

# Digital-intelligent Transformation of Vocational Education: Practice and Rethinking of Chengdu's "One Industrial Park-One College" Mode

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## ABSTRACT

The digital-intelligent age drives in-depth reform of the integrated development of Chengdu's industry, vocational education and city. As a characteristic practice of this kind of integrated development mode, the "One Industrial Park-One College" mode is undergoing digital-intelligent transformation, which has already made beneficial attempts in the following four levels: strategy-organization, platforms-bases, business-teaching, academic evaluation-employee assessment, and has further formed an intelligent integration, synchronic collaboration, joint education, mutually reinforced developing ecology of the industry, vocational education and city construction. In the future, the digital-intelligent construction of the "One Industrial Park-One College" mode in Chengdu will seek new breakthroughs in the aspects of value adherence, difficulty breaking, and development design.

**Keywords:** *Integrated development, Vocational education, Digital-intelligent transformation, The "One Industrial Park-One College" mode.*

## 1. INTRODUCTION

Under the influence of the new technological revolution represented by big data, artificial intelligence, cloud computing, etc., the integrated development of digitizing, networking, and intelligence has rapidly penetrated into all walks of life. Humans, machines, and things are deeply integrated in multi-dimensional space, which has become the "core engine" driving economical and social development, and is pushing vocational education to implement digital transformation and intelligent upgrades so as to cultivate high-quality and compound skilled personnel for the development of local economy and society.

"Locality" is the most fundamental "gene" of vocational education[1]. In the process of exploring the digital-intelligent transformation of vocational education, Chengdu has overall planned it with the construction of Chengdu-Chongqing economic circle, the national high-tech industrial base and digital city. With the integration of industry, vocational education and city as core mechanism, and the "One Industrial Park-One College" mode as

practical carrier, Chengdu has formed a "Chengdu paradigm" in digital-intelligent transformation of vocational education, which can provide a good practical reference for other regions.

## 2. CHENGDU'S "ONE INDUSTRIAL PARK-ONE COLLEGE" MODE

This mode was first proposed by Chengdu Vocational & Technical College of Industry in 2015 during its exploration on "building academies with groups, co-education with industrial parks, and service development" reform. After pilot testings within its secondary schools, many theoretical achievements and practical experience have been formed. This reform was gradually radiated and had driven other vocational colleges in Chengdu to carry out innovative practices with consideration of their own school positioning and characteristics, and finally became the so called "One Industrial Park-One College" mode with Chengdu characteristics.

## **2.1 Core of the “One Industrial Park-One College” Mode**

The core of this mode is that vocational colleges taking the highlighting of vocational education’s “type” characteristic and the enhancement of vocational education’s adaptability as the value pursuit, and under the overall promotion of the school, each subordinate secondary school or professional group sets up characteristic branches or industrial colleges docking with industrial parks and functional zones. This practice takes the integrated development of industry, vocational education and city as a guidance, connects with local economic and social construction, focuses on the goals and characteristics of talent training, expands the traditional school-enterprise cooperation and governance structure, and integrates government departments, industrial parks, enterprise groups and other collaborative innovation driving factors, to build a new systematic mechanism featured with the integration and innovation of government, industry and academia, as well as school, enterprises and the city, thus further to promote the cultivation of technical and skilled talents who are coupled with the needs of local economy and society.

## **2.2 Characteristics of the “One Industrial Park-One College” Mode**

Based on vocational education’s “type” characteristic of the cross-border integration of “educational” and “professional”, [2] the “One Industrial Park-One College” mode creatively integrates elements of “industry” and “city” in “education” and implements the Party and State’s new requirements on the integrated development of industry and vocational education at the height of an organic integration of vocational education, industry and city construction. This mode, through the in-depth integration of policy, system, culture, technology, resources, personnel and other factor endowments, as well as the innovative joint of collaborative governance mechanisms and platforms like apprenticeship with Chinese Characteristics, college-led vocational education groups, and city-shared public training bases, promotes the precise connection between vocational education and labor market, professional groups and occupational post groups, course contents and industry standards, teaching process and business process, academic evaluation and employee assessment, graduation certificate and vocational qualification certificate, as well as

school education and lifelong learning.[3]By this way, it can cultivate technical and skilled talents with nation feelings and urban imprints for industrial parks and surrounding enterprises to empower a high-quality development of local economy and society.

