

# Insights of the new model of collaborative co-construction of modern industrial colleges in the background of digitalization for higher vocational colleges

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**Abstract.** To solve the contradiction between the supply side of talents and the demand side of enterprises, it has become a general trend for universities to deepen the integration of industry and education and collaborative education. This paper takes the Advanced Manufacturing College of Dongguan Institute of Technology (Chang'an) as an example. It explores the connotation of modern industrial college and the construction mode of collaborative education. It aims to build a modern industrial college with a "five-in-one" industrial chain through the new mode of education-industry integration and human education. It also aims to provide new ideas and references for the new mode of collaborative construction of a modern industrial college in higher vocational institutions.

**Keywords:** modern industrial college; integration of industry and education; higher vocational institutions; Dongguan Institute of Technology

## 1 Introduction

With the accelerated changes of the new round of scientific and technological revolution and industrial revolution, information, technology, and human resources have become the core foundation. Higher vocational colleges and universities have the problem that students' courses must be better integrated with the skills enterprises need to use. To further encourage higher education institutions and vocational colleges to set up industrial colleges, the General Office of the State Council issued "Several Opinions on Deepening the Integration of Industry and Education" in 2017. <sup>[1]</sup> The establishment and upgrading of modern industrial colleges are significant to the industrial transformation and innovative education and teaching reform in higher vocational colleges.

## 2 The foundation of modern industrial college

### 2.1 The development process of modern industrial college

The modern Industrial College was first planned by the Ministry of Education and Employment in the UK. Its primary purpose is to provide available teaching methods to individuals and en-

terprises by using modern digital network technology to improve the employability of individuals and productivity. The first person who proposed the "Modern Industrial College" in China was Xiaohang Qin in 1988. <sup>[2]</sup> In "Industrial College: An Effective Exploration of Implementing Engineering Integration in Higher Vocational Colleges," Qiu'er Xu first took industrial college as an essential carrier of industry-education integration. <sup>[3]</sup> With the promotion of the new model of industrial colleges by national policies, vocational colleges, and higher education institutions continue to explore and practice to establish new talent cultivation platforms.

## **2.2 Definition of modern industrial college**

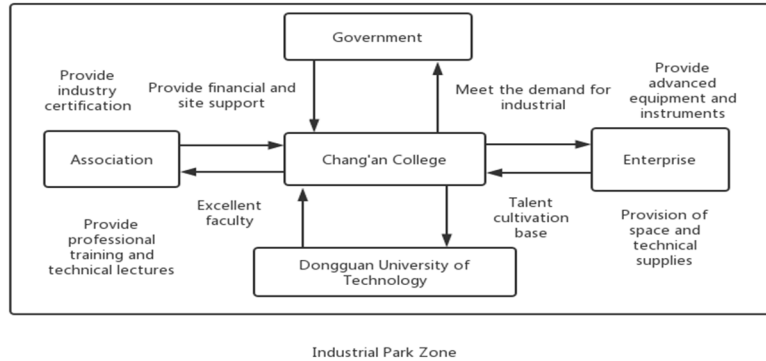
There is no uniform definition of the connotation of industrial college in the domestic academic session. Most scholars believe that industrial college is a new education model that integrates high-quality resources of enterprises, colleges, universities, and research institutions to realize school, government, association, and enterprise in the face of the development needs of new industries and critical regions. After nearly ten years of exploration and development, different models of industrial colleges have emerged. How to define the industrial college? Qiu'er Xu (2007) <sup>[3]</sup>, Guangzhi Zeng and Xiaofeng Zhao (2019) <sup>[4]</sup> and others consider industrial colleges as "order-based" education, "internship training base," "It is an effective means to solve the demand side of industry and talent training side and is a new model of organic integration of industry and education. It is a new model of organic integration of industry and education. "Industrial college is the base of higher education school" was first created. Qingxiang Shao consider modern industry colleges as higher education institutions that implement professional education with universities. <sup>[5]</sup> However, using a base to elaborate industrial colleges is inaccurate, and we must refer to cooperative enterprises as the practice base of higher education institutions.

## **3 Construction Model of Advanced Manufacturing Institute (Chang'an) of Dongguan Institute of Technology**

To solve the mismatch between the demand side of enterprises and the supply side of higher education, it is imperative to establish a modern industrial college. With the support of national policies, many colleges, and universities have started to explore the exploration path of establishing modern industrial colleges. This paper takes the Advanced Manufacturing College (Chang'an) of Dongguan Institute of Technology (in the future referred to as Chang'an College) as an example.

