

From Collaboration to Integration: Exploring the Path of Deep Integration of Industry and Education in Higher Vocational Colleges from the Perspective of Stakeholders

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How to cite this paper: Song, J. J. (2025). From Collaboration to Integration: Exploring the Path of Deep Integration of Industry and Education in Higher Vocational Colleges from the Perspective of Stakeholders. *Open Journal of Social Sciences*, 13, 282-293.

<https://doi.org/10.4236/jss.2025.1312021>

Received: November 4, 2025

Accepted: December 22, 2025

Published: December 25, 2025

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Abstract

Under the current background of vocational education reform led by the “Double High Plan”, the integration of industry and education between higher vocational colleges and regional enterprises still faces practical difficulties such as shallow cooperation, resource misallocation, and goal conflicts. Based on the perspective of stakeholders, this study takes three “double-high” colleges that focus on communications electronics, finance and business fields, and comprehensive characteristics as cases. It uses qualitative research methods and conducts semi-structured interviews with 12 school and enterprise personnel, participatory observation, and secondary data analysis to deeply explore the specific form, interaction process, and sources of conflicts of the integration of industry and education. The study found that the integration of industry and education in “double-high” colleges has evolved from “internship base/order training” to “industrial college/technology research and development center” and then to “industry chain collaboration platform”. There are three core contradictions in the interaction process: the misalignment of “industrial attributes” and “educational attributes” in the connection of resources, the blurring of rights and responsibilities in “emphasis on form over content” in the sharing of responsibilities, and the value conflict between the “educating humanity” of colleges and universities and the “utilitarianism” of enterprises in terms of fundamental goals. The root cause lies in the failure of all parties to build a sustainable coordination mechanism with “balanced interests, resource adaptation, and clear rules.” By revealing the deep interactive logic of industry-education integration, this study provides theoretical basis and practical reference for building a deep integration path between schools and enterprises, and expands the explanatory boundaries of stakeholder theory in the field of voca-

tional education.

Keywords

Double High School Plan, Integration of Industry and Education, Higher Vocational Colleges, Stakeholders

1. Introduction

Under the context of the ongoing deepening reform of vocational education in China, the newly revised Vocational Education Law of the People's Republic of China (officially implemented on May 1, 2022) and the High-level Vocational College and Program Construction Initiative with Chinese Characteristics (hereafter referred to as the "Double High Initiative") have jointly established a rigid institutional environment for strengthening industry-education integration. This framework not only lays a policy foundation but also provides legal safeguards for the high-quality development of vocational education. The Central Committee of the Communist Party of China and the State Council attach great importance to the advancement of vocational education in the new era. The Report to the 20th National Congress of the Communist Party of China further clarifies the need to "pursue collaborative innovation in vocational education, higher education, and continuing education, and promote the integration of vocational and general education, industry-education integration, and science-education integration"—a directive aimed at optimizing the typological positioning of vocational education. Against this policy backdrop, the Double High Initiative, as a core task for advancing the typological development of vocational education, is designed to enhance the adaptability, integrity, and service capacity of vocational education, thereby addressing the urgent demand for high-caliber technical and skilled talents arising from national industrial upgrading. However, despite the increasing refinement of the institutional framework, a notable tension persists between policy aspirations and grassroots practice. While many vocational colleges have actively explored pathways for school-enterprise collaborative talent cultivation under the guidance of the Double High Initiative, they commonly confront practical challenges such as superficial cooperation modalities, insufficient endogenous motivation for enterprise participation, and structural mismatches between resource supply and demand. These practical bottlenecks not only restrict the adaptability and forward-looking nature of talent cultivation, but also pose challenges to the effectiveness of vocational education in empowering regional economies to achieve high-quality development, thus becoming the key issues that urgently need to be addressed in the current process of building the "the Double High Plan (officially known as the Plan on Developing High-level Vocational Schools and Majors with Chinese Characteristics)".

