Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 6, 1740-1747
2025
Publisher: Learning Gate
DOI: 10.55214/25768484.v9i6.8237
© 2025 by the authors; licensee Learning Gate

Research on the industry-education integration in higher vocational education from the perspective of social partnership theory

Yanziye Wei[1], Chenxue Ren[2*]
[1,2]School of Graduate Studies, Lingnan University, Tuen Mun, Hong Kong; WEI_YANZIYE@outlook.com (Y.W.)
chenxueren@ln.hk (C.R.)

Abstract: As a vital source of skilled and adaptable talent, higher vocational education (HVE) plays a crucial role in supporting industrial development. Amid rapid technological advancement, China faces the urgent challenge of optimizing its vocational education system to meet the evolving needs of emerging industries, equip the workforce with relevant technical skills, and thereby promote economic growth and sustain international competitiveness. Guided by the theory of social partnership, this study investigates the current state of China's higher vocational education and its interplay with industrial development. Drawing on the successful vocational education models of developed countries such as Germany, the United States, and Australia, this research proposes strategic pathways tailored to China's context for deepening industry-education integration. The study offers valuable insights and policy recommendations to enhance the effectiveness of vocational education reform and support the sustainable development of China's industrial economy.

Keywords: *Higher vocational education in China, Industry-education integration, Optimization strategies, Social partnership theory.*

1. Introduction

In recent years, China has significantly increased its investment in higher vocational education (HVE) to support its economic transformation. As the country shifts from a traditional manufacturing-based economy toward one driven by innovation, technology, and services, the demand for a highly skilled workforce has become increasingly urgent.

However, many vocational colleges in China struggle to keep pace with the rapidly evolving labor market. Curricula in numerous programs remain outdated and disconnected from current industry trends, leading to a growing skills mismatch that undermines graduate employability and hampers industrial productivity. Weak collaboration between vocational institutions and industry stakeholders further limits the ability of schools to adapt to technological change and workforce needs.

This study adopts Social Partnership Theory as its theoretical foundation to address these challenges. The theory emphasizes collaboration among government, industry, and educational institutions as a means to close the gap between education supply and market demand. Through coordinated efforts, these stakeholders can jointly build a responsive and flexible vocational education system capable of cultivating high-level talent aligned with emerging industry needs [1].

In light of the rapid growth of emerging industries such as intelligent systems, renewable energy, digital technology, and biotechnology, vocational education must urgently evolve to provide specialized, hands-on training that aligns with labor market trends. This research explores how project-based learning, interactive curricula, and close industry collaboration can enable vocational institutions to respond effectively to these demands.

The primary aim of this study is to propose an integrated model for aligning China's higher vocational education with industrial development. It analyzes current challenges in the vocational

© 2025 by the authors; licensee Learning Gate
History: Received: 28 March 2025; Revised: 3 June 2025; Accepted: 6 June 2025; Published: 20 June 2025
* Correspondence: chenxueren@ln.hk

education system and identifies strategic solutions. By examining the vocational education models of countries such as Germany, the United States, and Australia, the study offers practical guidance and comparative insights to inform China's reform efforts.

Ultimately, this research seeks to bridge the education-industry divide by using Social Partnership Theory to improve vocational education outcomes, align training with market needs, and provide actionable recommendations for educators, policymakers, and businesses. It follows a systematic approach that includes: a review of relevant theories; analysis of the current status and difficulties in China's industry-education integration; comparative case studies of advanced international models; and a proposal for transforming and upgrading China's vocational education system in response to the demands of a rapidly changing economy.

2. Theoretical Foundation and Literature Review

2.1. HVE-Industry Linkages

The relationship between industrial development and vocational education is direct, most notably in the demand of the labor market matching to relevant educational programs. The introduction of specialized programs in various fields like information technology (IT), artificial intelligence (AI), and renewable energy, among others, have been in demand due to their rapid growth. VET programs prepare students for future jobs by offering them the technical skills and knowledge they need to enter emerging industries, ensuring that they are relevant in an ever-evolving economy [2].

