

# Study on the Adaptability of Specialty Construction of Chongqing Higher Education Institutions to the Development of "33618" Modern Manufacturing Cluster System

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**Abstract:** This paper takes the industrial development of 33618 modern manufacturing clusters in Chongqing Municipality as the actual background as the basis. The purpose of this paper is to study the adaptability of the construction of higher education institutions and the development of "33618" modern manufacturing cluster system, analyze the degree of match between the current higher education institutions' professional settings and the development needs of the manufacturing industry, and put forward corresponding optimization proposals. Through this research, we can more deeply understand the development status and future trends of the city's manufacturing industry, to further promote the high-quality development of the manufacturing industry to provide strong support. The study firstly elaborates the development overview of modern manufacturing industry in Chongqing, combines the development of 33618 modern manufacturing cluster system, and constructs the development model of professional construction applicable to the current economic background. Secondly, through questionnaire survey, interviews and policy text analysis, multi-source data including teachers, students, enterprises and relevant government document statements were collected to ensure the comprehensiveness and accuracy of the research results. The study found that: educational institutions with high technology acceptance are more capable of attracting and cultivating students with innovative spirit and practical ability; effective allocation of resources directly affects the quality of teaching and the enhancement of students' ability; the

implementation of teaching reforms can significantly enhance the responsiveness of education and the level of market orientation; and the in-depth promotion of the integration of industry and education is conducive to the accumulation of students' practical experience and the enhancement of their employment competition. In summary, the construction of e-commerce in colleges and universities should comply with the general trend of digital transformation, innovative educational concepts and teaching models, and strengthen cooperation with the industry in order to better adapt to and lead the needs of future e-commerce development. The research results of this paper expand the theoretical vision of 33168 modern manufacturing cluster system development research, and provide experience exploration and practical guidance for the construction of modern manufacturing industry in Chongqing and even the whole country, the new requirements for university professional construction and talent training, collaborate with industry information technology, education, science and technology, human resources and other relevant departments to promote the innovation of manufacturing high-quality development of talent training system, and promote the integration of "industry chain, innovation chain, talent chain, capital chain" depth.

**Keywords:** 33168 Modern Manufacturing Cluster System; Integration of Industry and Education; Professional Construction

## 1. Background of The Study

Manufacturing industry is the main body of the national economy, is the main battlefield of

science and technology innovation, is the foundation of the founding of the country, the tool for the development of the country, the foundation of a strong country. General Secretary Xi Jinping pointed out that our strategic choice is to continue to grasp the manufacturing industry, the high-quality development of the manufacturing industry, is the top priority of the high-quality development of China's economy. the scale of China's manufacturing industry has steadily ranked first in the world, but the core technology is stuck at the neck, big but not strong, supply chain security and other issues are still prominent. With the new energy, new materials, biotechnology, new generation of information technology, artificial intelligence and other scientific and technological achievements of the rapid iteration and continue to promote industrial innovation, to China's manufacturing industry from big to strong development has brought important historical opportunities and major challenges. the report of the 20th CPC National Congress pointed out that we should deeply implement the strategy of developing the country through science and education, the strategy of strengthening the country through talents, the strategy of innovation-driven development, open up new fields and new tracks for development, and continuously shape new dynamics and new advantages for development. To build a national important advanced manufacturing center is the Party Central Committee to Chongqing's important strategic mission, "the development of new quality productivity is the modernization of the new Chongqing comprehensively promote the construction of national important advanced manufacturing center, as a good national strategic hinterland construction "front-runner" an important task. "[1] Chongqing Municipal Party Committee and Municipal Government proposed to build "33618" modern manufacturing cluster system, based on the existing foundation, amplify the advantages of the characteristics, build the "four pillars", and timely introduction of the "In-depth promotion of the new era of the new journey of the new Chongqing manufacturing industry high-quality development action Program (2023-2027)". In order to achieve the city's manufacturing industry in the global competition in the breakthrough, based on

industrial innovation, focusing on talent support, the Municipal Economic and Information Commission to organize and carry out "the city's institutions of higher learning professional construction and" 33618 "modern manufacturing cluster system development adaptability research" research work.