## **3. THE PRACTICE OF DIGITAL-INTELLIGENT TRANSFORMATION OF CHENGDU’S “ONE INDUSTRIAL PARK-ONE COLLEGE” MODE**

In response to the new challenges and opportunities brought by the integrative and innovative development of new technologies and industrial enterprises, and the new requirements of vocational education’s digital-intelligent transformation carried out by the “*Vocational Education Professional Catalogue 2021*”, Chengdu has implemented the digital-intelligent construction of the “One Industrial Park-One College” mode from the following aspects, which are strategy-organization, platforms-bases, business-teaching and academic evaluation-employee assessment, and has achieved phased results.

### **3.1 Digital-intelligent Link Between Strategy and Organization**

Chengdu, focusing on high-quality economical development and smart city construction, has proposed to build a “5+5+1” modern and open industrial system and create a series of industrial functional zones; and introduced strategic planning documents like “*The Fourteenth Five-Year Plan for Chengdu’s National Economic and Social Development and the Outline of the 2035 Vision*”, “*The Fourteenth Five-Year Plan for Chengdu’s New Economic*”, “*The Action Plan for Chengdu’s Smart City Construction(2020-2022)*”, etc.. Through synergy of the above policies, Chengdu has broken the physical “fences” and invisible mechanical “shackles” to drive the integrated development of industry, vocational education and city to deepen through digital-intelligent transformation; and further broken the traditional two-dimensional organizational governance structure of the “One Industrial Park-One College” mode and reshaped it from the three dimensions of physical space, mobile space and intelligent space.

Specifically, with the government’s policy support and restraint mechanism, as well as the deep integration and innovative application of new

technologies in various fields, Chengdu has built a cloud-based and platform-based organizational structure of the “One Industrial Park-One College” mode by promoting the digital reform and intelligent upgrade of its traditional pattern under the physical space (e.g. industrial colleges, cross-enterprise training centers, industrial & educational alliance), thus to realize multi-dimensional flow, mutual integration and coexistence of the “production” of enterprises, the “teaching” of vocational colleges, and the “city” of the government in the intelligent space. By this way, a multi-coordinated intelligent organization structure is built and an Industry-Vocational Education-City Integration Community is formed based on the information technology and sharing-development concept.[4]

### ***3.2 Digital-intelligent Link Between Platforms and Bases***

The internal driving force of the “One Industrial Park-One College” mode is to identify the common demands between vocational education and Chengdu’s high-quality development of economy and society, especially with the construction of its “5+5+1” modern and open industrial system. While the coupling points between “vocational colleges” and “parks” in Chengdu are talent training, knowledge re-engineering, technical service functions and capabilities on the vocational education side; and talent needs, technology applications and scientific-technological development of enterprises on the industry side.

With focuses on the above coupling points, Chengdu taking integrated development of industry, vocational education and city as the guidance, construction of a networked governance system as the core and full coverage of information platform as the path, has built digital-intelligent platforms and bases including talent demand analysis platform, education and teaching resource platform, practical teaching base, scientific research and technical service platform, industrial service platform, dual-teacher training and development base, comprehensive management service platform... which have promoted a digital-intelligent link between platforms and bases in the fields of education and teaching, talent development, social service on the vocational colleges side and governance platforms in the fields of procurement, production, operation, management on the enterprises side. Through this way, a smart development space and environment has been

jointly created, which can effectively stimulate and enhance the synchronicity, mutual adaptability and synergy between vocational education and industry, and further empower the integrated development of vocational education and industrial economy.

