

## **A Study on the Innovative Driving Path of Industry Education Integration in Applied Undergraduate Universities in the New Era**

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### **Abstract**

The integration of industry and education in the new era has risen from the level of institutional supply to a national strategy. In the new era, the integration of industry and education in application-oriented undergraduate colleges and universities realizes the integration and complementarity of resources in application-oriented undergraduate colleges and universities. It is an innovation driven collaborative upgrade between schools and enterprises, which is of great strategic significance for enhancing the independent research and development innovation capabilities of enterprises, driving the transformation of original innovation achievements and industrial incubation, enhancing China's overall scientific and technological innovation capabilities, and building an innovative talent training model for application-oriented undergraduate colleges and universities. The integration of industry and education is an important convergence point for vigorously promoting the supply side structural reform of education and fully implementing the innovation driven development strategy in the new era, and higher education institutions are an indispensable key and core link in the industry education integration chain. This study provides a perspective on the current situation of industry education integration in applied undergraduate colleges and universities, and analyzes the feasibility of the industry education integration model in applied undergraduate colleges and universities based on supply side reform and innovation driven theory. By constructing a corpus and analyzing key factors, this paper analyzes the risk and benefit impact, risk and benefit types, and risk and benefit management of the integration of industry and education in applied undergraduate colleges and universities. Based on theories such as game selection, game analysis, individual rational constraints, and subjective rational manifestation, A comprehensive discussion from multiple perspectives on the operational mechanism of deep cooperation and integration between applied undergraduate institutions and enterprises, and an exploration of the dynamic risk sharing and benefit sharing mechanism of industry education integration. Based on the perspective of "integration theory", a model of industry education integration in applied undergraduate colleges and universities is proposed, which is based on long-term, close, and stable cooperation and driven by innovation. Based on the actual situation of applied undergraduate colleges and universities in China, taking the Guangdong Provincial Department of Science and Technology's provincial-level project "Guangdong Cold Chain Standardization Engineering Technology Research Center" jointly built by Guangzhou University of Business and Guangdong Bayer Cold Chain Logistics Company as an example, this study explores the innovative driving mode and path of industry education integration in applied undergraduate colleges and universities from the perspective of supply side reform, Explore how to rely on supply side reform measures to eliminate the distorted allocation of production factors in application-oriented undergraduate

colleges and universities, and expand effective and high-end application-oriented undergraduate colleges and universities through innovation driven integration of production and education supply. Based on the empirical part of the corpus and model analysis, this article draws conclusions and path recommendations.

## Keywords

New era; Innovation driven; Integration of industry and education ; Applied undergraduate universities.

## 1. Introduction

In the new era, it is advisable to strengthen the construction of the national innovation system in the new era, strengthen strategic scientific and technological capabilities, deepen the reform of the scientific and technological system, and establish a technology innovation system with enterprises as the main body, market as the guide, and deep integration of industry, academia, and research. The Outline of the National Medium - and Long Term Science and Technology Development Plan (2006-2020) proposes to comprehensively promote the construction of a national innovation system with Chinese characteristics, with the creation of enterprises as the core and the collaboration of industry, academia, and research as the breakthrough point, and significantly improve the country's independent innovation capacity. It can be seen that in the new era, achieving the integration and deep cooperation of applied undergraduate and higher education resources has significant strategic significance and policy basis for enhancing the independent research and development innovation ability of enterprises, driving the transformation of original innovation achievements and industrial incubation, enhancing China's overall scientific and technological innovation ability, and constructing a new talent training model for applied undergraduate and higher education.

Entering a new era, reform is driving itself onto the fast lane with the help of innovation and the overlapping of the times; With the integration of manufacturing and modern service industries, the integration of industry and education has become a necessary and social consensus for the development of the new era. The integration of industry and education, as a major policy, has been included in major documents related to the construction of the "Double First Class", the transformation and development of local undergraduate universities, the construction of modern vocational education systems, and the fields of industry, technology, and talent, becoming a hot topic in national education reform. The deepening of supply side reform in the field of education has a profound impact on industry education integration cooperation in terms of factor resources, industrial clusters, and policy environment. Therefore, how application-oriented undergraduate institutions can leverage the integration of industry and education to drive innovation and cultivate new driving forces and advantages in the new era has become a hot topic, providing inspiration and guidance for this study.

## 2. Literature References

### 2.1. Literatures

Through sorting out, relevant domestic and foreign research mainly focuses on three aspects: the driving mechanism of industry education integration, the model of industry education integration, and the performance evaluation of industry education integration:

The topic of why the education and industry sectors should cooperate on the driving mechanism has always been a hot research topic among foreign scholars. Foreign scholars generally believe that the integration of industry and education is actually an informal virtual organization with a certain degree of independence and autonomy. Most scholars believe that