In view of this, this study aims to focus on the micro-practice mechanism of the integration of industry and education in higher vocational colleges under the

background of the “Double High Plan”. The core research question is: to systematically analyze the specific path and morphological pedigree of the evolution of school-enterprise cooperation from formal “collaboration” to substantive “integration”, and to deeply explore the interactive logic and inherent conflicts between the two parties in key dimensions such as resource docking, responsibility sharing, and goal coordination. By revealing these deep mechanisms, the research is committed to providing a theoretical basis and practical mirror for building a sustainable and in-depth integration model of industry and education, thereby promoting the in-depth expansion of academic dialogue on the standardized development of vocational education.

Although existing research has made progress at the policy interpretation and macro-structure level of the integration of industry and education, such as focusing on regional ecological construction, high-quality development connotation, and teacher competency models, most of them remain in institutional description or one-dimensional analysis, and lack an in-depth deconstruction of the interactive mechanism of multiple subjects in specific cooperation forms. Especially in the practice of school-enterprise cooperation transforming from “formal collaboration” to “substantive integration”, micro-processes such as how to effectively transform resources, how to reasonably share responsibilities, and how to dynamically adjust goals are still in a “black box” state, and no systematic theoretical explanation has yet been formed. To this end, based on the stakeholder collaboration theory, this study selected three “double-high” colleges and universities in S Province to carry out multiple case comparative analysis. Through in-depth interviews and text analysis, it focused on typical forms such as industrial colleges, order training, and technology R&D centers, aiming to reveal the interactive logic and sources of conflicts between schools and enterprises in resource docking, responsibility sharing, and goal coordination. The research is not only committed to providing a path reference for the optimization of the mechanism of industry-education integration from a practical level, but also strives to make up for the lack of analysis of the “form-process-conflict” chain relationship in existing research from a theoretical perspective, and promote the research on industry-education integration to deepen the micro-mechanism and process dimensions.

2. Analytical Framework and Research Design from the Stakeholder Perspective

2.1. Literature Review

Existing research has formed a relatively systematic theoretical framework around the integration of industry and education in vocational education, focusing on three core issues: the evolution of practice forms, the contradictory nature of the interaction process, and institutional innovation in the context of the “Double High Plan”. Scholars generally point out that the integration of industry and education has gradually developed from early point-like cooperation to a systematic and ecological collaborative model, showing the evolutionary characteristics from

loose connection to entity embedding, and from resource complementarity to strategic symbiosis (Liu, 2024; Wu, 2018). At the level of school-enterprise interaction, research has revealed value tensions and resource docking obstacles caused by differences in organizational attributes, highlighting the inherent conflict between “educating people” and “utilitarianism” and its constraints on the depth of cooperation (Chi, 2021; Zhou et al., 2023). Faced with the high standard requirements put forward by the “Double High Plan”, the academic community has further explored the deepening path of the integration of industry and education from the dimensions of professional group construction, governance mechanism and evaluation system (Shen, 2021).

However, existing research still has obvious limitations in the specific context of “double high” colleges and universities. First, the description of the practice form has not fully reflected the new collaborative mechanism derived from the construction of professional groups in “double high” colleges and universities, and there is a lack of systematic comparison of the morphological differences caused by different professional attributes and regional industrial ecology (Yuan, 2022). Secondly, the dynamic analysis of micro-game processes such as resource transformation, responsibility sharing and goal adjustment in school-enterprise interaction is still insufficient and fails to effectively reveal the internal mechanism of cooperation sustainability (Chen, 2014). Third, the research on the meso-level transmission mechanism on how the “double high” policy requirements are transformed into coordinated actions is relatively weak, especially the lack of overall governance analysis of the “fragmentation” problem in the policy implementation process (Shen, 2021). The above research gaps constitute the logical starting point of this study, which aims to systematically explain the morphological genealogy, interactive logic and institutional adaptation path of the integration of industry and education in the context of “double high” through multiple case comparisons, so as to bridge the shortcomings of existing theories in the “structure-process-mechanism” chain explanation.

