

Empirical Study on the Relationship Between the Internationalization of Vocational Education in Higher Vocational Colleges in Jilin Province and the International Competitiveness of Talents

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Abstract

With the development of globalization and Industry 4.0, the internationalization of vocational education has become an important way to enhance the international competitiveness of regional talents. As a typical cold-region border province in Northeast China, Jilin Province has made certain progress in the introduction of international courses, internationalization of teachers, and integration of industry certifications in higher vocational colleges. However, the overall level still lags behind advanced regions in China, which restricts the international adaptability of technical and skilled talents. Based on the theories of human capital and competitive advantage, this paper uses a combination of questionnaire surveys and semi-structured interviews to analyze the influence mechanism of international input and certification transformation in higher vocational colleges in Jilin Province on students' knowledge transfer ability, cultural adaptability, and technical competitiveness, and puts forward corresponding countermeasures and suggestions. The research results show that the degree of internationalization and certification transformation have a significant positive effect on the international competitiveness of talents, and policy support and cross-cultural differences have a moderating effect on their influence. The research conclusions provide theoretical support and operational paths for the internationalization practice of vocational education in the cold regions of Northeast China.

Keywords: internationalization, vocational education, higher vocational colleges, talent competitiveness

1. Introduction

In the context of the continuous restructuring of the global industrial chain and the development of regional integration, the internationalization degree of vocational education has become an

important indicator for measuring the competitiveness of technical and skilled talents in a region. In recent years, China has actively promoted the "going global" of vocational education, such as the "Luban Workshops" and

the “China-Russia Vocational Education Alliance”, providing valuable experience for the internationalization of vocational education in China. However, as a northeastern industrial base and a cold-temperate border economic zone, higher vocational colleges in Jilin Province still have significant shortcomings in terms of international educational management level, the construction of international curriculum systems, and the localization of industry certification standards. This chain contradiction of “insufficient curriculum supply — incompatible standards — lagging enterprise adaptation” has severely restricted the international competitiveness of vocational talents in this region. Therefore, studying the mechanism of the impact of vocational education internationalization on the international competitiveness of vocational talents in Jilin’s higher vocational colleges has important theoretical and practical value.

2. Research Background

2.1 Economic Pattern Transformation Under the Globalization Wave

Currently, globalization is advancing rapidly, and the world economy is deeply integrated. Data from the World Bank shows that global trade volume has continued to grow over the past few decades. Even though it fluctuated due to the impact of the COVID-19 pandemic in 2020, the scale still exceeded 19 trillion US dollars. The World Trade Organization predicts that it will resume growth, highlighting the close connections among economies and the dependence of enterprises on international markets. International investment flows have also remained at a high level for a long time. Multinational companies have global layouts, such as setting up factories, research and development, and sales networks in multiple countries, which have facilitated the flow of global resources and increased the interdependence of economies to an unprecedented extent. Under this pattern, enterprises face global competition and need internationalized talents to adapt to complex and diverse operating environments. The internationalized quality of talents has become a key competitive advantage. Effectively adapting to the external environment is crucial for maintaining competitiveness, emphasizing that enterprises must be flexible in responding to changes in market conditions and social and economic policies. Moreover, the

internationalized quality of talents has become a key competitive advantage (Chychun & Maksymiuk, 2022).

2.2 Transformation of Talent Demand in International Business Operations

The internationalization of enterprises has shifted the demand for professional talents from product export to localization and global resource integration. This requires new qualifications for professional talents. In the automotive manufacturing industry, companies like Toyota and Volkswagen have set up factories worldwide, demanding local technicians to not only master basic processes but also understand local standards and consumer preferences; in the international finance sector, banks such as HSBC and Citibank require their branches to have talents who are proficient in international regulations and product innovation, and can also understand the local market. These talents must not only have solid professional knowledge but also possess an international perspective, be attentive to industry trends, be capable of collaborating in a multicultural environment, be familiar with international norms and standards, and be able to meet the demands of international business operations of enterprises. In the globalized market, enterprises’ products and services need to follow unified international standards, which requires professional talents to possess corresponding knowledge and skills to meet the demands of international business operations. (Levitt, T., 2024)