enterprises and higher education institutions can promote labor productivity improvement and accelerate the marketization process of products through mutual learning and strong cooperation (Hayton et al, 2010; Chesbrough H et al, 2011). Some scholars have pointed out that the driving mechanism for cooperation between enterprises and schools comes from organizational forms that can ensure market competitiveness while maintaining the independence of schools and enterprises (Pierre V, 2012; Brostrom, 2012). At the same time, some scholars have conducted research from the perspective of specific characteristics of industries and the characteristics of enterprises themselves, believing that the motivation for enterprises to participate in industry education integration and how to participate in industry education integration models are closely related to the characteristics of the industry or industry in which the enterprise is located, as well as the characteristics of the enterprise itself (Ankrah et al, 2013; Bowman et al, 2013). In recent years, scholars have conducted further research and pointed out that not all industry education integration is beneficial for the development of enterprises. Only those industry education integration that are suitable for the innovation knowledge foundation of enterprises can play a role in promoting enterprise development (Antonio Stratos et al, 2016; Roy et al, 2017). DV Gaines (2013) studied the integration model of industry and education in applied undergraduate colleges and universities, starting from the integration of technology in education, business, and industry, and studied the factors that affect the integration model of industry and education in applied undergraduate colleges and universities. The research conclusion pointed out that the challenges faced by teachers in applied undergraduate colleges and universities in applied undergraduate education are related to industry and industry A metaphorical comparison of the challenges faced by employees in business society and industrial industries. Understanding the limitations faced by applied undergraduate teachers and employees of industrial and corporate companies in similar work environments on a daily basis is crucial, mainly because technological changes often lead to rapid changes in all work environments. In recent years, some scholars have also studied the integration of industry and education in universities from the digital perspective, such as the current situation of the integration of industry and education in application-oriented undergraduate universities from the perspective of "Internet plus" and the corresponding "Internet plus" countermeasures, Propose a comprehensive reform path for applied undergraduate and vocational colleges based on the integration of industry and education (D Liu, 2020; H Li et al., 2020; Hart, Amy, 2021; Lance Wentzel et al., 2022). Education and welfare states: The eastward expansion crisis of the four world EU countries in capacity production is caused by the eastward expansion problem, but its root is far from this problem. J Allmender&S Leibfried (2003) studied the process of European integration from a macro perspective and believed that European integration is the core of territorial prosperity; Integration has developed around the concentric circular structure of the center. The emergence of this concentric circle structure pattern, as pointed out in this study, is driven by the dialectical relationship between integration and expansion. As the expansion process reaches its limit, different forms of EU integration may emerge, resulting in different categories of EU members; This research conclusion has been confirmed in recent regional studies (MC Guisan&P Exposito, 2021; Hart, Amy, 2021). In recent years, foreign literature has mainly analyzed the integration of industry and education from the perspective of enterprises, empirically studying the relationship between employer flexibility and achieving student career development, and pointing out that employer flexibility can positively promote student motivation. There are also studies indicating that employer plans with higher flexibility have a positive impact on organizational culture and employee morale (N Arthur Mensah, 2021; L Bao, 2022). In recent years, research has also focused on the role of the "three spirals" of industry education integration strategy. This type of research is mainly empirical research, using "future foresight" as a mediating variable to study the impact of mergers and acquisitions effectiveness

in the higher education industry from the perspective of enterprises. These results indicate that government support, competition intensity, and knowledge creation ability are positively correlated with the effectiveness of enterprise mergers and acquisitions, These relationships are regulated by future foresight (ZS Sajwani et al, 2021; Hart, Amy, 2021). In recent years, foreign literature research has focused on exploring the concept of corporate social responsibility (CSR) from the perspectives of corporate social responsibility and organizational cognition, in order to analyze the relationship between the organizational cognition of small and medium-sized enterprises, the integration of corporate social responsibility, and sustainable business performance (SBP). It is necessary to incorporate corporate social responsibility into educational cooperation development plans and link the adoption of corporate social responsibility with a hierarchical system (Lance Wentzel et al, 2022). Domestic research mainly focuses on three aspects: driving mechanism, operating mechanism, and benefit distribution mechanism. Zhai Meirong et al. (2013) conducted in-depth research on the coupling laws of industry education integration and its mechanisms from the dual perspectives of systems theory and process theory, and explored the design principles, evaluation indicators, and construction methods of industry education integration mechanisms. In recent years, scholars have started to study the operating mechanism from case studies. Domestic scholars mostly start from their own actual cases of universities, explore specific operating mechanisms suitable for their own regions and schools, and introduce universal operating mechanisms (Liu Maoyuan, 2017; He Yubing, 2017). In the actual process of strengthening the implementation of industry education integration, the conflict of interests between schools and enterprises has always been an inevitable and important aspect that restricts the deepening of industry education integration. Therefore, in recent years, research on the interest mechanism of industry education integration has gradually increased. For example, Li Bozhou (2013) classified intermediary organizations as the innovation income distribution subject of enterprises in industry education integration, and analyzed the income distribution problem between the two parties in industry education integration. Many scholars have adopted the "three helix" theory to study the efficiency and influencing factors of innovation in the integration of industry and education in high-tech industries (Liu An, 2011; Zhuang Tao, 2015; Li Xiaoming, 2015).

Regarding cooperation models, research on the integration of industry and education in foreign countries is relatively mature. The academic community mainly divides the integration of industry and education into models represented by Germany's "binary system", the United States' "school led cooperative education program", Japan's "enterprise led industry school cooperation", and Australia's "industry led TE-FA". Some scholars have pointed out that the model of integrating industry and education can establish a closer relationship between schools and society through cooperative education (Johan B&Pablo D'Este, 2010; Antonio M P, 2011). Some scholars, such as Sharabati Shahin (2013), have pointed out that the model of industry education integration is an applied learning paradigm, which must be jointly guided and completed by higher education institutions and enterprises; Through in-depth cooperation between schools and enterprises, talents can master practical production technologies or skills, thereby effectively cultivating competitive human resources in the market. In terms of content, the integration of industry and education in China usually involves the joint training of talents by applied undergraduate institutions and enterprises. The research on the integration of industry and education in the domestic academic community is diverse. Scholars such as Lin Runhui (2012) have conducted research from a practical operational perspective, believing that the existing integration models can be divided into two categories: enterprise based cooperation and school based cooperation. In recent years, scholars have started with case studies and conducted case analysis on the integration of industry and education based on practical exploration. They have concluded that the appropriate selection of the operation