2.2. Theoretical Framework: Analytical Dimensions from the Perspective of Institutional-Cultural Mutual Construction

This study adopts Freeman’s stakeholder synergy theory as its core analytical framework. This theory posits that the sustainable development of an organization hinges on the systematic identification of key stakeholders’ demands and the implementation of effective synergy, through which a synergistic effect transcending the capabilities of individual entities is achieved via resource complementary and shared responsibility. Its core principles—interest balance, resource matching, and responsibility parity—serve as a robust response to the practical predicaments in industry-education integration between higher vocational colleges and enterprises under the context of the “Double High Plan”, including inadequate resource alignment, imbalanced responsibility allocation, and difficulties in goal integration. Moreover, it provides theoretical underpinnings for unpacking the

complete logic spanning from cooperation motivation and synergy pathways to conflict mechanisms.

In the specific research process, this study systematically converts the basic principles of stakeholder theory into guiding dimensions for data analysis to strengthen the methodological connection between theory and empirical research. First, based on the “principle of interest identification and integration”, it clearly defines higher vocational colleges (with the core goal of cultivating high-quality technical and skilled talents and enhancing industrial service capabilities) and regional industrial enterprises (with the core demand of matching talent supply and sustainable technological accumulation) as the two core stakeholders. The difference in their goals constitutes the logical starting point for synergy and also the source of cooperative tension. In the data collection and analysis, it will systematically sort out the specific demands of both parties in talent cultivation, technology research and development, resource input, etc., and identify their consistency and divergence. Secondly, based on the “principle of resource complementary and alignment”, a four-dimensional analysis framework of “demand identification - resource integration - responsibility allocation - goal synergy” is constructed to deeply explore the alignment efficiency and transformation mechanism of both parties in terms of knowledge resources, technological resources, human resources and facility resources. In the data analysis stage, it will focus on examining the institutional obstacles, information asymmetry and capability mismatch in the resource transformation process, and trace the causal relationship between them and the previous demand mismatch. Further, following the “principle of shared responsibility and fair distribution”, it focuses on the institutional arrangements and actual implementation of both parties in terms of cost sharing, risk prevention and control, and outcome distribution in cooperation. Through qualitative coding and case comparison, it analyzes the inhibitory effect of unbalanced responsibility allocation on the continuous participation willingness of enterprises and its restrictive mechanism on the depth of cooperation (Grollmann & Rauner, 2007).

Based on the aforementioned principles, this study establishes the following theoretical assumptions: an imbalance in interest claims will lead to resource conversion stagnation, an unequal distribution of responsibilities will undermine the sustainability of corporate participation, and the structural conflict between long-term talent cultivation and short-term economic goals will constrain the transition of industry-education integration from formal coordination to substantive symbiosis. By systematically incorporating the core principles of stakeholder theory into the data construction and analysis process, this framework helps reveal the intrinsic mechanisms of deep integration among the education chain, talent chain, and industrial chain, laying a rigorous theoretical foundation for empirical research.

2.3. Research Design and Data Processing

This study adopts a multiple case comparison method and aims to systematically

examine the practical forms and interaction mechanisms between higher vocational colleges and enterprises in the process of integrating industry and education under the background of the “Double High Plan”. This method can take into account situational differences and common characteristics, and is suitable for in-depth analysis of the internal relationship between “form-process-mechanism”. The study selected three construction units of the “Double High Plan” as cases, based on the principle of purposive sampling to ensure that they are representative in terms of professional types (covering modern communication technology, e-commerce, software technology and other professional groups) and regional industrial ecology.

In terms of case selection, this study adheres to the principle of purposive sampling by selecting three institutions under the “Double High Plan” as research subjects. The chosen cases exhibit significant representative in terms of professional structure and regional industrial layout. Specifically, the three institutions focus on developing specialized clusters such as modern communication technology, e-commerce, and software technology. These professional fields hold strategic importance in China’s current industrial upgrading and regional economic development: modern communication technology serves as the core pillar supporting the digital economy and new infrastructure construction; e-commerce profoundly reshapes regional trade ecosystems, driving the restructuring of industrial and value chains; and software technology acts as a key driver for the deep integration of smart manufacturing and modern service industries. Therefore, focusing on these specialized clusters facilitates an entry point through typical industry models to understand the practical pathways of vocational education aligning with industrial demands.