In the field of higher education, "33618" modern manufacturing industry clusters and make every effort to build a national important advanced manufacturing center, requirements related. "As an important position to train professionals, the training of talents in universities should serve the national and local development strategy, oriented to the needs of economic and social development, which is also the core path of the connotative development of universities. "[2] In the face of the challenges of the new era of scientific and technological revolution and industrial change, it is necessary to give full play to the role of scientific research facilities such as laboratories in colleges and universities and research institutes, strengthen cooperation with enterprises, and realize the reform of the educational content, teaching methods and training of human resources in innovative modes, in order to help enterprises to break through the technological barriers limiting their development quickly and accurately. On the one hand, colleges and universities need to update teaching content, strengthen practical teaching, and reinforce students' technical application ability and market insight; on the other hand, colleges and universities are also facing challenges such as insufficient faculty, uneven distribution of teaching resources, and disconnection between the education model and industry demand. However, this also provides colleges and universities with the opportunity to improve the quality of education and students' employability through industry-teaching integration and teaching reform.

This project studies how to carry out the construction of university professional direction of "33618" modern manufacturing cluster in the context of Chinese-style modernization, which is of great significance for improving the quality of talents and serving the local economic and social development. the research results will help provide decision-making reference for policy makers, educators and industry practitioners, and contribute more

and more power to the construction of Chongqing as a manufacturing power in the new journey of promoting Chinese-style modernization. This project studies how to build e-commerce majors in colleges and universities in the context of digitization, which is of great significance for improving the quality of talents and serving the local economic and social development. The research results will help provide decision-making reference for policy makers, educators and industry practitioners, and promote the standardization, systematization and internationalization of e-commerce professional education in Chongqing and even the whole country.

## **2. Overview of The Development of Chongqing's Manufacturing Industry and Future Development Trends**

### **2.1 Overview of the Development of the Manufacturing Industry in Chongqing**

"The manufacturing industry is the main body of the real economy, is the foundation of the city of Chongqing, the foundation of the strong city. Nowadays, Chongqing has basically completed the transformation from a national old industrial base to a nationally important modern manufacturing base, which is mainly reflected in the following: the city has all 31 major manufacturing industries, and has basically built a manufacturing system with a complete range of categories and a wide variety of products; and a number of products have obvious competitive advantages in the country. "[3] As of 2022, the production of microcomputers, automobiles, and smartphones accounted for 19.9%, 7.6%, and 6% of the national output, respectively. 2022, from the perspective of the scale of the manufacturing industry, the city's large-scale industrial enterprises completed an output value of 274.93 billion yuan, an increase of 4.7% year-on-year; from the perspective of the market main body, there were 7,454 industrial enterprises above the scale of the industry, of which there are 2 enterprises of more than 100 billion yuan, 26 enterprises of more than 10 billion yuan, and the national specialized, special, new and advanced enterprises have been established in the city. From the perspective of market main body, there are 7454 industrial enterprises above scale,

including 2 enterprises above 100 billion yuan and 26 enterprises above 10 billion yuan, and the total number of national specialized, special and new "small giants" enterprises reaches 255; from the perspective of development of key enterprises, the output value of "double hundred enterprises" completes 1449.71 billion yuan, accounting for 52.7% of the city's large-scale industrial output value; from the perspective of spatial layout, the manufacturing industry of Chongqing Municipality has been From the spatial layout, Chongqing manufacturing industry has built up "2+13+36" park system, industrial parks concentrated 95% of the city's enterprises; from the scientific and technological innovation, large-scale industrial R & D investment intensity of 1.6%, to maintain the first in the West. Indicates that Chongqing manufacturing industries, the status of key enterprises to play a more prominent role, industrial concentration is further strengthened, the transfer of scientific and technological achievements in the innovation and development of enterprises to play a more prominent role.

### **2.2 Future Development Trends**

The second plenary session of the Sixth Municipal Party Committee of Chongqing Municipality formulated the "33618" modern manufacturing cluster system as a manufacturing development plan, aiming to promote the high-quality development of manufacturing industry in Chongqing Municipality. The system will focus on creating a smart network of new energy vehicles, a new generation of electronic information manufacturing, advanced materials, the three trillion industrial clusters, and strive to cultivate into a world-class industrial cluster, become a "manufacturing city" core pillar. In the construction process, Chongqing will make full use of the existing industrial foundation and characteristic advantages, and build up the "four beams and eight pillars", to promote the city's manufacturing industry to form upstream and downstream collaboration, high, medium and low-end synergistic integration of cluster development, in order to build a national important advanced manufacturing center. Each manufacturing enterprise's production capacity, service capacity, innovation capacity, etc. are directly determined by the "33618"

modern manufacturing cluster system construction process and quality. the newly introduced program can be regarded as the action guide and policy toolbox for Chongqing manufacturing enterprises in the next five years. This program is not only of great significance to the economic development of Chongqing, but also has a far-reaching impact on promoting the overall upgrading of China's manufacturing industry.