mode of industry and education integration is significantly related to its depth (Wu Wei et al., 2015; Dai Yong, 2016; Zhu Shaoying, 2016; Qi Ershi, 2016). Recently, some scholars have also studied the phenomenon of industry education integration in policy forms, summarizing several main stages of the evolution of higher education industry education integration policies: the stage of close coupling between industry and education, the stage of loosening industry education ties, the stage of restoring industry education relations, and the stage of industry education integration. The functions played by the subjects in each stage are different. In the mature stage, the main focus is on interest oriented mechanisms, gradually transitioning to value realization and cultural integration; Based on the game structure between "instrumental rationality in pursuing economic benefits" and "people-oriented value rationality" of decision-makers in the integration of industry and education, as well as the "matching" problem of various resources in the integration of industry and education, this study investigates the various deep-seated factors that affect the implementation of higher education industry and education integration policies. It is pointed out that breaking through the implementation dilemma of higher education industry and education integration policies requires decision-makers to return to their focus on "people" and solve the distortion of resource elements, Resolve the communication gap between industry and education integration; Deepening the Integration of Industry and Education in Higher Education (Shen Jie et al., 2021; Yang Guangqi, 2022; Zhou Haiying, 2022). In recent years, some scholars have also studied the close relationship between school administrators and industry and teaching under the background of industry education integration. From the perspective of teaching management, they have studied how to use industry education integration as a link to improve the quality of talent cultivation, promote the depth of integration, and form a collaborative mechanism between industry and teaching (Liu Rui, 2022; Qi Yuanyuan, 2022; He Lifen et al., 2022).

One of the implementation goals of the integration of industry and education in higher education regarding performance evaluation is to efficiently enhance the competitiveness of enterprises while improving the quality of higher education. Therefore, the implementation effect and corresponding performance evaluation of this cooperation model have always been the focus of researchers, and many foreign scholars evaluate the performance of industry education integration through various methods. Scholars such as Hayton (2010) have empirically estimated the contribution rate of industry education integration model to industrial innovation, and empirically demonstrated the relationship between academic cooperation and new product research and development. In recent years, more scholars have evaluated the integration of industry and education by exploring and analyzing actual cases, with a particular emphasis on in-depth analysis of the ultimate benefits, benefit distribution mechanisms, and risk bearing of all parties involved in industry and education integration (Antonio Stratos et al, 2016; Roy et al, 2017). Most domestic scholars believe that the essence of the integrated talent cultivation model of industry and education is a talent cultivation model that integrates production, teaching, and research. The academic community generally agrees that it is necessary to drive talent cultivation through innovation, increase the construction of teaching staff, and build a reasonable education evaluation mechanism, To facilitate and improve the connotative development of talent cultivation and comprehensively enhance the level of innovative talent cultivation (Zhang Xiufeng, 2015; Dai Yong, 2016; Gao Fenglan, 2017). Scholars have also compared and analyzed the talent cultivation models of applied undergraduate education in countries such as Germany, the UK, and the US, and proposed that the fundamental to deepening the integration of industry and education lies in building a strong operational support system and performance evaluation (Zhu Shaoying, 2016; He Yubing, 2017). In recent years, scholars have conducted research from the perspective of financial capital. For example, Liu Maoyuan and Gao Fenglan (2017) pointed out that with the deepening of reform and opening up, the integrated education and industry model should be combined

with the promotion of social resources, especially social capital. Under the integrated education and industry model, the continuous practice of deepening the integration will attract more sufficient capital inflows. Therefore, it is recommended to evaluate performance from the perspective of capital return rate.

## 2.2. Reviews.

At present, the academic community at home and abroad has a relatively deep understanding and research on the theory and practice of industry education integration innovation driven talent cultivation, and has elaborated and analyzed from multiple perspectives. However, due to the diversity, heterogeneity, and complexity of the forms of industry education integration, especially the influence of objective conditions, historical background, and heterogeneous demands of different stakeholders in different stages and periods, there are research shortcomings and corresponding innovative points in this study as follows:

1) The perspective is limited, and current literature rarely conducts comprehensive research based on new perspectives. Most studies only focus on a single theoretical basis, which leads to incomplete and reasonable explanations of talent cultivation driven by industry education integration innovation, and also makes it difficult to guide industry education integration practice. Therefore, this study will be based on research on industry education integration innovation talent cultivation models at home and abroad, extract their common characteristics, and compare typical successful industry education integration from multiple perspectives and related research, Based on the current background of China's education supply side structural reform, a new perspective can be extracted to scientifically explain the deep cooperation and innovation driven model between applied undergraduate institutions and enterprises.

2) Most existing studies have paid little attention to the actual influencing factors that affect the selection of industry education integration models, and there is a lack of optimization analysis of school enterprise innovation collaboration paradigms that combine specific contexts and disciplines. Especially, research specifically focused on the integration of industry and education in the specific field of applied undergraduate colleges and universities is very limited. Therefore, this study will combine the specific proposition of "applied undergraduate colleges and universities+industry education integration", Clarify the influencing factors and analytical framework of talent cultivation effectiveness in applied undergraduate colleges and universities, and quantify the degree and proportion of correlation between the influencing factors of cultivation effectiveness; On this basis, further construct the mechanism and model for the formation of the driving effect of in-depth cooperation and innovation between applied undergraduate institutions and enterprises.