2.3 Current Situation and Trends of Internationalization of Vocational Education

Extensive international educational exchanges and cooperation have been carried out: According to the statistics of UNESCO, the number of vocational colleges participating in international education exchange programs has steadily increased over the past decade, with an annual growth rate of approximately 8%. The forms of exchange programs are diverse, including student exchanges, teacher visits, joint training, and academic discussions. For example, Chinese and German vocational colleges have conducted student exchanges, teacher visits promoting the exchange of teaching experiences, joint training integrating resources, and academic discussions focusing on cutting-edge topics, driving the development of global vocational education. Academic discussion

activities focus on cutting-edge issues in vocational education, international industry development trends, and educational and teaching reforms, providing a platform for vocational education practitioners from various countries to exchange ideas and share achievements, which is conducive to promoting the common development of global vocational education theory and practice. This also aligns with the advocacy for international cooperation in vocational education to promote knowledge sharing and development (UNESCO, 2024).

The influence of international industry certification systems is expanding: International industry certification systems are becoming increasingly important in vocational education. Taking the international engineering education certification (ABET) as an example, students of certified engineering programs have significant advantages in the international job market. International certifications in other fields such as computer science can also verify professional knowledge and enhance graduates' employment capabilities, prompting institutions to align with international demands. Students who obtain certifications are more likely to secure high-quality employment opportunities. Ewell elaborated on the importance of the certification system in ensuring educational quality and aligning with industry needs. By participating in and obtaining these certifications, vocational schools can facilitate the close alignment of their teaching and educational activities with international industry demands, ensuring that the students they cultivate meet the requirements of the international market for professional talents (Ewell, 2022).

2.4 Challenges Faced by Vocational Education in Internationalization

Lack of unified and comprehensive assessment standards: The assessment of the internationalization degree of vocational education lacks a unified and comprehensive standard. Different institutions adopt different assessment methods and indicators due to various differences, resulting in chaotic and inaccurate assessment. Some institutions only focus on the number of international students or the number of international cooperation projects, ignoring key factors such as quality and depth. The quality of international courses and the level of international teaching staff have also not been fully reflected. The internationalization degree of international courses not only depends on

whether the course name contains the word "international", but more importantly, whether the course content covers international cutting-edge knowledge, international industry standards and cases, and whether the teaching methods conform to international educational and teaching concepts (Knight, 2020).

Challenges in integrating industry certification systems: The integration of industry certification systems into vocational education faces numerous obstacles. On one hand, there are differences between international certification standards and the local curriculum system and students' knowledge foundation; on the other hand, the curriculum settings of institutions focus on local needs and pay insufficient attention to international standards, resulting in a mismatch between teaching content and certification requirements. In addition, students have difficulties in preparing for certification exams, facing high language, professional knowledge requirements and high costs.

3. Research Questions

3.1 Construction of Evaluation Index System for the Internationalization Degree of Vocational Education

In the context of globalization, it is of utmost importance to establish a scientific evaluation index system for the internationalization degree of vocational education. This is mainly carried out from three dimensions: international cooperation and exchange, international curriculum system, and international teaching staff.

International Cooperation and Exchange Dimension: The depth of cooperation is evaluated by looking at joint research achievements, the improvement of exchange students' abilities, etc.; the breadth focuses on the diversity of cooperating countries and regions. For example, when vocational schools cooperate with multiple countries in different fields, it reflects the breadth and depth of their cooperation. For instance, international textbooks and online course resources, sharing of practical resources, such as international enterprise internship bases and laboratory equipment, as well as sharing of teacher resources through teacher exchanges and the establishment of joint teaching teams, etc. (Li & Ding, 2023).

International Curriculum System Dimension: Completeness requires comprehensive coverage of international cutting-edge knowledge and

industry standards, and the curriculum structure should be in line with international educational concepts, using project-based learning methods, etc. At the same time, the update frequency of the courses should keep up with international trends, for example, in the case of information technology professional courses, it should cover the latest technologies and standards.