## 2.3 Problems

### 2.3.1 Policy Orientation Issues

In terms of policy, although Chongqing Municipality has introduced a series of policy measures to promote the transformation of the modern manufacturing industry, there are differences in the specific implementation details and implementation framework in the field of higher education. the effectiveness, competence and operability of the policies in the current process require identifying and dissecting the bottlenecks in the implementation of the policies, optimizing the policy environment and better promoting the construction of 33618 modern manufacturing industries and the cultivation of talents.

### 2.3.2 Problems of Enterprise Talent Demand

New changes have occurred in the demand for enterprise job talents. With the accelerated development of intelligent manufacturing, enterprise production positions are in rapid change. According to the survey, in the intelligent manufacturing enterprises: production line operation and operation and maintenance positions accounted for about 35% -40%, production line process management positions accounted for about 30% -35%, quality management positions accounted for about 10% -13%, the three types of positions accounted for about 80% of the demand for enterprise positions; product design positions accounted for about 8% -12%, sales and service positions accounted for about 8% -10%, technology management positions accounted for about 80%; product design the three types of positions accounted for about 80% of the demand for enterprise positions; product design positions accounted for about 8%-12%, sales and service positions accounted for about 8%-10%, and technical management

positions accounted for about 3%-5%. Around the industrial chain of technology demand is mainly manifested in the standardization, networking, platform technology comprehensive application, enterprise talent demand presents knowledge and skills composite trend. the rapid development of the new round of scientific and technological revolution has promoted the emergence of new occupations, new types of jobs and new positions, which has continuously put forward new demands for practitioners' knowledge and skills, and has put forward new and higher requirements for the adaptability of the professional settings and talent training of colleges and universities.

### 2.3.3 Problems with Educational Models

"Adjustment of professional goals is a strategic task to adapt to the construction of the national modern industrial system, buttress the needs of industrial development, and promote the structural reform of the supply side of vocational education talents, and it is an important basis for the running of schools and training of talents in all institutions of higher education. "[4] the updating of majors in colleges and universities is lagging behind the needs of industrial development. According to the national regulations on professional adjustment and renewal, the cycle of updating and adjusting majors in colleges and universities is five years, and the time limit for professional adjustment is too long, making it difficult to keep up with the pace of transformation and upgrading of industries. "Taking the new generation of electronic information industry as an example, during the three years from April 2019 to June 2022, the Ministry of Human Resources and Social Security, the General Administration of Market Supervision, and the National Bureau of Statistics have jointly released five batches of a total of 74 new occupations, of which 29 belong to the category of information technology, accounting for a ratio of 39.2%. "[4] Only by major categories, college graduates are difficult to cope with the needs of new occupations, thus putting forward new requirements for the subdivision of the field of specialization of colleges and universities. Corresponding to the "33618" modern manufacturing cluster system requirements, the city's colleges and universities also need to

further strengthen the segmentation of professional construction, such as further strengthening of intelligent measurement and control engineering, intelligent perception engineering, software and microelectronics, power semiconductors, robotics engineering, display science and technology, integrated circuit engineering technology, rare-earth permanent magnet materials and other professional construction. Specialized construction in the field.

### 2.3.4 Teaching Resource Issues

The problems of uneven distribution of resources and lagging updating are equally prominent. Colleges and universities have not invested enough in teaching resources, especially advanced teaching tools and experimental facilities, which to a certain extent negates the improvement of education quality and the cultivation of students' abilities. Existing resources are optimized and new technologies and platforms are actively introduced to modernize teaching resources.