3) There is relatively little research on the integration of industry and education, which combines system dynamics, numerical simulation, and empirical case studies to deeply explore the effectiveness of industry and education integration. Therefore, the research on the complex formation effects of influencing factors on the mechanism of innovative talent cultivation in industry and education integration is not in-depth enough. Therefore, this study will be based on the research of relevant industry education integration mechanisms, establish a comprehensive impact mechanism system for in-depth cooperation between applied undergraduate universities and enterprises, empirically analyze the specific mechanism of innovation driven action in the process of talent cultivation through in-depth cooperation between applied undergraduate universities and enterprises, propose a more scientific and reasonable operating mechanism system based on the research, and conduct empirical testing, Analyze the innovation driven talent group, verify the dynamic changes and evolutionary trends of the innovation talent team, reveal the complex mediating and regulatory effects of influencing factors on the effectiveness of industry education integration in cultivating innovative talents, and provide theoretical support for effective policy measures to cultivate

and supply high-end innovative talents through in-depth cooperation between applied undergraduate universities and enterprises.

### **3. Research from Problem Perspective**

#### **3.1. Feasibility of Education Supply Side Innovative Driving.**

Industry and education have always been a focus of socio-economic development since industrialization and informatization. In the new era, the integration of industry and education, driven by innovation, has presented new and higher requirements for cultivating new driving forces and advantages, and will also release higher dimensions of supply side efficiency vitality for higher education. The integration of industry and education is closely related to innovation driven development. With the strong implementation of China's innovation driven development strategy in the new era, high-end talents and technological innovation have become a decisive factor in China's high-quality development in both industries and education. High end talents are the primary factor resources for integrating and leveraging other high-end resources, leading the upgrading of other high-end factor combinations. Technological innovation is an important driving force for achieving explosive growth in social productivity and industrial transformation and upgrading. This objectively requires the construction of a new innovation mechanism system and corresponding innovation ecosystem atmosphere that is in line with this new era, making high-end talents and technological innovation a strong driving force for the development of industries, industries, and enterprises, and making innovation and practical needs a strong driving force for promoting the supply side reform of higher education in China's new era, as well as the innovation and reform of talent training and teaching models. In recent years, based on the top-level design of the country and with strong support, guidance, and promotion from national policies, the innovation driven reform of industry education integration in applied undergraduate colleges and universities in the new era has been promoted from the supply side, and phased achievements have gradually emerged. The purpose of driving innovation through the integration of industry and education in the new era is to drive reforms and collaborative innovation in various fields and aspects such as education, science and technology, and talent by promoting comprehensive education and industry reform, and to transform the new advantages brought by the integration of industry and education into a synergistic force for high-quality development (China Higher Education, 2020).

#### **3.2. Analysis of Current Situation of Industry Education Integration in Applied Undergraduate Colleges and Universities**

China's higher education (2020) analyzed the main challenges faced by the integration of industry and education:

One is the issue of reaching consensus through proper understanding. We need to further understand and consolidate the consensus on the comprehensive reform of industry education integration on a larger scale and more fully, so as to make our understanding more in place. This understanding includes the recognition of various entities in the integration of industry and education in higher education in Guangdong Province towards the innovative driving force of industry and education integration in the new era, and the positioning requirement of industry and education integration as a national strategy. Only with this understanding in place can we better promote the effectiveness of reform and enable all participating parties to work together. As a comprehensive reform in the new era, innovation driven integration of industry and education requires all participating entities to focus on the overall development of innovation, work together to strengthen the strategic thinking of industry and education

integration, establish a common consciousness, and promote joint action to achieve high-quality development.

The second is to form a joint effort among all parties, using innovation to drive breakthroughs in various obstacles to reform. As a national strategy, the innovation driven reform of the integration of industry and education in the new era has become more clear in its supply side reform orientation, and its top-level design is very prominent. Therefore, from the decision-making level to the implementation level, there is organizational heterogeneity in the various policies and regulations introduced by various departments, cooperative enterprises, industries, and industries in the early stage of the integration of industry and education in higher education in Guangdong Province. Therefore, it is urgent for organizations to establish a seamless connection between each other in order to achieve deep integration of industry and education, while also providing mechanism guarantees and smooth supply for innovation drive. Among them, the combined force of "demand orientation+contribution orientation" based on standardized industry education interconnection has not yet been fully formed (China Higher Education Research Group, 2020). Based on this issue, in the new era, the drive for innovation in the integration of industry and education needs to accelerate the improvement of the key common system (standardization) supply of "industry and education integration" at the micro level, accelerate the exploration of diversified innovation practices in the deep participation of various entities in the integration of industry and education in higher education in Guangdong Province, and accelerate the transition from traditional cooperation to true industry integration between schools, enterprises, and industry and education, forming joint efforts from all parties, Using innovation to drive breakthroughs in various obstacles to reform.

Thirdly, the core role of application-oriented undergraduate institutions in the integration of industry and education needs to be further highlighted. We need to further coordinate and give full play to the core role of application-oriented undergraduate colleges and universities in the integration of industry and education, and build an innovative backbone network driven by innovation in the integration of industry and education. The integration of industry and education in higher education in Guangdong Province in the new era actually covers a wide range, covering the entire field of higher education and vocational education from "Double First Class" universities to applied undergraduate, vocational and technical universities, vocational colleges, and secondary vocational schools (China Higher Education Research Group, 2020). From the perspective of the innovation industry chain, this industry education integration innovation drive also covers the entire innovation chain, including basic research, applied research, technological research and development, and commercialization and industrialization of achievements. Guangdong Province's applied undergraduate colleges and universities are at the forefront of reform and opening up. With the help of the favorable period of the Guangdong Hong Kong Macao Greater Bay Area construction, Guangdong Province is facing the construction of a higher education highland in 2035. This "double superposition" urgently requires supply side reform of higher education. The core role of Guangdong's applied undergraduate colleges and universities in the integration of industry and education needs to be further highlighted and played, To achieve the integration of industry and education as the main line, and to achieve a larger range of linkage in the national strategic innovation driving system. Based on this issue, Guangdong application-oriented undergraduate colleges and universities can further coordinate and play a core role in the integration of industry and education. With the help of innovation driven by the integration of industry and education, they can build an innovative backbone network, create an innovative resource attraction center for the regional economy, and facilitate the aggregation of resources, integration of industrial chains, and achievement transformation driven by the integration of industry and education. This will contribute to the cultivation of innovative talents and the subsequent development of innovative achievements Transforming and creating new things.



