

A Research Plan for the Construction of a Technical Innovation Service Platform in Vocational Colleges under the Background of “Double-high Program”

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Keywords: Technical Innovation Service Platform; core research team; three integrations; industry

Abstract: The new mission of higher vocational education in the new era under the background of the “Double-high Program” is to construct a platform for innovation, establish high-level and structured scientific research teams, and form the research fields suitable for regional development, so as to play the leading role of higher vocational education in talent cultivation. Thus, cultivating high-quality talents and improving national competitiveness have been achieved for promoting economic and social development. The importance, urgency and value of the subject were fully reflected according to the vocational education status under the background of “Double-high Program”. The research statuses in foreign countries and in China were introduced in this paper. The main objective, core concept and the main concept of the Innovation Platform were introduced and analyzed. The research thoughts and methods including literature research, in-depth interview, data analysis, and case analysis were planned and proposed by the planned technical route. The innovations in the Research Plan were proposed such as implementing government-school-enterprise collaboration, exploring the functions of the Platform and building a Five-in-one Innovation Platform to develop modular courses, and integrating them into compound and innovative talent training. The research points were effective and innovative.

1. Introduction

A series of new objectives, judgments and requirements were proposed in the National Vocational Education Reform Implementation Plan, which was issued by the State Council of the People’s Republic of China on January 24, 2019. The top-level design and construction blueprint for vocational education in the new era was planned in the objective [1]. The Opinions on the Implementation of the Construction Program for High-Level Vocational Colleges and Specialties was called ‘Double-high Program’, and was issued by the Ministry of Education and the Ministry of Finance on March 29. It focused on concentrating efforts to construct a number of worldclass vocational colleges and specialties with Chinese characteristics that can lead the reforms and support the development. The Technical Innovation Service Platform is an effective measure to deepen the reform of vocational education, strengthen connotation construction, realize high-quality development, and construct a highland for cultivation of technical talents and. For vocational colleges, to create the “Innovation Platform” under the background of the “Double-high Program” is important and meaningful.

In this paper, the research status about the Technical Innovation Service Platform in vocational colleges was investigated and researched both at home and abroad. Then, the research contents on the Innovation Platform were planned including main objective, core concept and main concept. The the research thoughts and methods were planned and the research routine was designed for constructing the Technical Innovation Service Platform.

2. Research status

Since the development of the vocational education and training system is a research hotspot [2-7], especially in China, the national policies support the development of vocational education and training system now, and the research subject is more and more important.

2.1. Research Status in Foreign Countries

As an important part of the regional innovation system, the Technical Innovation Platform, is a strong support for technological innovation of regional industries and enterprises.

In the United States, the “Innovation Platform” was initially proposed in the Going Global: The New Form of American Innovation issued by the Council on Competitiveness in 1999. At present, a joint research, development and production mechanism composed of the federal government, state governments, enterprises, research institutions, and universities in high-tech industries in the United States is conducted. The government promoted joint development of new products by federal laboratories and private high-tech enterprises, and stipulated that federal laboratories should invest a certain proportion of funds for industrial cooperation, and identifying the research and development priorities, which could help to transfer technologies from federal laboratories and universities to enterprises, thus the industrialization of scientific and technological achievements was promoted [8].

European Institute of Innovation and Technology (EIT), the most typical institute in EU, is a partner organization founded in 2008, which consists of education institutions, scientific research institutes, and innovative enterprises. It can promote scientific and technological innovation, realize the transformation of scientific and technological achievements, and improve the industrial level while cultivating high-tech backbone talents. Based on industry-college-institute cooperation, EIT has successfully obtained corporate and social funds in addition to government funds, making it a successful model for the construction of Innovation Platforms.

In Japan, the Innovation Platforms with distinctive characteristics were mainly established by research institutions or institutes independently invested by enterprises. They would invest the funds required for technological research and development based on their own development strategy, to ensure sustained and long-term investment during technological innovation. Fixed research personnel and equipment should be further arranged to form an independent innovation atmosphere and enhance the independent innovation capabilities of Japanese enterprises. Thus, an enterprise-based system for the construction of Innovation Platform was constructed.