### ***3.3 Digital-intelligent Link Between Business and Teaching***

Chengdu, following educational rules and teaching logic, has transformed new technologies, new standards, new models, new processes, and new processes in the business field of enterprises (production, operation, management, etc.) into vocational colleges’ teaching contents, and then made them linked to and transformed into teaching practices with the help of virtual simulation technology, intelligent cognitive experience, smart workshops, robots, cloud business systems and other digital-intelligent touch-points, thus to drive the optimization, improvement and agility of teaching objectives, teaching contents and teaching methods, and so as to realize the intelligent collaboration and effective connection between business and teaching[5].

This digital-intelligence link has solved the problem of time and space constraints. It has not only reversed an embarrassing scene of the “One Industrial Park-One College” mode in the traditional physical space that the business fields (concepts, knowledge, technology, models, processes, etc.) of enterprises have matured or are about to be eliminated, while the teaching of vocational colleges (teaching content, teaching process, teaching methods, etc.) has not caught up with them, but also greatly improved teachers and students’ perception, cognition and operational learnability of enterprises’ business. Furthermore, it has effectively broken through the technical problem that dynamic matching of vocational education personnel training with industrial development and city construction needs, and helped to fundamentally solve the long-standing structural contradiction between the supply side and the demand side considering technical and skilled talents.

### ***3.4 Digital-intelligent Link Between Academic Evaluation and Employee Assessment***

Under the “One Industrial Park-One College” mode, the teaching space extends from campus to industrial parks and industrial functional zones, and

to the inside of enterprises. Teaching contents also extends from traditional theoretical knowledge learning and operational drills of business to the completion of enterprises' real business and work. Therefore, from perspectives of the System Theory and under the guidance of principles like environmental adaptability, integrity, dynamics and feedback of the system theory[6], Chengdu has taken the "enterprise dimension" organically integrated into students' academic evaluation, the enterprise mentors and managers incorporated into the evaluation subjects, and the contents of enterprises' employees assessments (work standardization, management decision-making, thinking logic, overall planning ability, digital ability, etc. ) into the contents of vocational colleges' academic evaluation. This practice has promoted the organic integration of employee assessment and academic evaluation, and built a multi-dimensional evaluation system which can comprehensively judge whether a student is a qualified learner, an apprentice or a professional or not.

In terms of evaluation methods, a digital quantitative evaluation is implemented relying on the deep application of common-enabling technologies in various industries. The operating procedure is as follows: converts the evaluation contents into evaluation indicators and assigns points reasonably; then uses a digital platform to automatically, visually and timely display students' performance (e.g. ideal beliefs, professional knowledge, digital ability, management decision-making, work norms, professional quality, etc.) with the form of points; and finally collects, cleans and analyzes data on demand, and evaluates students in an all-round and objective manner. This kind of evaluation focuses on the process, is open and transparent, and has strong maneuverability. It can fully mobilize students' subjective initiative and make students truly become the "main responsible person" for their academic (professional) growth. It can also help enterprises to select and employ personal more accurately.

## **4. RETHINKING OF THE DIGITAL-INTELLIGENT TRANSFORMATION OF CHENGDU'S "ONE INDUSTRIAL PARK-ONE COLLEGE" MODE**

### ***4.1 Pursuit of Value From Beginning to End***

The digital-intelligent transformation practice of the "One Industrial Park-One College" mode is a top-down and macro-micro practice which finds breakthroughs to break through the traditional physical space, expand the flow space, and create intelligent space with the help of modern information technology. It has built a new smart development ecology which industrial development, education transformation and city construction are intelligently integrated, simultaneously coordinated, jointly worked and mutually promoted under the three-dimensional interaction. In concept, it abandons the traditional paradigm of considering the relationship among industry, vocational education, and city construction from a binary linear thinking; in practice, it breaks first and then reconstructs, and optimizes the space-time relationship of the three with the help of the integration and application of new technologies. By this way, it forms an ecological system with stable structure, technology empowerment as well as synergy and symbiosis, promoting the three to a real community of destiny, which demonstrates the unity of instructive, social and occupational natures, as well as the unity of openness, synergy and sharing of vocational education.

