Analysis and Prospect of Financial Fund Planning for Higher Vocational Education from the Perspective of Industry Education Integration: A Case Study of Tianjin

Mengjie Li[1] and Shenyi Yang[2]
[1]School of Economics, Capital University of Economics and Business, Beijing, China
[2]School of Culture and Communication, Beijing International Studies University, Beijing, China

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Abstract: As an important way to cultivate highly skilled talents, higher vocational education has received widespread attention for its financial planning, but there are still shortcomings in existing research and practice. This article takes Tianjin as an example to analyze the current situation, problems, and impact of financial fund planning for higher vocational education under the background of industry education integration on the allocation of educational resources and the quality of talent cultivation. Research has found that Tianjin has achieved significant results in the planning of financial funds for higher vocational education, but there are still some problems with the specific implementation. Based on this, this article proposes that the government should increase investment in the construction of a policy system for the integration of industry and education, develop specific and feasible policy texts, and establish a sound mechanism for evaluating effectiveness.

1 INTRODUCTION

With the gradual shortage of labor and the continuous increase in wages, the "Lewis turning point" has emerged in China, where the aging population is deepening, and the demographic dividend is gradually disappearing. In the era of rapid upgrading of industrial structure and rapid technological innovation, education has also been given higher requirements (Wang, 2024). Vocational education should not only adapt to the needs of the social economy but also play a leading role in technological innovation and industrial transformation. Through the cooperation between schools and enterprises, it will cultivate high-quality, innovative, and effective technical talents, and promote the transformation from the quantitative advantage of the labor force to the advantage of labor quality. Because higher vocational education is an important way to cultivate highly skilled talents, strengthening research and optimization of its financial planning is particularly crucial. Shen believes that in terms of investment status, existing literature on relevant topics in China mainly focuses on the sources of funding for higher vocational education, as well as regional differences and improvements in investment systems (Shen, 2020). As Zhou and Yue have said, the history of vocational education development is a history of continuous innovation in the concepts and practices of industry education integration and school-enterprise cooperation (Zhou & Yue, 2017). These issues also significantly exist in the financial investment of industry education integration. Internationally, the practice of industry-education integration started early and has developed into mature models, such as the dual system in Germany and the cooperative education model in the United States (Hu, 2024). Compared with the mature development of the integration of industry and education in the world, the development of related fields in China is relatively slow, and there is still room for improvement. Jia raised the issue of China's domestic education integration financial mechanism, firstly, the insufficient matching between vocational education financial mechanism and enterprise demand (Jia, 2019). Secondly, the fiscal mechanism has not been aligned with the interest mechanisms of all parties involved in the integration of industry and education. Finally, the incomplete integration system of industry and education has resulted in the inability to reflect the role of fiscal funds (Jia, 2019).

Tianjin is the first "National Vocational Education Reform and Innovation Pilot Zone" in China. Vocational education started early, but there are still

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problems such as an imbalanced funding structure and inadequate investment mechanism guarantee (Gao, 2023). In 2019, Tianjin was recognized as a pilot city for the integration of industry and education, fully reflecting the high importance that Tianjin attaches to this aspect. However, the issue of related special funds not only limits the scale of vocational education in Tianjin but also hinders the further deepening of cooperation between industries and schools. Therefore, based on policy analysis of national policies, this article combines data and case analysis of Tianjin and specific schools in Tianjin to explore a planning model suitable for the special financial funds for the integration of industry and education in higher vocational education in Tianjin based on actual implementation effect research and provide reference experience for other regions. This study also helps to explore the positive interaction mechanism between industry education integration and fiscal funding planning, providing theoretical support for promoting the deep integration of vocational education and industrial development. Finally, by analyzing the existing problems and deficiencies in the planning of financial funds related to the integration of industry and education in Tianjin, targeted suggestions are provided on how to optimize fund allocation and improve utilization efficiency.

2 TOP-LEVEL POLICY ANALYSIS OF THE SPECIAL FUND FOR INDUSTRY EDUCATION INTEGRATION

In the process of promoting close integration between schools and industries, special funding policies at the national level have played an indispensable and important role. The implementation of these policies not only promotes deep collaboration between schools and industries but also lays a solid foundation for regional economic development and the construction of an innovative society, demonstrating the country's strategic vision and policy wisdom in promoting the linkage between education and industry.

2.1 Precise Advertising Strategy

In terms of funding allocation, policy documents at the national level also demonstrate precision. For example, relevant policies indicate that central budget investment will support pilot cities to independently plan and construct industry education integration training bases and prioritize the layout and construction of industry education integration innovation platforms. At the same time, dynamic rewards will be given to provinces and pilot cities with significant construction achievements. This policy not only ensures that funds can flow to the most needed and critical areas but also creates a positive competitive atmosphere through the establishment of reward mechanisms, promoting continuous exploration and innovation in the integration of industry and education in various regions.