#### 4. Case Study and Inspiration on the Integration of Industry and Education in Applied Undergraduate Colleges and Universities Driven by Innovation in the New Era——Taking Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center as an Example

##### 4.1. Analysis of Corpus Data

Targeted interviews and data collection will be conducted on enterprises and application-oriented undergraduate institutions that are currently engaged in the integration of industry and education. Targeted interviews and data collection will be conducted around specific cooperation methods and contents, especially the distribution of cooperation benefits and the construction of cooperation platforms, in order to obtain first-hand information and construct a corpus. For some feedback information that is not sufficient, individual interviews will be used, Make targeted supplements to make the information collected in this study more comprehensive and comprehensive. 0

The first step is to use Word list for filtering, and we found that besides the original word (such as the), education ranked at the front end (4th place, frequency 380); Next is industry (7th place, frequency 313); Integration (9th place, frequency 219); These three belong to the research ontology of this article, which can prove that the corpus conforms to the theme and has validity. So continue to see that training (12th place, frequency 178) is the most prominent. Therefore, in the second step, we conduct Concordance analysis on these high-frequency core words and extract their influencing factors from their context before and after.

Source of corpus: Research report on typical cases of school enterprise cooperation in the integration of industry and education (2022).

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2	1004	the
3	882	of
4	380	education
5	319	in
6	316	a
7	313	industry
8	295	to
9	219	integration
10	216	for
11	197	enterprises
12	178	training
13	158	enterprise
14	154	vocational
15	143	with
16	131	as
17	125	The
18	120	development

Fig.1 Word-list

The second step is to Concordance analyze the context of these high-frequency core words Training and extract their influencing factors. It is shown by Fig.2

Concordance	Concordance Plot	File View	Clusters	Collocates	Word List	Keyword List
Hit	KWIC	File				
1	igh School students carry out practical training activities in school enterprise cooperative enter	CORPUS OF Cases of Industry Education Integration ar				
2	ry Education Integration Skilled Talent Training Alliance" and create a brand for industry educati	CORPUS OF Cases of Industry Education Integration ar				
3	completion, it can provide about 20000 training and appraisal workstations simultaneously. At pre	CORPUS OF Cases of Industry Education Integration ar				
4	on, learning, research, innovation, and training", and a virtual complex of "virtual and real inte	CORPUS OF Cases of Industry Education Integration ar				
5	ng training with war, combining war and training", and integrates practical operations in enterpri	CORPUS OF Cases of Industry Education Integration ar				
6	al schools in the province, attracting, training, and cultivating more than 2000 students. We have	CORPUS OF Cases of Industry Education Integration ar				
7	ledge and skills, implementing business training, and achieving resonance between students and pos	CORPUS OF Cases of Industry Education Integration ar				
8	f students for comprehensive off campus training and on-the-job internships. Teaching resource pla	CORPUS OF Cases of Industry Education Integration ar				
9	he integrated development of education, training, and research within vocational colleges. The sch	CORPUS OF Cases of Industry Education Integration ar				
10	h as project-based production, employee training, and technical consulting for enterprises, realiz	CORPUS OF Cases of Industry Education Integration ar				
11	ng bases, promote productive internship training, and achieve platform integration. Figure 4: Oper	CORPUS OF Cases of Industry Education Integration ar				
12	dern apprenticeship systems, on-the-job training, and on-site management training for team leaders	CORPUS OF Cases of Industry Education Integration ar				
13	Figure 3: Conducting on-site management training and theoretical learning for team leaders (III) T	CORPUS OF Cases of Industry Education Integration ar				
14	universities, and has reserved over 500 training and practical workstations for the industry and o	CORPUS OF Cases of Industry Education Integration ar				
15	create an environment of "Internet plus Training", and the case has certain application value. The	CORPUS OF Cases of Industry Education Integration ar				
16	tical education, teaching and practical training, and dual teacher education; We have piloted the	CORPUS OF Cases of Industry Education Integration ar				
17	ogical iteration functions into project training and innovation and entrepreneurship education, an	CORPUS OF Cases of Industry Education Integration ar				
18	diversity" modern apprenticeship talent training, and promoted the transformation of modern appren	CORPUS OF Cases of Industry Education Integration ar				
19	en the structure of professional talent training and regional industry docking, establish regional	CORPUS OF Cases of Industry Education Integration ar				
20	quality of vocational education talent training, and serving the development ability of the indus	CORPUS OF Cases of Industry Education Integration ar				
21	new teacher training, backbone teacher training, and the new round of "Hundred and Ten Thousand T	CORPUS OF Cases of Industry Education Integration ar				
22	on, research and development, teaching, training, and entrepreneurship and entrepreneurship; Innov	CORPUS OF Cases of Industry Education Integration ar				
23	ctric Appliances has built a technician training and incubation workshop to cultivate industrial p	CORPUS OF Cases of Industry Education Integration ar				
24	er training, naming classes, short-term training, and other forms. It vigorously promotes the teac	CORPUS OF Cases of Industry Education Integration ar				
25	ational education, training, practical training (appraisal), research and development, career gui	CORPUS OF Cases of Industry Education Integration ar				
26	ation, industry, academia, research and training are being promoted to promote the high-quality de	CORPUS OF Cases of Industry Education Integration ar				
27	nterprises; Secondly, taking vocational training as the starting point, undertaking national level	CORPUS OF Cases of Industry Education Integration ar				
28	essional conduct education. new teacher training. backbone teacher training. and the new round of	CORPUS OF Cases of Industrv Education Inteoration ar				

Fig.2 Concordance of Training

An analysis of its Concordance plot revealed that it is robust, with a relatively uniform distribution throughout the entire corpus. It is shown by Fig.3



Fig.3 Concordance Plot of Training

And organize these entries into a table as follows

Table 1. Training Concordance

1stdimension	2nd dimension	3rd dimension
Training	practical training	...School students carry out practical training activities in school enterprise cooperative enterprises...