2.2. Research Status in China

At present, higher vocational education has made a great progress in China, and has gained a certain sense of social identity in the field of training for application-oriented talents. The organic combination of teaching and scientific research is an effective mechanism for vocational colleges to realize continuous development [9]. The implementation of the “Double-high Program” can promote the education and scientific research, and promote the specialty construction and talent training. Thus, the level of scientific research and the quality of talent training of higher vocational education is improved.

The problems faced in the development of higher vocational education shall be reflected and resolved through scientific researches. However, the rapid development of vocational education have started for a short time. The basis for scientific researches is still weak, and its role in promoting talent training and specialty construction in vocational colleges has not been fully played. The studies on Technical Innovation Service Platform are relatively scattered, without a systematic study. For example, we have proposed the “Three Integrations”, referring to the integration of industry development, enterprise development, and talent training, so as to clarify the Platform’s construction path. However, how to implement the proposal and present the effects of the proposal should be researched comprehensively and systematically, including the scientific research team, operating system, scientific research and teaching, and mutual support for transformation of scientific research results.

3. Research contents on innovation platform

3.1. Main Objective

During the construction of the Innovation Platform, the governments, schools, industries and enterprises should perform collaborative innovation in Beijing, especially in the Economic and Technological Development Zone, to study its operation mechanism, highlight the “double-subject” status of schools and enterprises, and promote the Platform to fully play its role. The “Double-subject” here refers to schools and enterprises.

This study focuses on the research approach for constructing the Technical Innovation Service Platform for vocational colleges based on the background of the “Double-high Program”. It intends to make up for the shortcomings of technological innovation in vocational colleges, follows the trend of technological development, and promotes the organic combination of talent training, team building, and technical services based on accumulation of technical skills. Thus, it has realized coordinated advancement, mutual promotion, and overall improvement of functions of the Innovation Platform.

3.2. Core Concept

There are three core concepts involved in the construction of the Technical Innovation Service Platform, such as “Technical Innovation Service Platform”, “Core Research Team” and “Three Integrations”. The definitions are as follows: (1) The “Technical Innovation Service Platform” refers to the Industry-Education Integration Platform, which consists of schools, governments, industries, and enterprises based on all-round cooperation on aspects of talents, equipment and venues between schools and enterprises. It should be constructed following the concept of “collaborative innovation, openness and sharing”, national needs, regional economic and social development needs. Based on modern industrial system It should be able to resolve practical problems in the improvement of regional leading industries, transformation of traditional industries and development of industrial enterprises, and cultivate talents according to their technical processes and product development needs [10]. (2) The “Core Research Team” is an effective organization of scientific research human resources. It carries on talent training for specific scientific research projects. And it is a team composed of researchers with complementary skills in vocational colleges, who are willing to take responsibilities for common scientific research purposes, objectives, and working methods [11]. (3) The “Three Integrations” are the integration of industry development, enterprise development, and talent training, so as to clarify the Platform’s construction path.

3.3. Main Concept

This study intends to construct an Innovation Platform under the background of the “Double-high Program”, and the research based on the construction of a Specialized Test Base for Complex and Special-Shaped Parts (the Innovation Platform set in schools by Beijing Economic and Technological Development Zone). It focuses on the integration of the Innovation Platform into the development of automobile industry, development of machinery industry enterprises, training of SCI (skilled, comprehensive, innovative) talents, the forming of an incentive mechanism for the scientific research team, a technical service mechanism and an achievement transformation mechanism in the process of “Three Integrations”. It also focuses on systematic studies, with the aim of developing an operation mode for promoting the Innovation Platform.

- Build a core scientific research team, and clarify the team building mechanism. The key to construct a Innovation Platform is to organize, optimize and build a well-structured team in terms of subject theory, skills, and age. It is particularly important to explore the building mechanism, incentive mechanism, performance evaluation mechanism, training promotion mechanism and cultural influence mechanism of the scientific research teams in vocational colleges.
- Improve the Platform’s support system based on collaborative innovation of the governments, schools, industries and enterprises. Based on high-end automobiles and NEVs, robots and

intelligent manufacturing industries, and enterprises with micro, small and medium-sized scales in Beijing Economic and Technological Development Zone, the Innovation Platform focuses on service orientation, and “double-subject” status of schools and enterprises in innovation following their innovation needs, so as to improve the technical innovation service support system under the leadership and support of the government.