International Teaching Staff Dimension: Not only the proportion of teachers with international backgrounds is considered, but also their teaching contributions are focused on, such as integrating international teaching methods and industry dynamics. In addition, the frequency and effectiveness of teachers' participation in international academic exchanges and training are also crucial, such as introducing new content after teachers attend international conferences to enhance students' practical abilities. The quality of the teaching staff is crucial for providing effective educational services. Their participation in international cooperation can enhance the overall educational experience (Rafdinal et al., 2021)

3.2 The Mechanism of the Impact of Vocational Education Internationalization on the International Competitiveness of Talents

Clarifying the impact mechanism of each dimension of vocational education internationalization on the international competitiveness of talents is the key to revealing the intrinsic connection between the two.

The influence transformation path of international exchange and cooperation projects: Providing students with a platform for expanding international perspectives is crucial. The key lies in how to convert the advantage of perspectives into actual competitiveness. For example, after international exchange students return to their home country, how to combine their experiences with the domestic vocational education system and establish a transformation mechanism.

The competitiveness enhancement effect of international curriculum design: Different design methods have different effects on the enhancement of talent competitiveness. The selection of course content focuses on theory, practice, or a combination of both, which will affect students' performance in the international workplace. It is necessary to conduct in-depth

research on how to precisely identify the needs and optimize the curriculum and teaching methods.

The shaping effect of international faculty allocation on talents: International faculty influence students' comprehensive qualities through unique teaching methods and experiences. It is necessary to study how to leverage their advantages, establish a collaborative teaching mechanism with local faculty, and enhance students' international competitiveness.

3.3 Issues of Integration and Practice of Industry Certification System in Vocational Education

The integration of the industry certification system into vocational education faces challenges and requires addressing the issues of integration and practice.

The seamless integration strategy of certification standards and curriculum system: To achieve seamless integration, the course content needs to be streamlined and optimized according to the certification standards, teaching methods should shift to being student-centered, and assessment methods should be diversified to comprehensively examine students' mastery of certification knowledge and skills.

The practical impact of integrating the certification system on the international competitiveness of talents: After the integration of the industry certification system, the actual impact on the international competitiveness of talents needs to be deeply studied. For example, international certifications have different levels of recognition in different regions, and it is necessary to ensure that students can apply their knowledge and skills in practice and enhance their practical working abilities.

3.4 Interaction Between the Degree of Internationalization of Vocational Education and the Integration Degree of Industry Certification Systems

There is an interaction between the degree of internationalization of vocational education and the integration degree of industry certification systems, which affects the international competitiveness of talents.

Interaction mode and mechanism: A high degree of internationalization can provide resource support for the integration of certification systems, and a well-developed certification system can also promote the internationalization of vocational education. However, the specific

mode and mechanism are still unclear, and there may be differences among different majors and development stages.

Interaction synergy effect: How the interaction between the two enhances the international competitiveness of talents needs to be revealed through empirical research. For example, in the international business major, the integration of internationalization and certification system is manifested in aspects such as students' international employment.

4. Research Objectives

This study focuses on the internationalization of vocational education and aims to achieve the following goals:

Precisely analyze the interrelationships of core elements: Thoroughly explore the complex relationships among the degree of internationalization of vocational education, the integration degree of industry certification systems, and the international competitiveness of talents. Through theoretical and empirical research, clarify the mutual interactions between the various manifestations of internationalization and the integration of each dimension of the industry certification system, as well as the comprehensive influence on the multi-faceted performance of the international competitiveness of talents.

Construct a scientific assessment system: For the degree of internationalization of vocational education and the integration degree of industry certification systems, construct a comprehensive, scientific, and operational assessment index system. Through literature research and integration of multiple disciplinary theories, use scientific methods to determine the weights of the indicators, providing self-assessment and comparative analysis tools for vocational schools.

Reveal the internal influencing mechanisms: Utilize advanced technologies and case studies to reveal the internal influencing mechanisms of the degree of internationalization of vocational education and the integration degree of industry certification systems on the international competitiveness of talents. Through structural equation models, explore the effects of different variables, and clarify the differences and commonalities in the impact paths of various factors under different conditions.

Provide practical strategy guidance: Based on

the research results, provide international development strategies for vocational education institutions and practical strategies for the integration of industry certification systems, providing comprehensive assistance from macro to micro to enhance the international competitiveness of talents.