The matching relationship between higher vocational education and industrial development is mutual. On one side, as an industry unit, vocational education prepares support industries with the workforce to boost productivity, innovation, and economic growth. Conversely, industries have a strong voice in designing and delivering vocational education programs. To ensure their curricula meet industrial needs, many vocational colleges also work hand-in-hand with the industries [3]. This is typically done via internships, apprenticeships, and work placements, giving the students hands-on experience and insight into what the job market requires. Encouraging these partnerships will ensure that vocational education institutions equip students with the theoretical foundation and the practical skills needed to thrive in the labor market.

This reciprocal relationship is particularly important in China, where the country is shifting from an industrial-based economy to a technological and innovation oriented one. Higher vocational education is important in developing professionals for manufacturing, construction, engineering, IT, and other industries. Given the fast pace of technological developments, the Chinese vocational education system has been continuously updated and broadened to accommodate the rising need for skilled labor, including in all fields concerning thriving sectors such as green economy, advanced manufacturing, and digital technologies. Such adjustments represent an important reason for vocational education to continue to be a source of industrial development, allowing China to maintain its competitive advantage in the international market.

Vocational schools also provide a skilled workforce needed to bolster innovation and, thus, industrial competitiveness. The standard of vocational training can determine how well industries compete in markets like advanced manufacturing, biotechnology, and information technology. This is a vital workforce that helps drive technological innovations and high levels of productivity in those industries. Thus, the interaction of industrial development and vocational education is a mutually formative one: As industries advance, they mold the curriculum and structure of the vocational education system to their needs, and as the vocational education system advances, it produces skilled workers to fit terse but industry [4].

However, obstacles persist in aligning vocational education with industry requirements. Education and industry can be effectively integrated only when overcoming problems such as outdated curriculums, limited industry connections, and depriving practice opportunities. On the other hand, some vocational education institutions might not adapt quickly enough to fast-changing technology or not offer students the practical experience demanded by industries. In order to solve the problems we

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 6: 1740-1747, 2025
DOI: 10.55214/25768484.v9i6.8237
© 2025 by the authors; licensee Learning Gate

face, governments, educational institutions, and industries must work together to make sure these systems of vocational schooling are dynamic, adaptable, and responsive to the needs of the labor market.

Altogether, there is a dynamic and mutual development relationship between higher vocational education and industrial development. Vocational education, in turn, supplies the skilled labor that industries require for innovation and economic growth, whilst industries provide demand-side relevance to vocational education by defining skills and knowledge needed in the labor market. The social demand for professional training increases in relation to the new necessities that is asked from the labor market, so the vocational education systems have to adapt itself to this need to keep providing futurist students with the competencies that they will require in the world of work, adapted to new technologies and competences required due the continuous transformations in the world.

2.2. Social Partnership Theory

Social Partnership is a concept or category used in Western countries to coordinate the relationships among social interest groups. It refers to 'strategic alliances formed by governments, public institutions, private institutions, and social organizations, which are conducive to establishing innovative solutions to complex local social and economic problems, and these solutions must be beneficial to the local population and contribute to the collaboration of local institutions [5]. The Social Partnership Theory posits that society is a complex network of interest relationships, and upon examining this network, it becomes evident that the most central relationships are those among the government, enterprises, and enterprise employees. These three entities have interdependent interests, engaging in a relationship of mutual checks and balances and mutual competition. However, they also have a relationship of mutual protection and promotion [6]. Therefore, to construct a healthier and more harmonious social relationship, it is necessary to abandon the zero-sum game mentality and position each other within a partnership framework. In this process, the following strategies should be adopted:

To ensure effective cooperation in complex social relationships, it's important to strengthen mutual recognition and trust among different parties. This starts with understanding each other's social identities, which leads to deeper trust and greater support for collaboration. Secondly, decisions should be made collectively. In complex social relationships, different social roles often lead to conflicts and competing interests. To minimize friction, it is important to approach decision-making with an open attitude and to encourage participation from all social groups. This inclusive process helps in achieving a more favorable outcome. Thirdly, enterprises need to take on the responsibility of training their employees. Enterprises must take responsibility for employee training. While utilizing their skills for rapid development, they should address employees' needs and enhance vocational skills training to support their growth and development. Fourthly, the government should strengthen the supervision and inspection of corporate behavior to ensure that businesses fulfill their responsibilities effectively. To guarantee that enterprises meet their social obligations, it is essential for the government to continually refine relevant laws and regulations to regulate corporate behavior, thereby providing more protection for the rights and interests of individual employees.