### **3.1 Five-in-one collaborative development of education model**

Under the background of a national policy of building new engineering departments in colleges and universities, Chang'an College has continuously explored the high-quality resources of the interest communities of all parties, exchanged and shared its resources, and continuously innovated the education mode of "College, Government, Association, and Enterprise," so that all parties have achieved a benign relationship of joint development (see Figure 1).



**Fig. 1.** Five-in-One Education Model

"Government": i.e., Changan Township Government, the government is mainly responsible for support, organization, and management. The town government annually provides about \$7.5 million in funding, school sites, and industrial resource support for collaborative education. It provides more flexible support for innovation and entrepreneurship, and talent policies. Moreover, the town government employs a team of engineers and operational staff to manage Changan College corporately and professionally. The curriculum of Chang'an College mainly faces the 3C manufacturing and equipment industry in Chang'an town, which delivers a large number of excellent talents to Dongguan every year and alleviates the contradiction between the supply side of talents and the demand side of enterprises.

"Enterprise" need many excellent talents and actively participates in the collaborative education model, including free new equipment for practical training, teachers with new technical skills, and corresponding supporting facilities. At the same time, they provide students with internship positions, participate deeply in the construction of new engineering practice platforms and co-construction of practice courses, and guide students to start their businesses.

The "Association" is the association that mainly plays the role of linkage and service. Associations include ACMT Association, Dongguan Intelligent Manufacturing Industry Association, Dongguan Mechanical and Electrical Manufacturing Society, and Guangdong Mechanical Engineering Society Science and Technology Service Station. At the same time, the association industry will organize technical certification and examinations for students, provide training bases free of charge, and not participate in the distribution of benefits.

"Learning", that is, Chang'an College, is the core of the collaborative education model. It coordinates and links up with Dongguan Institute of Technology resources, leading the construction of courses, teaching, and research platforms and the joint construction of laboratories with enterprises. Chang'an College is a substantial training base of Dongguan Institute of Technology, which undertakes necessary courses for upgrading and transforming the new engineering and training the application-oriented talents the country needs.

The "Industrial Park Zone" is the park that provides students with internship training, exchange, visit, and other diversified enterprise clusters in the vicinity. The "school-enterprise government-association park" forms a five-in-one all-round three-dimensional collaborative education model oriented to the advanced 3C product manufacturing industry in Dongguan and Chang'an town, cultivating excellent talents needed by enterprises and completing the "last mile" of engineering education. Through the construction of the benefits community (see Fig. 2), Chang'an University has formed a network of enterprises and associations involved in collaborative education.

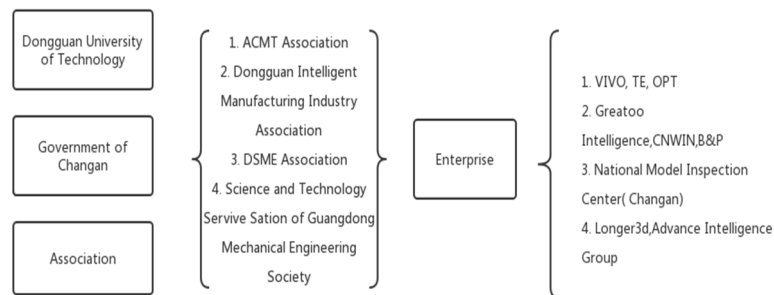


Fig. 2 the construction of the benefits community

## 4 Conclusions

Effectively using the resource advantages of different subjects, the government uses its guiding advantages to keep up with national policies and reforms. It guides the reform and upgrading of modern industrial colleges and universities from the general direction. Enterprises have the advantages of technology research and development and product production in the market and collaborate to develop advanced technology and equipment needed by the market. Universities are educational public welfare organizations, and their advantages are mainly in research institutes and industrial parks. Colleges and universities have the advantage of scientific and technological research and development and collaborate to develop advanced technology and products at home and abroad. The industry association understands the demand for local talent and supply and the frontier technology of this industry. It has the advantage of standardization, essential for constructing industrial colleges. The "government, association, academia and enterprises" have formed a gathering industrial park, which has an essential role in understanding the dynamic changes of the local economy and can better solve the problems of upgrading and transformation of local industries and changes in economic structure. Modern industrial colleges can use the tangible assets of all parties, actively strive for and introduce resources such as capital investment, high-end scientific research, technical talents, existing equipment and technology from external entities, expand the source channels of school resources, match resource elements according to the law of education, dovetail with industrial needs and integrate resource elements to provide strong guarantee support for the cultivation of new engineering talents.

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