2.2 Priority Support for Key Areas

In terms of guiding the direction of training base construction, national-level policy documents also reflect clarity. The relevant policies stipulate that when arranging specific investment projects, the construction of training bases in the fields of advanced manufacturing, artificial intelligence, elderly care, and housekeeping will be put in the first place. This policy not only clarifies the direction of fiscal investment but also helps to concentrate resources to promote the in-depth development of industry education integration in key areas and improve the efficiency of fund utilization.

2.3 Diversified Incentive Measures

Regarding enterprise incentive measures, national-level policy documents are increasingly improving, gradually achieving diversification and targeted incentive methods. From proposing the direction of enterprise incentives for the first time to building a combined incentive mechanism of "finance+finance+land+credit", and then refining specific policies from four aspects, the country has gradually improved the incentive system for the projects through three important policy documents. The final specific policies are shown in Table 1. These policies are guided by systematization and precision, taking into account the actual needs of enterprises and reflecting the strategic layout of government support for the integration of industry and education. At the same time, the gradual promotion and refinement of these policies have created a favorable environment for deep cooperation between enterprises and educational institutions. However, Yang Guangjun's research found that some problems have gradually emerged in the implementation process of relevant incentive policies for enterprises, such as the tax credit incentive policy emphasizing "hard" over "soft" in recognizing

enterprise investment, emphasizing enterprise resource investment over school output effect in incentive orientation, and the difficulty in forming a joint force of relevant policies. The incentive effect on enterprises still needs to be strengthened (Yang, 2022).

Table 1: Final specific policies of "finance+finance+ land+credit".

Policy points	Policy initiatives
Financial Policy	The government has increased its efforts to recommend vocational education industry education integration medium - and long-term loan projects to financial institutions.
Investment Policy	The central government will invest in the construction of qualified training bases. Eligible projects will be included in the scope of local government special bond support.
Financial and Tax Policy	Enterprises that invest according to regulations can deduct 30% of the investment amount from the education surcharge and local education surcharge that should be paid in the current year.
Land Policy	The construction land for enterprises to invest in or cooperate with the government in the construction of Vocational Colleges and universities shall be managed according to the land for education. Explore the way of a long-term lease, a combination of lease and concession, and flexible term transfer for land supply.
Credit Policy	Strengthen the collection of credit information of enterprises integrating production and education, and carry out industry credit evaluation.

3 LOCAL LEVEL ANALYSIS OF TIANJIN CITY

3.1 Specific Implementation

3.1.1 Policy Implementation

The "Tianjin Vocational Education Regulations" and the "Tianjin Vocational Education Industry Education Integration Promotion Regulations" will be implemented from 2024 onwards, making Tianjin a national modern vocational education reform and innovation demonstration zone and one of the first batch of national pilot cities for the integration of industry and education. In the "Tianjin Vocational Education Promotion of the Integration of Industry and Education", the use of key special funds of the relevant financial departments is classified. At the same time, it is required to diversify fundraising methods and give priority to supporting special funds related to government and enterprises. At the level of supervision and management, the regulations clearly state that it is necessary to jointly formulate measures for the management of special funds and strengthen the supervision of the use of funds. At the same time, in terms of policy incentives, the Tianjin Municipal Development and Reform Commission took the lead in compiling the "Implementation Plan for the Construction of Tianjin Pilot Cities for the Integration of Industry and Education", and put forward a policy combining 22 incentive policies of "finance + tax + land + talent".

Macro-fiscal policy provides a guiding framework for local governments, and Tianjin's regulations are the concrete implementation and refinement of this. This top-down policy linkage and complementarity reflects the positive interaction between the state and the local government and the joint efforts to achieve the same goal.