- Serve micro, small and medium-sized enterprises, and form the Platform’s operation mechanism. During the operation of the Platform’s for innovation, it intends to serve enterprises, especially enterprises with micro, small and medium-sized scale in Beijing Economic and Technological Development Zone. For technology research and development and product upgrade, improve the corresponding management system, form an operation mechanism, promote the sound development of the Innovative Platform, and form the operation mechanism of the Innovation Platform participated by governments, schools, and enterprises, so as to promote the achievements facilitately.
- Integrate into the talent training system, and innovate the path of promoting education through researches. The development of the Innovation Platform should integrate the training of compound technical talents and innovative technical talents into the SCI talent training system. On the one hand, new products, new techniques, and new norms in external service items can be applied in teaching. Modular courses should be constructed for cultivating compound and innovative talents. On the other hand, the students can participate in the process of external services, and cooperate with technical personnel to resolve practical problems during production, so as to build student innovation teams, accumulate practical experience, and explore talent training paths.

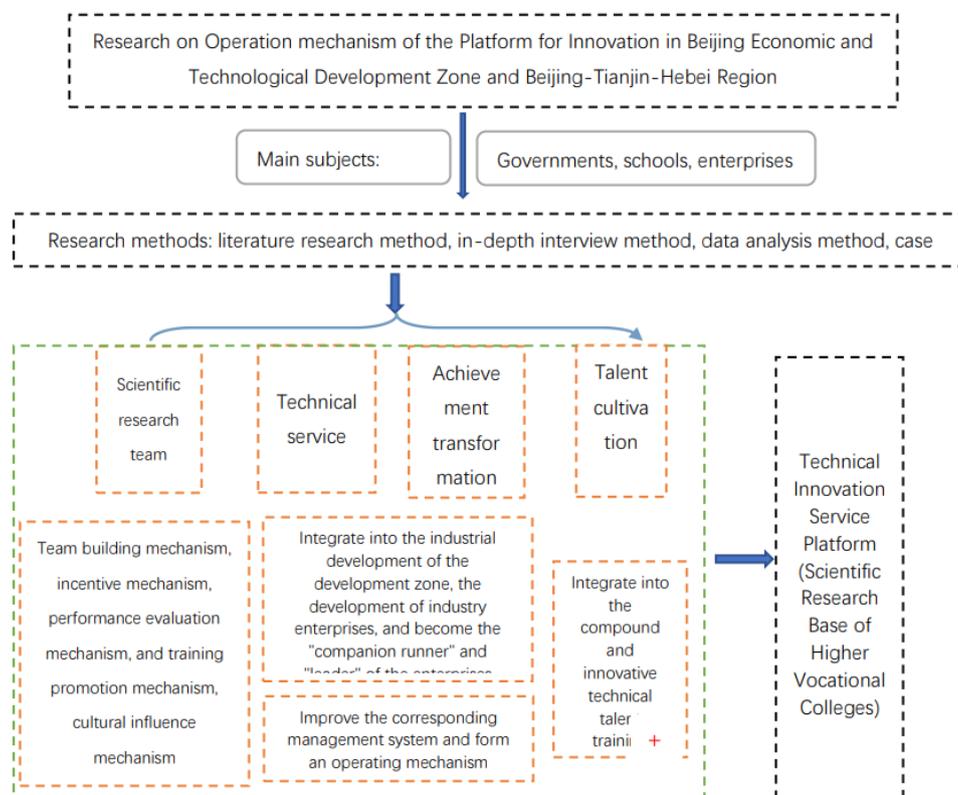


Figure 1. Diagram of the research technology route

4. Research thoughts and methods

4.1. Research Thoughts

“School-enterprise cooperation, and industry-education integration” centering on the National Implementation Plan for Vocational Education Reform should be highlighted. The methods of

literatures, in-depth interviews, data analysis, and case analysis were applied. It is integrated into regional economy to resolve the technical problems encountered by enterprises in Beijing Economic and Technological Development Zone. In addition, it has also collected the first-hand data of typical cases regarding the operation mechanism of the Innovation Platform in the process of providing technical services. While focusing on the research team's incentive mechanism, technical service mechanism, achievement transformation mechanism, and talent cultivation, it intends to construct a highly systematic operation mechanism of the Innovation Platform, and build a replicable, easy-to-learn, and popularized operating mode, thus giving full play to the radiation effects. The technical route is shown in Figure. 1.