5. Significance of the Research

5.1 Theoretical Significance

Enrich the theoretical framework of vocational education internationalization: Current research on vocational education internationalization is lacking in completeness and often focuses on isolated aspects. For instance, the forms and contents of international exchanges and cooperation, or the description of international student mobility. These limitations restrict our understanding of the broader meaning of internationalization (Zhao, 2023). This study constructs an evaluation index system from multiple dimensions, covering international exchanges and cooperation, international curriculum systems, and international faculty teams, and uses quantitative analysis to precisely assess and deeply explore the complex relationships between the degree of vocational education internationalization, the integration of industry certification systems, and the international competitiveness of talents. It uses structural equation models to reveal the interaction mechanisms of various factors and fills the research gap in multi-factor interaction relationships, enriching the theoretical content and forming a complete theoretical framework.

Expand the application boundaries of interdisciplinary theories: Promote the cross-fertilization of theories from multiple disciplines such as educational economics, human resource management, and international business in vocational education research. Educational economics analyzes resource allocation and cost-effectiveness, human resource management helps understand the mechanism of talent competitiveness cultivation, and international business theories provide perspectives for the alignment of vocational education with international industry demands, expanding the application scope of various disciplinary theories and opening up new paths for vocational education research. Research shows that there is a positive correlation between internationalization and human capital and relational capital. It will generate

management and social impacts, providing references for the decision-making processes and policy makers of companies undergoing internationalization. (Pulido-Lopez, A., & Lopez-Salazar, A., 2024)

5.2 Practical Significance

Provide precise navigation for the internationalization strategic planning of vocational education institutions: The constructed evaluation index system helps vocational education institutions assess their own internationalization level, identify deficiencies, and formulate improvement measures. The research results provide operational guidelines for integrating industry certification systems, guiding institutions to select certification systems, reforming courses and teaching staff, and reasonably allocating resources based on the influence mechanism, and formulating internationalization strategic plans.

Promote in-depth transformation of vocational education talent training models: Provide support for the innovation of vocational education talent training models. The curriculum design combines international cases and industry dynamics, focuses on the international framework; teaching methods promote a student-centered approach, exercise students' multiple abilities; practical teaching strengthens cooperation with international enterprises, establishes internship bases and project platforms, and enhances students' practical and international cognitive abilities.

Promote seamless connection and coordinated development between vocational education and international industries: Help vocational education institutions capture international industry dynamics, adjust majors and course settings, strengthen cooperation with industry organizations, and participate in standard formulation. At the same time, provide talent support for international industries, carry out industry-university-research cooperation, and promote industry innovation and upgrading. Ghosh emphasized the transformative potential of these technologies in vocational education and pointed out that they can enhance learners' skill development and adaptability (Ghosh, 2024). By leveraging these innovations, educational institutions can create more attractive and effective training programs to meet industry expectations.

Lead the innovative development of global vocational education exchanges and cooperation: Provide new ideas for global vocational education exchanges and cooperation. Provide assessment and planning methods for international exchange and cooperation projects, promoting precise cooperation; course development cooperation promotes the joint development of international course materials; teacher training cooperation promotes the internationalization of the teaching staff, improves the global quality of vocational education teachers, and promotes the internationalization, diversification and innovation of vocational education. This contact not only improves teachers' teaching skills, but also promotes the development of a more adaptable and globally-aware teaching staff (Sukiyani, 2023).

6. Research Methods

6.1 Research Design

This study adopts a mixed research approach, which is divided into two parts: quantitative questionnaire survey and qualitative interviews.

6.2 Sample Selection

Five representative higher vocational colleges in Jilin Province were selected, covering disciplines such as medicine, engineering, and management. A total of 1,000 student questionnaires were obtained through stratified cluster sampling. At the same time, 15 interviews were conducted with teachers, educational administrators, and representatives of certification institutions for purposeful interviews.

6.3 Variable Design

Independent Variables: Internationalization Input (Course Coverage, Duration of Teacher Training), Certification Conversion (Degree of Localization of Cold Region Technical Standards, Certification Pass Rate)

Dependent Variable: International Competitiveness of Talents (Knowledge Transferability, Cultural Adaptability, Technological Competitiveness)

Moderating Variables: Policy Support Intensity, Cross-cultural Differences

6.4 Data Analysis

Quantitative data were analyzed using SPSS for descriptive analysis, correlation tests, and multiple regression analysis; qualitative data were analyzed using NVivo for thematic coding

to explain the underlying reasons behind the quantitative results.