### 2.3.5 Problems of School-Enterprise Cooperation

The ability of college graduates to master the advanced production equipment of enterprises is insufficient. Among the three elements that make up productivity, the combination of producers and advanced production tools is the core of advanced productivity; practical education is the essence of vocational education, and the advanced nature of the practical training tools provided to students by schools has a direct impact on the skill level of students. Compared with the speed of updating the production equipment of enterprises, the practical training equipment provided by schools cannot maintain the leading position for a long time, and there is a big gap between the production equipment used by the graduated students of vocational schools in schools and the production equipment actually used by enterprises in terms of technological advancement, and it is difficult for the technical ability of students to meet the needs of enterprises, which leads to difficulties for graduates of colleges and universities to use the production equipment of enterprises.

The identification of these problems is a revelation of the actual challenges in the process of construction and talent cultivation

of modern manufacturing professions in the current 33618, which provides a solid foundation for the subsequent proposal of specific improvements, optimization programs and implementation paths. Through systematic analysis and in-depth discussion, it aims to accelerate the city's construction into a nationally important advanced manufacturing center and cultivate high-quality talents.

## 3. 33618 Modern Manufacturing Cluster College Specialization Construction Framework

### 3.1 Renewal of Educational Philosophy

The updating of the concept of education is crucial. First, we need to deepen the concept of integration of industry and education into all aspects of education. This includes the establishment of an education mechanism that closely matches with enterprises in the "33618" modern manufacturing cluster to meet the demand for talents in industrial development. Secondly, the importance of practical teaching is self-evident. In the process of curriculum design and implementation, the combination of theory and practice should be emphasized, and students' practical ability and competitiveness in employment should be enhanced through school-enterprise cooperation and internship training. In addition, the concept of student-centered education needs to be emphasized. We need to pay attention to the individual differences and development needs of students, provide personalized teaching support and services, and cultivate high-quality talents that meet the needs of industrial development.

### 3.2 System Integration and Optimization of The Curriculum

Corresponding to the "33618" modern manufacturing cluster system requirements, although the city's colleges and universities in the first level of professional categories are basically able to cope with the needs of industrial development, but the integration and optimization of the curriculum system is necessary. Comprehensive research and analysis results, compared with the "33618" modern manufacturing cluster talent demand and the existing professional settings in colleges and universities, some of the majors need to be strengthened, including 10 high-

frequency majors (materials science and engineering, computer science and technology, electrical engineering and automation, electronic information engineering, communications engineering, artificial intelligence, data science and big data technology, new energy materials). Science and Big Data Technology, New Energy Materials and Devices, New Energy, Mechanical Engineering), 21 sub-fields of specialization (New Energy Vehicle Engineering, New Energy Vehicle Test Technology, Microelectronics, Optoelectronics, Integrated Circuits, Power Semiconductors, Rare-Earth Permanent Magnet Materials, Embedded Systems and Technology, Functional Materials, Satellite Communications and Navigation, Instrumentation Science and Technology, Brain Science, Genetic Engineering, Immunology, Human-Computer Interaction, Bioproducts Inspection and Quarantine, Human-Machine Interface), and the following (biological product inspection and quarantine, environmental science and engineering, intelligent measurement and control engineering, software and microelectronics, robotics engineering, integrated circuit engineering technology), as well as the demand for enterprise job talents to the comprehensive, refined direction of change and other issues, the need for colleges and universities in the construction of the profession to take active measures to deal with. "For colleges and universities, it is necessary to adjust the curriculum in the theory and practice of the allocation of hours, accelerate the teaching reform, timely adjustment of the curriculum, so as to achieve employment-oriented, so as to continuously improve the employability of students." [5]

Secondly, the establishment of industry-education consortia is an effective way to train talents in line with industrial needs. Colleges and universities should update and adjust the curricula of relevant majors in accordance with the needs of enterprises and market trends to ensure that students acquire knowledge and skills in line with the actual needs of the industry. Conduct targeted curriculum design and teaching activities to improve students' practical ability and employment competitiveness. Reform the curriculum system to enhance practicability. This requires

higher education institutions to finally, strengthen cooperation with enterprises to improve the relevance and effectiveness of education. This requires institutions of higher education to establish long-term cooperative relationships with enterprises and jointly develop courses and training programs adapted to the needs of the modern manufacturing industry. In addition, the establishment of a sound curriculum evaluation system is also an important part of curriculum integration and optimization. the practicality and foresight of the curriculum content can be ensured by building a system that is fundamental to the statute, goal-oriented, and means of evaluation. It is also necessary to pay attention to the individual differences and developmental needs of students and provide personalized teaching support and services.

