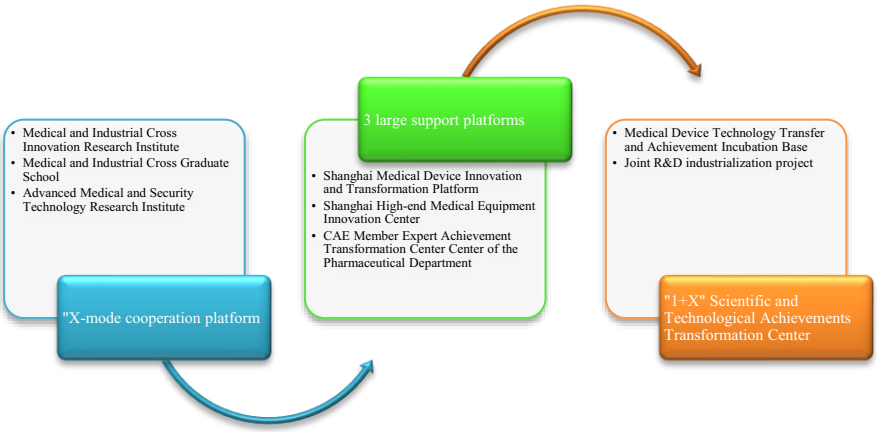

Fig. 1. A "Trinity" industry-education integration platform of USST.

Through the above trinity model, the industry-education integration platform plays a role in integrating cutting-edge innovation resources. By introducing first-class innovation projects, gathering resources and forces from all parties to effectively integrate and integrate technological innovation resources from universities and scientific research institutions, clinical practice resources from medical schools and hospitals, government resources, and commercial and financial resources, a collaborative innovation chain resource integrating engineering, demand, technology, industry, and capital for high-end medical equipment has been constructed, promoting the close coupling of politics, industry, education, research, utilization, and finance. It has solved the long-term and high investment problems that have plagued the industrialization of high-end medical devices, rapidly promoting the industrialization of innovative projects, and providing a solid guarantee for promoting the integration of industry and education in the intersection of medical and industrial fields.

4.3 Promote the Deep Integration of Innovation Chain, Talent Chain and Industrial Chain

In terms of deep integration of the innovation chain and the industrial chain, university teachers extract major topics from the practical problems of medical and industrial intersection, which is conducive to cultivating major original innovation. Clinicians propose requirements, and engineering teachers develop and develop on demand, making research and development closely combined with market demand, with a

[3] The above data is sourced from the annual reports (2017-2019) of USST.

promising prospect for the transfer and transformation of technological achievements, it can meet the increasingly urgent need of the biomedical industry to transform and upgrade small medical devices to high-end medical equipment. In terms of deep integration of talent chain and industrial chain, first, medical and industrial cross scientific research projects bring together talents from different disciplines to solve problems and jointly tackle key issues, forming a magnet effect of attracting talents.

In recent years, as a local university, the USST has attracted the full-time participation of the world's top strategic scientists, and has also independently trained “Yangtze River Scholars”; The school has over 800 teachers directly involved in medical and industrial cross innovation and education, including over 10 national level talents and over 100 provincial and ministerial level talents. The second is that medical and industrial cross projects have provided the industry with urgently needed versatile talents. The university has adjusted its enrollment plan according to the type of medical work, established selection criteria that meet the requirements of medical personnel training, established a system framework, established a team of internal and external tutors, and formed a new model of hospital workstations and project led cultivation of outstanding medical and industrial composite talents. In total, it has trained more than 1000 medical and industrial composite talents to enter medical related enterprises for internship and employment, filling the demand gap of about 65% for high-level medical and industrial composite talents in the medical industry, 80% of graduates are employed in medical related enterprises, and the input of these medical and industrial talents has reduced the employee training costs of enterprises by about 45%. Universities have fully integrated innovation and talent chains into the industrial chain, becoming an important link in the industrial chain.[4] They have established a new relationship with the industry, promoting the autonomous control and upgrading of original industrial technology. In the "chain" integration of industry and education, an organic interaction between universities and industrial development has been formed.