3.1.2 Financial Investment

In 2020, the financial budget for higher vocational education in Tianjin reached 534453725.84 yuan, laying a solid foundation for the development of vocational education. In 2021, the expenditure on vocational education in Tianjin has significantly increased, especially in higher vocational education. The preliminary budget is 55706800.00 yuan, and the actual settlement expenditure is 601426161.00 yuan, accounting for 107.96% of the preliminary budget. The main reason for exceeding the budget is that the government has increased special funds for student aid and "double high" construction, which reflects the government's emphasis on improving the quality of vocational education and student welfare. In 2022, Tianjin's financial investment in higher vocational education continued to increase, with a budget of 618.727 million yuan at the beginning of the year and an expenditure of 708719869.60 yuan at the end of the year, completing 114.54% of the budget at the beginning of the year. Similar to 2021, the reason for the final budget is higher than the budgeted amount is also due to an increase in student aid and dedicated funds for "double high". This indicates that in promoting the high-quality development of higher vocational education, Tianjin not only pays attention to the reasonable arrangement of the budget but also flexibly adjusts according to the actual situation to ensure sufficient investment of funds. In 2023,

Tianjin's financial investment in higher vocational education reached a new level. The budget at the beginning of the year was 93938800.00 yuan, and the expenditure settlement reached 1042426731.08 yuan, completing 110.97% of the budget at the beginning of the year. This growth trend once again confirms Tianjin's firm support and continuous investment in the development of higher vocational education, and further reflects the government's strategic vision and practical measures for developing vocational education.

The financial budget for higher vocational education in Tianjin has been increasing year by year. Especially since 2021, the growth rate of funds has significantly accelerated, reflecting Tianjin's determination and strength to promote high-quality development of vocational education. At the same time, the fact that the final accounts are generally higher than the budget also indicates the flexibility and practicality of government fund management, which can increase funds promptly according to actual needs to ensure the smooth implementation of various tasks.

3.2 Existing Problems

3.2.1 Inconsistent Proportion of Government and Social Investment

Although the task of cultivating skilled talents requires vocational colleges and industry enterprises to jointly undertake it, it has increasingly become a consensus among vocational colleges, enterprises, and various sectors of society (He, 2013). But for quite some time, the lack of integration between industry and education, and the insufficient depth and practicality of school-enterprise cooperation have been pain points and obstacles., the insufficient depth and practicality of school-enterprise cooperation have been pain points and obstacles. There is a current situation of "hot school and cold enterprise" in the integration of production and education in vocational colleges. Some scholars have pointed out that with the formation of the new normal, the original development model based on rapid growth in fiscal investment is difficult to sustain. If it want to continue the good trend of vocational education development, it will be an unavoidable issue of the times to shift from external development relying on incremental resources to internal development relying on improving the efficiency of utilizing existing resources (Duan, 2023).

Z School closely follows policy developments in the field of industry education integration. Starting in 2022, it has implemented the New Energy Vehicle and Rail Transit Industry Education Integration Training Base Project, responding to the national strategic task of "building 100 high-level, specialized, and open industry education integration training bases". The preliminary design estimate for the project has a total investment of 1600.563 million yuan, and the actual total expenditure is 172 million yuan. The funding source is from applying for central budget funds and local government special bonds, and the shortfall is self-raised by the school.

There is a deviation in the annual budget execution of central subsidy funds. Specifically, the school's budget for central subsidies in 2023 is 80 million yuan, but the actual implementation amount is only 54.137 million yuan, with an implementation rate of only 68%. This deviation indicates that the school has certain deficiencies in the use of funds and budget execution, and has not fully allocated and used funds according to the budget plan. Secondly, according to the performance table, some projects require final payment after passing the acceptance inspection, but the school has not completed the acceptance work of all projects by the end of 2023, so the full final payment has not been paid. This situation was resolved in early 2024, and the school completed the final payment. This also reflects that there is a certain lag in project management and fund payment in schools, and it is necessary to further strengthen the monitoring of project progress and the timeliness of fund payment. At the same time, the school has invested a large amount of special bond funds in infrastructure construction and teaching equipment procurement. In 2022, the school received 40 million yuan in special bond funds for infrastructure construction and the purchase of teaching equipment. In 2023, the school added 20 million yuan of special bond funds for the expansion of the training base and the promotion of related projects. This investment indicates the high importance that the school attaches to infrastructure construction and the purchase of teaching equipment, and also reflects the school's determination to improve teaching quality and practical training conditions. From another perspective, this also reflects the need for schools to plan more scientifically and reasonably in terms of fund allocation and utilization. The use of central subsidy funds and special bond funds should be coordinated and complementary to each other to ensure the smooth implementation of various school work. Therefore, schools need to further strengthen the scientific and effective management of funds,

optimize the structure of fund allocation, and improve the efficiency of fund utilization.

In summary, statistics show that, based on the existing known data, the government's fiscal funds account for a significant proportion of investment in this special project. However, the financial support provided by enterprises to the base is relatively limited, and the government still needs to stimulate the investment enthusiasm of enterprises.