	Talent Training Alliance	...Integration Skilled Talent Training Alliance" and create a brand for industry education integration skilled talent training...
	innovation, and training	A functional complex of "production, learning, research, innovation, and training", and a virtual complex of "virtual and real interaction, software and hardware integration, upgrading and empowerment".
	business training	Á 3 modular curriculum system, achieving "integration of knowledge and technology", synchronous acquisition of knowledge and skills, implementing business training, and achieving resonance between students and positions. Each major is modularized and combined according to different projects for on-the-job production.
	internship training	Implement the planning and construction of integrated training bases, promote productive internship training, and achieve platform integration.
	on-site management training	Through deep integration of industry and education with vocational colleges, joint training forms such as on-site engineers, new apprenticeship systems for enterprises, modern apprenticeship systems, on-the-job training, and on-site management training for team leaders are carried out to promote the integration of engineering and academia
	teacher training	Implement seven key projects at the municipal level, including teacher ethics and professional conduct education, new teacher training, backbone teacher training, and the new round of "Hundred and Ten Thousand Talents Training Project" and "Double Teacher" quality improvement project.
	technician training	has built a technician training and incubation workshop to cultivate industrial precision talents, and on the other hand, it has formed good cooperative relationships with 17 schools in the province.

Based on the above corpus analysis, it can be seen that students on campus carry out practical training activities in school enterprise cooperation enterprises, and integrate industry and education to build technical training incubation workshops, cultivating precise industrial talents. On the one hand, the enterprise has formed a good cooperative relationship with the school. Implementing seven key projects at the municipal level, including teacher ethics and conduct education, new teacher training, backbone teacher training, a new round of "Ten Million Talents Training Project" and "Double Teacher" quality improvement project, in order to integrate skilled talent training alliances and create a brand of industry education integrated skilled talent training. The integration of industry and education is still a functional complex of

"production, learning, research, innovation, and training", a virtual complex of "virtual and real interaction, software and hardware integration, and upgrading empowerment". The modular curriculum system and the integration of industry and education construction achieve the integration of knowledge and technology, synchronously acquire knowledge and skills, implement business training, and achieve resonance between students and positions. Each profession carries out modular combination of industry education integration construction according to different projects, and carries out on-the-job production. Implement the planning and construction of an integrated training base for the integration of industry and education, promote productive internship training, and achieve the integration of industry and education integration construction platforms. By deeply integrating industry and education with higher education institutions, joint training forms such as on-site engineers, new apprenticeship systems for enterprises, modern apprenticeship systems, on-the-job training, and on-site management training for team leaders are carried out to promote the integration of engineering and education, and the construction of industry and education integration.

#### **4.2. Analysis of Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center**

In the new era of deepening reform and opening up, building a new development pattern of "dual circulation" requires the promotion of digital economy transformation and upgrading, as well as high-quality digital development towards depth. Accelerate the digital transformation and upgrading of manufacturing, service, and foreign trade industries. One of the core viewpoints of digital high-quality theory comes from evolutionary economics and economic metaphors. The research approach and paradigm shared by both are based on systems engineering theory, and with the help of system engineering methods as its research tools, this method has been recognized and praised by many systems engineering experts, and applied to the interdisciplinary field of economics (Gong Jianhua, 2016; 2020; Yucong You, 2018; 2019). From the perspective of economic metaphors, a typical criterion for evaluating validity and reliability lies in systematic "mapping", which means that the self-contained systems formed by the source domain and the target domain can correspond one-to-one. This is similar to "standardization", just like the "ECONOMY IS LINE" in economic metaphors (McCloskey, 1983; Yuchong You, 2018; 2019). The digital economy is a sub branch of the economy and the latest business form, suitable for deductive reasoning in systems engineering. Therefore, the economy is like a machine metaphor, and the adaptation between its various components must be consistent in the "standard caliber" of each interface in order to seamlessly connect. This type of system metaphor mapping is also applicable to deductive reasoning in systems engineering. In the digital economy, high-quality digital development urgently requires "knowledge sharing" among enterprises; Data sharing and mining, including high-level cognitive neural machine learning, objectively require a prerequisite that the departments, organizational structures, information platforms, data measurement standards, and metrics of each enterprise must be standardized in order to be consistent, which is also a necessary prerequisite for digital sharing. Many economic metaphors or commercial metaphors have also been empirically demonstrated based on corpora, and the corresponding inference of economic sharing needs standardization is deduced using the systematic principles of the source domain (such as machines requiring consistent parts).

Based on the theoretical framework of digital economy standardization economics and using standardized system engineering methods, this study explores and improves the collaborative innovation system and basic conditions of industry education integration in the engineering center from the perspective of innovation driven by digital economy. Based on the operational practice of the joint construction center of Guangdong Cold Chain Standardization Engineering Technology Research Center, a high-quality digital guidance system for industry education

integration is constructed, and the practice confirms the positive transfer promotion function of the university science and technology special envoy system on the integration of industry education in the joint construction center.