In addition, the “comprehensive characteristics” referred to in this study cover the following dimensions: type of institution (coexistence of industry characteristic and comprehensive types), regional industrial ecology (covering digital economy highlands and manufacturing transformation zones), and differences in the integration mode of industry and education (such as order training, industrial colleges, technology research and development platforms, etc.). Each school has at least two years of experience in deep integration of industry and education. The research subjects cover four key subjects: college managers, professional course teachers, enterprise managers, and enterprise technical personnel. Four people are selected from each school, for a total of 12 people, to ensure diverse perspectives and information saturation. The data collection adopts the triangulation method, integrating semi-structured interviews, participatory observation, and secondary data analysis. The interview revolves around four dimensions: cooperation form, resource docking, responsibility sharing, and goal coordination. The entire process is recorded and transcribed; Observe and focus on core fields such as industrial colleges and training bases; Second hand materials include cooperation agreements, training programs, and enterprise resource lists, which collectively support the reliability and validity of the research. By systematically comparing

these cases with different “comprehensive characteristics”, the study can more comprehensively capture the practical logic of industry education integration in different institutional environments, resource conditions, and development stages, thereby enhancing the external validity and theoretical saturation of research findings.

After completing the data collection, this study used the grounded theory method to systematically analyze the data and strictly followed academic ethics to ensure the rigor of the research process and the credibility of the conclusions. Data analysis mainly relied on NVivo 12 software and followed the progressive process of “open coding - main axis coding - selective coding”. First, by labeling the interview transcripts, observation notes and secondary data sentence by sentence, 128 initial concepts were extracted, which were combined and summarized to form 45 core initial codes. Furthermore, through logical classification, the initial concepts were integrated into four main categories: “cooperation form type”, “resource docking mechanism”, “responsibility sharing logic” and “goal coordination conflict”. Finally, the “school-enterprise interaction logic” was extracted as the core category, and an explanatory framework for the industry-education integration process was constructed with form as the basis, resources as the support, responsibilities as the rules, and goals as the results. In order to ensure the quality of the research, a triangulation and mutual verification strategy was adopted to cross-validate interviews, observations, and documentation. Some research subjects were invited to verify the preliminary analysis to ensure that the interpretation was close to reality. Two researchers independently coded some texts, with a coding consistency of 88%. Disagreements were discussed and a consensus was reached. In terms of ethics, the principle of informed consent was strictly implemented, all personal information was anonymized, and the main findings were reported to the participants after the study was completed.

Through the design and execution of the above-mentioned systematic and transparent research methods, this study strives to deeply reveal the micro-mechanism of the integration of industry and education under the background of “double high” and provide a solid academic basis for related practices.

3. Research Findings

3.1. Integration Forms and Interactive Contradictions from the Perspective of Multiple Cases

Based on the case comparison of three “double high” colleges and universities, this study identifies the morphological evolution path of the integration of industry and education in practice and its associated structural contradictions. At the morphological level, school-enterprise cooperation shows the progressive characteristics from “point cooperation” to “chain collaboration”, which can be divided into three levels: the basic level is represented by “internship bases” and “order classes”, focusing on talent transportation and job adaptation; the middle level is represented by “Industrial Colleges” and “Technology R&D Centers”, which are

embodied in the co-construction of physical platforms and joint research of courses; the deep level is represented by the “Industrial Chain Collaborative Innovation Platform”, which aims to realize the systematic connection of the education chain and the industrial chain within the region. This evolution path reflects the logical upgrade of collaboration between schools and enterprises from resource complementarity to strategic symbiosis.

However, the deepening of the form does not automatically dissolve the inherent tension in the cooperation. At the level of resource docking, there is an obvious misalignment of “teaching-production” attributes. The technical resources provided by enterprises are mostly production-oriented and difficult to directly transform into course content that can be used for teaching; enterprise tutors have difficulty in ensuring teaching input due to heavy production tasks, and school teachers also face the challenge of insufficient industrial practice capabilities; in addition, the adaptability gap between production sites and teaching functions further restricts the efficiency of resource integration. In terms of responsibility sharing, cooperation agreements mostly stay at the framework level and lack clear definitions of key matters such as cost sharing, risk prevention and control, and ownership of intellectual property rights, leading to problems such as unclear rights and responsibilities and uneven investment during the implementation process. In terms of goal coordination, colleges and universities focus on the long-term goal of educating highly skilled talents, while companies pay more attention to the immediate adaptation of job abilities. There are significant differences between the two in terms of curriculum setting, evaluation standards, etc., reflecting the essential conflict between “educating people” and “utilitarianism.”