4.2. Research Methods

- Literature Researches. Perform in-depth study on documents such as the National Implementation Plan for Vocational Education Reform and Opinions of the Ministry of Education and Finance on the Implementation of the Construction Plan on High-level Vocational Colleges and Specialties with Chinese Characteristics. Collect documents on the Technical Innovation Service Platform and other fields through CNKI, foreign language databases and the National Library, so as to obtain the latest domestic, foreign developments and trends in major research fields timely. Track the academic frontiers, and find the existing problems in combination with the current work regarding the Innovation Platform.
- In-depth Interview. Visit the Government of Beijing Economic and Technological Development Zone, especially interview with the Science and Technology Innovation Bureau. Visit the enterprises including Beijing Benz Automotive Company and Beijing New Energy Vehicle Co., Ltd., and visit representative colleges and universities in Beijing. Interview with the relevant working staffs, understand the measures and schemes for “Double-high” construction of vocational colleges, summarize the construction measures of the Technical Innovation Service Platform, and form the first-hand research data.
- Data Analysis. Find out the specific measures and experience to resolve problems through searching for information and data. Summarize the first-hand data obtained from the interviews and form the achievements in terms of the scientific research team of the Innovation Platform and its operation mechanism.
- Case Analysis. The Specialized Test Base for the research, and smart manufacturing of complex and special-shaped parts is the Innovation Platform set by Beijing Economic and Technological Development Zone in schools, which can integrate its innovation functions into the industries, the enterprises, and talent cultivation under the background of the “Double-high Program”. The verification and implementation of the operation mechanism of the Innovation Platform during the construction of the Specialized Test Base would be more universal and more generalizable valuable

5. Innovations

The innovations in the construction of the Technical Innovation Service Platform for vocational colleges under the background of “Double-high Program” mainly include the following contents.

5.1. Implementing government-school-enterprise collaboration

The construction of the Innovation Platform has been included in the planning of Beijing Economic and Technological Development Zone, which is the motivation from the Government. The construction of the pilot base has been included in the construction task of the “Double-high Program”, which is the motivation from the schools. The enterprises participating in the construction of the Specialized Test Base will enjoy the preferential policies from the Government, which can stimulate the motivation of enterprises. The motivation from the three parties will create a good construction environment for the Innovation Platform.

5.2. Exploring the functions of the Platform, and building a five-in-one Innovation Platform

This study intends to explore the cooperation mechanism between schools and enterprises and between schools and schools during operation of the Innovation Platform, to build a five-in-one Innovation Platform integrating technology research and development, technical services, social training, teaching training, and skill competition, to transfer production items into teaching carriers, and to serve the teaching.

5.3. Developing modular courses, and integrating into compound and innovative talent training

The research strength of the Innovation Platform should be played. Modular courses should be developed to cultivate compound and innovative talents in the field of high-end automotive smart manufacturing, and to build a training base for corporate employees.

6. Summary

With the economic development in Beijing Economic and Technological Development Zone, the functions of the Innovation Platform should be reconstructed and integrated into the development of Beijing by taking the opportunity of the “Double-high Program” based on the construction task of professional group. The research status both at home and abroad was introduced in this paper. The main objective, core concept and the main concept of the Innovation Platform were introduced and analyzed. The research thoughts and methods were planned and proposed by planning technical route. The innovations in the research plan were proposed including implementing government-school-enterprise collaboration and exploring the functions of the Platform and building a Five-in-one Innovation Platform. Developing modular courses, and integrating it into compound and innovative talent training. The research points will be effective and innovative.

Acknowledgements

Thanks to the funds and supports from The Beijing municipal education scientific planning project -2021 annual planning project (CGDB21208) and Major subject of Beijing Polytechnic (2020 z041 - SXZ).

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