5 Analysis in Promoting the Integration of Industry and Education

In the past, the university function to serve the society often remained at the initial stage of traditional collaborative innovation between schools and enterprises, limited to point-to-point cooperation between schools and enterprises, with limited driving effect on industrial and regional development. However, relying on the medical and industrial cross innovation and education system, innovative ideas derived from clinical needs, technical support from multiple disciplines in engineering, interdisciplinary medical and industrial graduate students, government oriented policies and support funds, private venture capital Innovative elements such as entrepreneurial service management have been effectively gathered. In the process of industry-university integration, it is not enough for colleges and universities to rely solely on their own

[4] The above data is sourced from the annual reports of USST HR department.

fighting alone, but more need to receive policy support and the dividend radiation of educational reform itself; In other words, it is necessary to give full play to the advantages and positive roles of the government, the higher education system, and universities.

5.1 The Promoting Role of the Government

The government should have a positive role in promoting the integration of industry and education, and we can understand from the following three aspects.

Firstly, the government should strengthen the policy guidance and institutional supply of industry education integration fields. In the context of promoting the integration of industry and education at a high level in the country, governments at all levels particularly need to understand and grasp the new connotation of industry and education integration and its role in the overall national strategy, extend industry and education integration from vocational education to the entire education system, pay more attention to institutional support and mechanism guarantee, incorporate industry and education integration into regional, educational, industrial and other sub plans, and support various colleges and universities to actively serve deeply integrate into regional and industrial development, increase policy supply, and truly promote the integration of industry and education into action through project guidance, tax incentives, evaluation guidance, and other means.

Secondly, the government should establish a platform between universities and enterprises. The medical industry intersection of the USST benefits from the support of the government. With the support of the government institutions, the USST builds a Shanghai High end Medical Equipment Innovation Center with seven partners, it's currently the only manufacturing innovation center in Shanghai in the field of biomedicine, and plays a significant role in promoting medical industry intersection innovation and talent cultivation. The platform built with government assistance is easier to gather and absorb multiple resources such as government, industry, university, research, and use, forming a chain effect.

Thirdly, the government should help break through the obstacles in the transformation of achievements and do a good job as a shopkeeper. Taking the medical engineering intersection of USST as an example, medical devices must complete the testing, reviewing, and registration process, and obtain a registration certificate before they can be listed. Medical devices also need to undergo preclinical testing. Clinical trials are generally conducted by enterprises contacting hospitals themselves, and the willingness of hospitals to cooperate is generally not high. This requires the government to strengthen reform in system design, explore green channel mechanisms, and shorten the medical device certification cycle, establish a medical device clinical trial coordination service platform, introduce medical device clinical trial licensing, incentive policies, etc., to accelerate the industrialization process.

5.2 Promote the Reform of "Breaking the Five Standards" Education Evaluation

For higher education, it is necessary to actively implement the requirements of the "Overall Plan for Deepening the Reform of Educational Evaluation in the New Era" establish an educational evaluation system that promotes the integration of industry and education, especially guide various colleges and universities to actively serve the major national strategies and industrial development needs, cultivate innovative talents that match them, focus on investigating their contributions to industrial transformation and upgrading, and compare the evaluation results with other universities; it is also necessary to undertake the expanding autonomy of running schools and explore the reform of breaking the five rules in educational evaluation. Teachers engaged in the integration of industry and education often have outstanding practical abilities, while their theoretical and scientific research abilities are relatively weak, so that they are at a disadvantage in terms of professional title evaluation.