3.2. Exploring the Root Causes from Collaboration Dilemma to Integration Path

The above contradictions essentially stem from the deep differences in organizational attributes, value orientations and resource structures of different stakeholders. From the perspective of stakeholder collaboration theory, school-enterprise cooperation is actually a dynamic game process of multiple subjects under heterogeneous logic. Obstacles in resource docking can be attributed to the lack of a transformation mechanism between “industrial knowledge” and “educational knowledge,” reflecting systematic differences in knowledge attributes, communication logic, and usage context between the two types of organizations. The ambiguity of responsibility sharing exposes the absence of institutional rules in cooperative governance, especially the lack of a reasonable allocation mechanism for input costs, risk responsibilities, and output benefits, resulting in a lack of stable expectations and constraints for collaborative behavior. The conflict at the goal level is more deeply reflected in the structural tension between the “social service” mission of vocational education and the “economic rationality” principle of enterprises.

To achieve the leap from “formal cooperation” to “substantive integration”, a

multi-level and systematic collaborative path needs to be built. At the institutional level, we should promote the establishment of an intermediary mechanism of “teaching transformation” to promote the effective transformation of industrial technology resources into educational resources; at the governance level, we must improve the refined design of cooperation agreements, clarify the boundaries of rights and responsibilities of all parties, and establish an incentive structure for risk sharing and benefit sharing; at the strategic level, through institutional guidance and policy empowerment, we should promote schools and enterprises to form a value consensus in the dimensions of talent training, technology research and development, and social services, and build a collaborative ecology based on long-term symbiosis. Only in this way can the organic connection between the education chain, talent chain and industrial chain be truly realized in the context of “double high”.

3.3. Demonstrate Validity and Build a Collaborative Governance System with Deep Integration of Empowerment

Several core contradictions identified in this study are consistently reflected across heterogeneous datasets. For example, the issue of “responsibility agreements prioritizing form over substance”—a recurring theme in interviews—was further corroborated by secondary document analysis. Specifically, the internship base co-construction agreement of School A (A-H1) merely provided a vague 100-word description without explicitly defining the specific responsibilities of either party; similarly, the industry college cooperation agreement of School B (B-H2) only ambiguously referenced “enterprises providing technical equipment” but failed to clarify the corresponding obligations of the academic institution. Such ambiguity in rights and responsibilities can be examined through the lens of stakeholder theory, as it essentially reflects the structural tension between heterogeneous organizations (schools and enterprises) regarding their perceptions of collaboration goals and responsibilities.

Concurrently, the “barriers to the transformation of technical resources” observed in fieldwork were highly consistent with interview data from School B’s faculty. A notable manifestation is that the AI technical documents provided by enterprises (B-G3) could not be directly converted into resources suitable for teaching scenarios. This phenomenon can be further explained by the divergence of stakeholder goals: as technology suppliers, enterprises are fundamentally oriented toward maximizing technical utility and market returns, exhibiting a distinct “utilitarian” tendency; in contrast, academic institutions, as the implementable of education, take “educating humanity” as their core value, emphasizing the adaptability and convertibility of technical resources in teaching. The fundamental difference in their value orientations constitutes a typical case of “goal conflict” in stakeholder theory. While there are individual exceptions—for instance, a technical staff member from an enterprise collaborating with School B (B-E3) noted that his company had effectively facilitated the transformation of industrial tech-

nology into teaching resources by establishing a dedicated “educational technology department”—this exception actually underscores the critical role of “educational awareness” in reconciling the aforementioned stakeholder contradictions. The vast majority of enterprises involved in school-enterprise collaboration lack such functional departments, making it difficult to bridge the value gap between “educating humanity” and “utilitarianism.” This finding does not undermine the generalizability of the core conclusion; instead, the contrast between positive and negative cases further highlights the necessity and urgency of constructing a stakeholder value synergy mechanism (Williamson, 1973).