3.2.2 Inadequate Fund Performance Evaluation System

Although the use of government financial funds in this project at Z school has shown significant results, there are still issues with transparency and inadequate supervision mechanisms in fund management. Firstly, the special funds are not reflected in the annual departmental final accounts and can only be queried from the special performance table. Secondly, the evaluation indicators for benefits in the self-evaluation performance table are too general and cannot truly reflect the actual implementation effect. In the future, efforts should be made to strengthen the transparency and auditing of fund utilization, while further optimizing the principles and structure of fund allocation to ensure the long-term sustainability of resource utilization.

4 IMPROVEMENT SUGGESTIONS

4.1 Enhancing Corporate Investment

The PPP model, also known as the "public-private partnership model," is a model in which the government collaborates with social capital to construct, and operate public infrastructure, or provide public services. Through the PPP model, the government and social capital clarify the rights and obligations of both parties in the form of a contract, jointly invest, construct, operate, and share benefits and risks (Ling, 2024). To address the issue of optimizing diversified investment, it can explore the application of the PPP model in the process of integrating industry and education in vocational colleges, that is, introducing social capital into the field of integrating industry and education in vocational colleges (Guo, 2012).

Firstly, introducing the PPP model can broaden the funding channels for vocational colleges, introduce social capital into the education sector, and alleviate local financial pressure. And ensure a win-win situation among enterprises, schools, and governments through a mechanism of benefit sharing. Secondly, the PPP model can reduce the cost of school-enterprise cooperation and form a risk-sharing mechanism, making enterprises more motivated to participate in the integration of industry and education. For example, the government can reduce the risk perception of enterprises in the initial investment by introducing government guarantee mechanisms. On this basis, optimizing the investment methods of enterprises can lower the threshold for participation by replacing direct capital investment with equipment, technology, and other forms. Schools and enterprises can jointly establish an "Industry Education Integration Special Fund" to support long-term cooperation projects. Finally, when applying the PPP model, the government should also pay attention to policy support, clarify the rights and interests of all parties, ensure that enterprises receive reasonable returns in the participation process, and thereby enhance their long-term investment motivation (Duan, 2023).

4.2 Optimize the Management and Allocation of Funds

For the issue of fund allocation and management, the country can learn from the results-oriented fiscal formula allocation method of OECD countries, allocate funds through signing performance contracts, and allocate funds according to different output results (graduation rate, employment rate) standards. Shift the focus of educational institutions from enrollment to the labor market, meet the needs of enterprises, and address various labor shortages. Track student situations through data systems, connect education and labor market achievements, enhance vocational education flexibility, strengthen long-term coordination relationships between schools, students, and employers, and promote industry education integration (Jia, 2019). Drawing on this method not only provides a more reasonable financial allocation plan for the integration of industry and education but also establishes scientific and specific performance indicators, ensuring the efficient and sustainable use of funds and providing strong support for the deepening development of industry education integration.

5 CONCLUSION

This article takes Tianjin as an example to analyze the impact of financial planning for higher vocational

education on the allocation of educational resources and the quality of talent cultivation under the background of industry education integration. Tianjin has achieved great success in this regard but also faces challenges.

The Tianjin Municipal Government attaches great importance to higher vocational education and provides institutional guarantees for it through the release and implementation of policy documents. In terms of fiscal funding planning, Tianjin is exploring diversified funding mechanisms, optimizing the structure of education expenditure, increasing funding investment, and providing stable and sufficient support for higher vocational education. The government should provide certain preferential subsidy policies, invest in vocational education enterprises, and form a good interactive capital chain. These measures have promoted the rapid development of higher vocational education in Tianjin, improved service capabilities and levels, extensively utilized funds, achieved high coverage and produced significant radiation effects.

However, when supporting vocational education, the government needs to focus on the comprehensive cultivation and development of the industry education integration system, starting from the policy goal of integrating social and economic benefits, ensuring that the allocation of educational resources meets social needs and enables long-term development. In Tianjin, there is a lack of specific rules for matters beyond hardware equipment in related fields, such as standardized implementation paths and operational rules. In addition, there is a lack of a scientific and reasonable evaluation standard system for project completion, which makes it difficult to accurately measure and provide feedback on actual effects and values and affects policy adjustments and optimizations. Therefore, based on the common problems mentioned above, this article believes that the government should formulate specific and feasible policy texts, clarify goals, tasks, and measures, and guarantee conditions. Further, improve relevant regulations to provide legal protection for multi-party deep participation in the integration of industry and education. Combining the above improvement methods, guides and promotes the integration of industry and education towards higher quality and deeper levels, and achieves precise docking and deep integration of educational resources and socio-economic needs.

AUTHORS CONTRIBUTION

All the authors contributed equally and their names were listed in alphabetical order.

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