From the perspective of standardization in the digital economy, this paper explores and analyzes the feasibility of enhancing the core competitiveness of industries represented by enterprises in the integration of industry and education in application-oriented undergraduate colleges and universities in the digital high-quality oriented development environment, leveraging the mediating effect of technology innovation driven "driver facilitator". Analyze all key elements in the Porter Diamond Model. In the integration of industry and education in application-oriented undergraduate colleges and universities, as the "other end of the cooperative game", the realization of the "heterogeneous" industry and enterprises' core competitiveness in the context of digital economy standardization must specifically rely on the drive of digital economy standardization and scientific and technological innovation. With the help of big data mining in the digital economy, the neural network cognitive layer connected by artificial intelligence, Internet plus and other technologies, the Pareto improvement of resource elements in the innovation driven dynamic evolution mode is maximized, and in the  $n+1$  stage, the new Pareto resource allocation state and new combination of resources formed by the  $n$  stage of scientific and technological innovation drive are solidified, that is, standardization. In this process, the digital economic resource elements of the core competitiveness of enterprises at the other end of the game in the integration of industry and education in various application-oriented undergraduate colleges and universities, especially the corresponding allocation and driving functions of digital economic resource elements that coexist in the integration of industry and education in application-oriented undergraduate colleges and universities, with big data, cloud computing, knowledge sharing, information sharing, and patent mutual authentication as the digital economic carriers. At the same time, the resource elements of production and enterprises, as well as digital (meta) resources at the other end of the game, undergo a "triple helix" interaction. In the long run, this iterative effect will also continue to improve with the continuous Pareto optimization of digital economy allocation, and will rise in an advanced model driven by digital economy standardization and technological innovation, thereby achieving the maximum optimization of resource element allocation at the entire production and enterprise end (i.e., reaching the Pareto level as Western economics calls it). The feasibility analysis can also be viewed as a new type of digital economy "sharing" characterized and carried mainly by "information, data, and knowledge" from the standardization of the digital economy. The data transmission mechanism in the integration of industry and education in application-oriented undergraduate colleges and universities can be accelerated through innovation driven resource allocation, especially the technology spillover effect of innovation can play its "accelerating catalytic" role, enabling the digitalization and standardization of "heterogeneous" industries and enterprises to better achieve efficient digital "information, data, knowledge" allocation and digital innovation technology spillover and cloud expansion at the "game ends" (i.e. production and research sides) in the integration of industry and education in application-oriented undergraduate colleges and universities. Ultimately, knowledge sharing is the most core element of achieving industry and education integration through digital economy standardization and digital technology transformation. From the feasibility analysis based on the perspective of the "sharing economy", it can be seen that these knowledge sharing are precisely one of the original intentions and goals of digitization. In other words, knowledge sharing takes digitization and standardization as the "dual grip", ultimately providing a digital economy intermediary link for the research of the driving model and path of industry education integration innovation in applied undergraduate colleges and universities under the background of the new era of digital economy from the standardization and digital enterprise end.

Digital high-quality oriented innovation driven development is a new concept that combines digital high-quality oriented development with innovation driven development in the new era. According to the theories of evolutionary economics and economic metaphor, this model is a system engineering model. For the object of this study, the Guangdong Province Cold Chain Standardization Engineering Technology Research Center, as a practical exploration case of industry education integration, the standardized engineering technology research center system includes a series of sustainable and comprehensive digital high-quality oriented capability system elements, including input-output subsystem, logistics marketing subsystem, financial information management subsystem, cold chain standardization innovation research and development subsystem, and dynamic environment (such as post epidemic) adaptability subsystem, as shown in Figure 4.

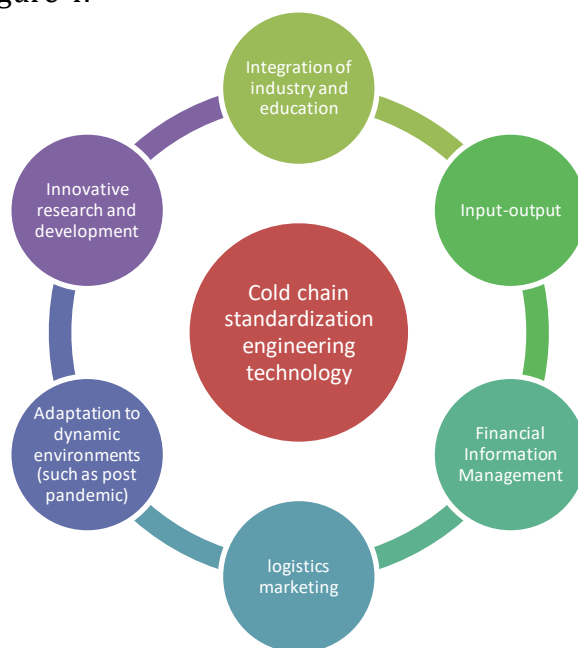


Fig.4 Guangdong Province Cold Chain Standardization Engineering Technology Research Center Industry Education Integration Digital High Quality Guidance System

The Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center is the main body of the supply side integration of industry and education in higher education. The digital high-quality oriented innovation driven development of higher education institutions is a long-term competitive advantage pursued by innovation driven supply side reforms in the education field. In this dynamic innovation driven process, the structural adjustment and reform of the supply side itself have dynamism, This is also consistent with the evolutionary economics and economic metaphor of EED epigenetic dynamics (You Yucong, 2021). Therefore, this study believes that the Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center's industry education integration digital high-quality oriented innovation driven development system has evolutionary dynamic characteristics. The second is the accumulation and transferability of implicit and explicit knowledge. The Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center, as the main body of the supply side of higher education, integrates industry and education. The unique subject knowledge accumulation, academic skill acquisition, scientific research information channel resources, and a series of implicit and explicit knowledge activation and transfer mechanisms of higher education institutions are difficult to obtain through ordinary transaction behaviors in the economic market, but can only be achieved through long-term accumulation of their own disciplines and academic education system Sedimentation is the key to the formation of "migration". For example, from the perspective of the integration of industry and education in the Guangdong Provincial Cold Chain Standardization Engineering

Technology Research Center, recent empirical analysis has found and confirmed the existence of innovation ability effects on both industry and education in four dimensions: teaching capital, human resources, service to regional society, and patent application certification, including direct and indirect aspects; The empirical analysis shows that the integration of industry and education in education and teaching by the Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center plays a mediating role in promoting the exploration and pursuit of "tacit knowledge" by professional degree talents in cold chain standardization.

The Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center is a provincial-level standardization engineering technology research platform that deepens the joint construction of industry education integration. Both schools and enterprises have the obligation to cultivate standardized talents, carry out standard research and promote demonstration projects. Actively strengthen the cultivation of international talents in standards, promote the construction of the cold chain logistics standard system for the "Vegetable Basket" project in the Guangdong Hong Kong Macao Greater Bay Area, strengthen the docking of cold chain standards in the Guangdong Hong Kong Macao Greater Bay Area, and promote the establishment of a national technology standard innovation base (cold chain logistics). The Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center is a provincial-level engineering technology research center that deepens the integration of industry and education, and jointly builds and manages enterprises. The Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center has also participated in the creation of Guangzhou's standardized international innovative city, receiving praise and achieving certain results. It has deepened the integration of industry and education to jointly build the Greater Bay Area Smart Cold Chain Industry College and innovated a unique applied talent training model. The teaching side fully utilizes this provincial-level scientific research platform to further strengthen cold chain standardization work, strengthen international cold chain standard docking, cultivate standardization talents, and serve the creation of a standardized and innovative city in Guangzhou. It promotes the implementation of the cold chain logistics standardization strategy in the Guangdong Hong Kong Macao Greater Bay Area, and also accumulates experience for deepening industry education integration, building high-level scientific research platforms, and serving local economic development. At present, the economic, social, and school enterprise cooperation benefits of the project are good. This project is of great significance in driving the school's teaching and research services to society and more achievements transformation, promoting school enterprise cooperation, and integrating industry and education. It is also of great significance for strengthening the docking of cold chain standards in the Guangdong Hong Kong Macao Greater Bay Area, promoting the establishment of national technical standard innovation bases (cold chain logistics), regional economic development, and social development.

This kind of accumulation and migration is also an important foundation guarantee for higher education institutions to achieve sustained educational performance benefits and high-quality education digitalization oriented sustainable digitalization oriented innovation; The accumulation and transfer of implicit and explicit knowledge greatly determine whether innovation in higher education institutions is sporadic or sustainable, digital, and high-quality oriented. The third is the reform of supply structure. Under the general equilibrium conditions of relatively stable market supply and demand, the progress of education reform in higher education institutions is relatively slow. This is mainly achieved through the optimization and allocation of implicit and explicit knowledge, teaching skills, and educational resources to continuously innovate and improve the educational performance of higher education institutions, adapt to market changes, and create new value in the supply of educational products and services.

## 5. Conclusion

Through the research on the collaborative innovation driving mechanism of Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center from the perspective of the integration of industry and education in the new era, we can deduce and verify the superiority and rationality of the system of science and technology envoys in universities in the new era. The Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center adopts a dual innovation model of mechanism and technology, where university science and technology envoys are stationed in enterprises, driven by enterprise mechanism innovation.

The Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center provides inspiration and conclusions for exploring the practical experience of industry education integration. The system of special envoys for science and technology in universities in the new era should adhere to serving the integration of industry and education in applied undergraduate colleges and universities in the context of the new era as its starting point and final destination. The innovative driving path of the system of special envoys for science and technology in applied undergraduate colleges and universities in the new era is a path dependence that takes scientific and technological talents as the main driving force for innovation, and uses scientific and technological achievements as the link between industry and education, promoting the integration of industry and education in applied undergraduate colleges and universities in the new era, and helping to comprehensively deepen the supply side structural reform of higher education in the new era. In the new era, the implementation of the "University Science and Technology Commissioner System" for the integration of industry and education in applied undergraduate and higher education institutions is closely based on the theory of supply side structural reform and innovation driven development in education. It aims to further improve the mechanism system for industry and education integration in applied undergraduate and higher education institutions and the policy environment for supply side structural reform in higher education in the new era. By further developing and improving the construction and system of the university science and technology commissioner team, the driving force and technological achievements driven by innovation are spread to both industry and education.

The experience of the Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center in exploring the integration of industry and education also confirms previous literature. The Standardization Engineering Technology Research Center has conducted practical exploration and verification on the relationship between the system of university science and technology envoys and the integration of industry and education in cultivating applied cold chain standardization talents. The research conclusions of practical exploration confirm that in the new era, the focus of higher education institutions, especially local applied undergraduate institutions, should be on cultivating applied talents. Therefore, it is urgent to focus on building a characteristic educational model that promotes collaborative education through the integration of industry and education with an application-oriented approach. As previous studies (such as Yuan Mao et al., 2017) have pointed out, the concept of industry education integration should be implemented throughout the entire teaching dynamic process of cultivating applied talents. In this process, the Guangdong Provincial Cold Chain Standardization Engineering Technology Research Center's exploration of industry education integration practice once again proves that the system of university science and technology special envoys is an effective innovative mechanism for achieving industry education integration and promoting collaborative education through school enterprise cooperation in the new era.



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