### 3.3 Reform of Teaching Methods

Teaching methods such as flipped classrooms, case studies, project-oriented learning and simulation operations are adopted to enhance students' learning initiative and practical ability. That is, it advocates the free development of individuality, encourages students to show distinctive personalities and pursue novelty in academics. With the teaching goal of being application-oriented and cultivating the ability to work in competent positions, we focus on what students have learned and emphasize the relevance of students' learning to the jobs they will be engaged in in the future. These methods can effectively promote the organic combination of students' theoretical knowledge and practical skills, and thus improve their comprehensive quality.

### 3.4 Construction of Practice Platform

The Second Plenary Session of the Sixth Municipal Party Committee of Chongqing Municipality formulated the "Action Program for Promoting the High-quality Development of Manufacturing Industry in Chongqing for a New Era and a New Journey (2023-2027)", which put forward the need to build the "four beams and eight pillars", and to promote the city's manufacturing industry to form upstream and downstream collaboration, and to promote the integration of high-medium-low-end synergistic cluster development. development, and cultivate a high-level "33618" modern

manufacturing cluster system. In this process, we need to make full use of the existing foundation, amplify the characteristics of the advantages, for example, Chongqing as a national important modern manufacturing base, manufacturing industry categories, with manufacturing industry all 31 categories of industry, built the world's largest electronic information industry cluster and the largest automobile industry cluster. At the same time, we also need to strengthen the docking with enterprises in the "33618" modern manufacturing cluster to promote student employment and talent training. This includes adjusting and optimizing the professional settings according to the needs of each enterprise, such as the addition of mechanical design and manufacturing and automation, electronic information engineering, computer science and technology and other majors.

### 3.5 Faculty Development

"In order to fully implement the spirit of the 20th Party Congress and the spirit of the second and third plenary sessions of the 6th Chongqing Municipal Party Committee, play a positive role in the integrated development of education, science and technology, and talents in universities, explore the theory and path of big data and intelligence to lead the development of high quality, and help the national information industry and Chongqing "33618" Modern Manufacturing Cluster System Construction. "[6] Colleges and universities need to cultivate a team of dual-teacher teachers with both specialized knowledge and rich practical experience. This is especially true for those specialized fields related to modern manufacturing, such as mechanical design and manufacturing and automation, electronic information engineering, and computer science and technology. Regularly organize teachers to participate in industry and technology training to enhance their teaching and research capabilities, and introduce international advanced education concepts and methods through international exchange programs. We also need to pay attention to the development needs of the teaching force and provide personalized teaching support and services to stimulate their enthusiasm and innovation.

### 3.6 Deep Integration of Industry, Academia,

### Research and Utilization

Corresponding to the requirements of "33618" modern manufacturing cluster system, the deep combination of industry, academia, research and utilization is the key. First of all, we need to strengthen school-enterprise cooperation and promote the deep integration of industry and education. Establish an early warning mechanism for professional market demand, through market research, industry data analysis, etc., to understand the changing trends of industrial demand in advance, so as to make timely adjustments. For majors that have no market demand for a long time, universities should consider gradually stopping enrollment and phasing out to avoid wasting resources. In addition, around the "33618" modern manufacturing cluster system, the formation of a number of municipal industry and education consortium, industrial parks led by the industry and education consortium, industry enterprise-led industry and education consortium, school-led industry and education consortium.

Through the implementation of the framework, 33618 Modern Manufacturing Education will be more in line with the requirements of the digital era and better able to meet the industry's demand for high-quality manufacturing talents. This will not only help to enhance the employment competitiveness of students, but also help to promote the development of the modern manufacturing industry in the said region by providing talents and intellectual support.

### 4. Conclusion

In general, the adaptability of the professional construction of higher education institutions in our city to the development of "33618" modern manufacturing cluster system is still to be improved. This study proposes the strategies of optimizing curriculum, innovative teaching methods, faculty construction and industry-university-research cooperation. It can effectively improve the adaptability of higher education institutions' professional construction and the development of modern manufacturing industry, and provide strong talent support for the development of modern manufacturing industry in our city.

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