7. Research Results and Analysis

7.1 Sample Description

This study actually distributed 1,000 questionnaires, and 973 valid questionnaires were retrieved, with an effective recovery rate of 97.3%. The sample covered 5 typical higher vocational colleges in Jilin Province, covering different disciplinary directions such as medicine, engineering, and management. Among the sample, 53.7% were male and 46.3% were female; the grade distribution was mainly in the second and third years, accounting for 82%; over 68% of the students had taken or were exposed to international courses or participated in certification training.

7.2 Variable Distribution Characteristics

Based on SPSS 26.0, descriptive statistics were conducted on the core variables:

International Input (X_1): Mean 3.26, Standard Deviation 0.74

Certification Conversion (X_2): Mean 3.14, Standard Deviation 0.78

Policy Support (M_1): Mean 3.42, Standard Deviation 0.69

Cultural Differences (M_2): Mean 3.01, Standard Deviation 0.71

Talent International Competitiveness (Y): Mean 3.37, Standard Deviation 0.73

Overall, the perception levels of the interviewed students regarding the input of international resources and certification conversion are at a moderately high level, but there are significant differences among different schools and majors.

7.3 Correlation Test

The Pearson correlation coefficient analysis results:

Internationalization input (X_1) is significantly positively correlated with talent international competitiveness (Y) ($r = 0.562$, $p < 0.01$)

Certification conversion (X_2) has a higher positive correlation with Y ($r = 0.615$, $p < 0.01$)

Policy support (M_1) is positively correlated with Y , while cultural differences (M_2) are negatively correlated with Y ($r = -0.292^*$, $p < 0.05$). This verifies the theoretical relationship between the variables.

7.4 Regression Analysis

Using multiple linear regression to test:

After controlling for variables, internationalization input (X_1) has a significant positive impact on Y ($\beta = 0.361$, $t = 8.47$, $p < 0.001$)

Certification conversion (X_2) has a stronger impact on Y ($\beta = 0.422$, $t = 9.02$, $p < 0.001$).

The model's explanatory power R^2 increases to 0.436, indicating the significant explanatory power of the independent variables for the dependent variable.

7.5 Moderating Effect Analysis

The moderating effect was tested using PROCESS macro Model 1:

Policy support (M_1) has a positive moderating effect on the relationships between X_1 and Y , as well as between X_2 and Y ($\beta = 0.135$, $p < 0.01$).

Cultural differences (M_2) have a negative moderating effect on the relationship between X_1 and Y ($\beta = -0.118$, $p < 0.05$). When the cultural distance between China and Russia is greater than 3.1, the marginal effect of internationalization investment significantly decreases.

7.6 Supplementary Analysis of Qualitative Interviews

The interview results further explain:

1) Managers believe that the international cooperation courses lack modules related to the cold-weather industry, making it difficult to fully align with the standards.

2) Teachers pointed out that insufficient language skills and international experience have limited the implementation of course content and certification standards.

3) Enterprise representatives emphasized that although students have obtained some international certifications, their cross-cultural communication and practical operation skills still need to be strengthened, especially in areas such as cold-region new energy and Russian e-commerce.

8. Conclusions and Countermeasure Suggestions

8.1 Research Conclusions

The internationalization level and the localization degree of accreditation in higher vocational colleges in Jilin Province are generally low, which hinders the international competitiveness of regional talents. International

input and accreditation transformation have significant promoting effects on knowledge transfer ability, cultural adaptability and technical competitiveness. Policy support can amplify the positive effects of internationalization and accreditation transformation. Cross-cultural differences are important limiting factors affecting the adaptability of talents.

8.2 Policy Recommendations

Establish an assessment system for courses based on industrial demands, precisely matching the technical standards of the cold-temperate region. Design a “standard grafting — capability certification — tracking feedback” certification conversion funnel to enhance the credibility of the certification. Increase government investment and policy incentives to support international teacher training and the development of bilingual courses. Establish cross-cultural adaptation modules such as those between China and Russia, and between China and Mongolia to reduce cultural inhibitory effects.

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