As for its deepening construction, there is no doubt that it is inseparable from the inheritance of the above-mentioned values and spiritual genes and also necessary to speed up the construction of a vocational education discourse system followed by value rationality[7], which are in the scopes of enhancing the adaptability and promoting the high-quality development of vocational education. Only the relevant stakeholders collaboratively persevere and work hard can vocational education's "type" nature be firmly built.

### ***4.2 Efforts on Solving the Practical Predicament***

As a characteristic practice of the integrated development of Chengdu's industry, vocational education and city, the "One Industrial Park-One College" mode is subjected to multiple constraints

from policy planning, industrial demands, vocational education itself and the science and technology development. Furthermore, its digital-intelligent transformation involves aspects including the establishment of school-running system and mechanism, data governance and application, digital-intelligent upgrade of courses and teaching, digital-intelligent infrastructure construction, etc.. It still faces many practical difficulties. For example, the construction and development of dimensions such as data governance capacity building, digital resource supply model building, and key information infrastructure system building are still immature; the new technology is superficial and patch-like attached to the curriculum teaching system, which leads to the lack of substantial integration.

Therefore, the deepening construction of the “One Industrial Park-One College” mode must be considered systematically from an ecological perspective. It should closely follow the requirements of Chengdu's entire city planning and construction, digital-intelligent transformation of industrial enterprises and the intelligent upgrading and digital transformation of vocational education, acquaint vocational education's “type” nature, clarify the role of the “One Industrial Park-One College” mode in Chengdu's economic and social development, and then seek breakthroughs in the fields of “innovation of digital resource supply mode, construction of data governance capacity, application of online learning space, construction of data-based education model, and guarantee of key information infrastructure”[8], as well as “digital-intelligent reconstruction of curriculum system, digital-intelligent transformation of teaching content and digital-intelligent empowerment of teaching models.”[9]

### **4.3 Good Jobs on Future Development Design**

In order to promote the digital-intelligent construction of the “One Industrial Park-One College” mode to continue to go deeper, and to continuously release the potential of cultivating talents and serving development, Chengdu must repeatedly study “*National Vocational Education Reform Implementation Plan*”, “*Vocational Education Quality Improvement Action Plan (2020-2023)*”, “*Opinions on Promoting the High-quality Development of Modern Vocational Education*” and other policy documents on the digital-intelligent transformation of vocational education,

study its digital economy construction and new strategies and plans for smart city development, and strengthen research to timely grasp the new progress and achievements of industrial parks, digital and intelligent development of enterprises as well as their new requirements and expectations to vocational education personnel training.

After that, Chengdu should place the digital-intelligent construction of the “One Industrial Park-One College” mode in the ecosystem of its economic and social development, do a good job in the top-level design of future development from the perspective of integrated development and the three perspectives that “where am I (that is, the existing foundation)”, “where am I going (that is, the development goal)” and “How do I go (that is, development path and measures)”, thus to fully concentrate advantageous resources and make concerted efforts at all levels and dimensions, and to make due contributions to help Chengdu build a pilot area for high-quality development, an integrated development pilot area, a sustainable development pilot area, a dual-cycle development pilot area, and a human-oriented development pilot area during “14th Five-Year Plan” period.[10]

## **5. CONCLUSION**

The core of vocational education's digital-intelligent transformation lies on the irreversible nature of the digital-intelligent upgrades of industrial enterprises and the era of smart learning brought about by the new round of scientific and technological revolution to strive to push the organic integration of education chain and industrial chain, professional groups and job groups, courses and new technology, as well as school teaching and enterprise business. As an innovative exploration always on the road, it requires the joint efforts of all stakeholders. Therefore, it is necessary for Chengdu and other regions to integrate resources from all sides to jointly promote the digital-intelligent transformation of vocational education.

## **AUTHORS' CONTRIBUTIONS**

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