The USST has given full leadership to interdisciplinary team leaders, implemented overall team assessment, and guided talent evaluation by ability, performance, and contribution. It is also necessary to explore and improve a comprehensive evaluation system for representative achievements, transformation of scientific and technological achievements, and interdisciplinary scientific research with medical and industrial characteristics, this has enabled interdisciplinary innovation oriented to industrial needs to be recognized and encouraged, greatly mobilizing the enthusiasm of teachers to engage in industry-teaching integration. In addition, in the medical and industrial cross innovation system supported by scientific and technological innovation, talent cultivation, and achievement transformation, multiple entities such as governments, social organizations, enterprises, and investment and financing institutions participate in the evaluation of scientific and technological achievements, which leads to the formation of multiple evaluation standards and effectively guides scientific and technological workers to write papers on the land of the motherland and at the forefront of the industry. With these methods, the teachers engaged in the integration of industry and education can obtain new promotion channels.

5.3 Promote Interdisciplinary Innovation and Organized Scientific Research

Industry is the main battlefield of technological innovation, and industry is an integrated complex giant system. Therefore, industrial technological innovation must also be interdisciplinary innovation. In the process of promoting the integration of industry and education, colleges and universities should not be limited to a certain teacher, a certain team, a certain discipline, and enterprises to carry out peer-to-peer cooperation. Instead, they should use the efforts of the entire school to promote the docking of discipline clusters and industries, carry out organized scientific research, and shift project organizations from passive to one-way proactive planning based on industry needs. They should cultivate and layout platforms as needed, and establish a mechanism for accurate and rapid discovery of high-quality achievements.

In order to promote the integrated development of various disciplines and medicine, and make each discipline an export of medical and industrial interdisciplinary technology applications, the USST has established the Medical and Industrial Interdisciplinary Innovation Center, which mainly performs the following responsibilities: First, both medical and university sides regularly communicate new needs, new methods, and new progress, organize peer-to-peer communication between teachers and doctors, and designate dedicated personnel to provide tracking and coordination services; The second is to establish a batch of special guidance projects for the construction of medical and industrial cross innovation every year, organize project selection, application, and expert review based on the collected needs, and organize interdisciplinary teams to carry out research on medical and industrial cross projects; Third, coordinate multiple resources such as hospitals, enterprises, scientific research institutions, and finance, and use the Spark a prairie fire and Yangpu District Growth Fund achievement transformation plan as the driving force to invest support funds in mature projects, and provide full chain support services; Fourth, coordinate a professional technology transfer service team to continuously track the progress of various projects, disclose, cultivate, and incubate projects with industrialization potential in advance, and lay the foundation for subsequent achievements transformation. This demand oriented, project led, interdisciplinary innovation organization and management model is a powerful booster for the integration of medical, industrial, and teaching.

6 Conclusion

The integration of industry and education in universities is an important component of the future development of Chinese universities, and promoting the integration of industry and education in schools is not a one-time achievement. Overall, universities can focus their thinking on the following aspects:

Firstly, the universities should learn to analyze and master the policy guidance of the government and higher-level authorities. Chinese universities are to some extent constrained by higher-level departments when formulating their own policies. Therefore, when establishing the policy and direction of industry education integration in universities, it is necessary to carefully consider and find a development path that is suitable for the characteristics of the university itself.

Secondly, the universities must enhance effective cooperation between higher education institutions and research institutions. The distribution of majors varies among higher education institutions, and their research directions also have their own characteristics. Through exchange and cooperation between universities, promote collaboration between universities and research institutions, and explore the possibility of further integration of industry and education in interdisciplinary areas.

Thirdly, the universities can strengthen the interaction between university research and enterprise practice. Inter school collaboration, school enterprise cooperation, and technology transformation. When dealing with the integration of industry and education between universities and enterprises, it is necessary to clarify the advantages and priorities of both parties. Universities should undertake research tasks in cooperative

secondary schools, while enterprises are responsible for practicing, analyzing, and optimizing research results.

Fourthly, the universities should improve internal collaboration mechanisms and talent cultivation models. the university itself could optimize departmental collaboration mechanisms, and provide support for the integration of industry and education, and provide policy guarantees; in addition, it is also necessary to strengthen the construction of a team of professionals in the integration of industry and education, in order to ensure the continuity of the integration of industry and education.

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