In summary, under the background of the “double high plan”, the practical form of school-enterprise integration of industry and education shows the characteristics of “layered progress”, but the misalignment of supply and demand in resource docking, vague rules of responsibility sharing, and conflict of interests in goal coordination are still major problems. The essence of these problems is the “insufficient coordination” of stakeholders - schools and enterprises have not achieved coordination of “interest balance”, “resource adaptation” and “clear rules”. The key to solving these problems is to build a coordination mechanism of “interest sharing, resource complementation and clear rules”.

4. Conclusion

This study, with the “Double High Plan” as its policy background, conducts a systematic exploration of the practical forms, interaction mechanisms, and collaborative dilemmas in the process of industry-education integration between higher vocational colleges and enterprises through a multi-case comparative analysis. The core research conclusions can be summarized into the following three aspects: First, the practical forms of industry-education integration exhibit a “layered and progressive” feature, evolving from the basic level of internship bases and order classes to the intermediate level of industrial colleges and technology research and development centers, and further developing into the deep level of industrial chain collaborative platforms. This evolutionary path reflects the value co-creation logic of both sides moving from resource complementary to strategic collaboration. Second, in the process of interaction between schools and enterprises, there exist three types of structural contradictions. Firstly, there are conversion obstacles between industrial technology and teaching resources in resource connection. Secondly, there are problems such as ambiguous agreement contents and unclear rights and responsibilities in responsibility sharing. Thirdly, in goal coordination, it is manifested as the conflict between the educational goals of the institutions and the utilitarian demands of enterprises. Further analysis reveals that the deep-seated reasons for these contradictions lie in the mismatch between industrial attributes and educational attributes. Specifically, “industrial attributes” emphasize efficiency, market response, and economic benefits, pursuing rapid technological iteration and profit maximization; while “educational attributes” focus on the all-round development of individuals, systematic knowledge, and

teaching laws, featuring long cycles and slow results. There is structural tension in value orientation, operational logic, and evaluation standards between the two, which restricts the effectiveness and sustainability of industry-education integration. Third, from a theoretical perspective, the root cause of the above contradictions lies in the absence of a collaborative mechanism among stakeholders. The two sides have not yet established a collaborative structure with balanced interests, appropriate resource allocation, and clear rules, making it difficult for cooperation to deepen from a formal level to substantive integration.

Based on research findings, this article further extracts feasible paths for the practice of integrating industry and education. Taking the successful “Education Technology Department” model in research and interview cases as an example, this department, as an independent entity jointly built by schools and enterprises, has dual functions of teaching organization and technical services. Its successful experience can be summarized as the following key replicate mechanisms: firstly, establishing an integrated teaching resource transformation mechanism of “curriculum project certification”, integrating real enterprise projects into the curriculum system after teaching transformation; The second is to implement the “dual job mutual employment” system, where enterprise engineers also serve as training supervisors, and college teachers participate in technology research and development, forming a two-way flow of human resources; The third is to establish a contract system for sharing achievements and risks, clarifying the ownership of intellectual property rights and the proportion of benefit distribution. Other universities and enterprises can refer to the above mechanism, combine their own professional characteristics and industry needs, and gradually achieve the transformation from loose cooperation to deep integration by establishing similar functional collaboration platforms. In addition, the case study conducted in this article has certain limitations, such as although the case samples cover three different professional groups, they do not include other professional groups, such as medical and health care, and do not compare the differences between “double high” colleges and ordinary vocational colleges, which limits the universality of the conclusions. Future research can expand the sample types and regional scope, validate research conclusions through quantitative methods, or conduct long-term tracking studies to reveal the dynamic evolution process of the collaborative mechanism of industry education integration.

Fund Project

This article is a phased research result of the school-level scientific research project of Sichuan Post and Telecommunications College “Research on the Current Situation and Optimization Strategies of the Integration of Industry and Education in Higher Vocational Colleges in the New Era” (Project No. YDXJKY202437).

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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