The industry-education integration in higher vocational colleges actually involves participation in a more complex social network. Students in vocational colleges, in practice, possess the identity of students, but also, due to the relationship of industry-education integration, have to some extent become or potentially become employees of the enterprises involved in this activity. Utilizing social partnership theory can coordinate the interests of enterprises, government, schools, and students in the context of industry-education integration, thereby devising more convincing plans to facilitate the swift implementation of this policy.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 6: 1740-1747, 2025
DOI: 10.55214/25768484.v9i6.8237
© 2025 by the authors; licensee Learning Gate

3. The Effectiveness and Challenges of Industry-Education Integration in China

3.1. Industry-Education Integration in China

Over the last several decades, China has vigorously adopted the integration model between industry and education as a strategic tool for improving its vocational schooling system to align with the increasing needs of a fast-changing economy. It is important, as this merger is seen as a bridge that fills the gap between what the education system produces inside and out and what actually the industries need. It requires close collaboration among three key players: the state, companies, and educational institutions. All stakeholders are crucial to ensuring the integration process is effective and sustainable.

At the policy level, China has established a policy environment to promote industry-education integration. Crucial policies like the "Made in China 2025" initiative and various reforms in vocational education have promoted industry-school partnerships. Education Government financial support, regulatory mechanisms, and policy guidance, aligned with labor market needs For example, the government provided subsidies to schools and businesses that participate in the cooperative training program and established vocational training standards that meet the needs of enterprises. Newly emerged industries like high-tech manufacturing and digital services have also been incorporated into the present vocational curricula by the government for the need of students to gain cognate skills.

Policy documents, particularly concerning vocational programs, will need to be realized in practice by educational organizations. Their role includes integrating industry-relevant curricula and providing students with on-ground training. These institutions collaborate extensively with businesses to co-create programs that align with the skills needs of employers. Businesses contribute real-world know-how, technologies, and facilities to the education sector in this partnership. As an example, many vocational schools in China have formed partnerships with leading technology companies so that students can use cutting-edge tools and platforms while in school.

Furthermore, businesses are in a position to ensure students get the training they need to be relevant. In China, a dual training system has been adopted by many companies, with students split between classroom learning and workplace education. Companies also do internships, mentoring, and apprenticeships with students so that they have a direct line into employment at graduation. This approach ensures that the industry's future workforce is equipped with the required technical and soft skills they require while also enhancing their market competitiveness to enhance the skills they need in the workforce by partnering with educational institutes.

Such an integrated model is indeed reflected in the improved employability of graduates. Students trained in vocational schools collaborating with industries have higher job placements owing to better placements skills gained during training. Moreover, many industries have also shown preference and satisfaction with the quality of graduates developed by various institutions, as they will have skills, practical knowledge, and hands-on experience. This ensure that the competence gap is lessened and that vocational education is utile to economic variability since the educations are always aligned to the industry cart requirements.

3.2. The Trials of Partnering Industry with Education in China

However, despite the apparent successes, several significant challenges remain in fully realizing of industry-education integration in China. The disparity between emerging industries' demand for skilled workers and vocational institutions' capability to train them is a few of the prime issues in this regard. Although the government has significantly invested in vocational education, institutions struggle to adapt quickly to changing industry needs. With limited resources, devoid of technical faculties, and obsolete infrastructure, it becomes challenging for educational institutions, especially in developing nations, to execute industry-related curricula at scale.

Moreover, there is often a disconnect between what is being taught and • needs of industry. This can lead to a mismatch between what is taught to students and what employers are looking for. While these programs run the risk of being out of touch with the job market, others may pay too much

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 6: 1740-1747, 2025
DOI: 10.55214/25768484.v9i6.8237
© 2025 by the authors; licensee Learning Gate

attention to theoretical knowledge, as opposed to practical, hands-on preparation, leaving graduates unable to adapt to an evolving job market.

The power imbalance and the conflicting interests between these three actors make it extremely difficult to achieve what the social partnership theory describes as the ideal collaborative model between government, industry, and education. Although the government has put systems in place to boost integration, implemening these policies is relatively weak, and businesses and educational institutions vary in their level of involvement. Data shows that some businesses — particularly small and medium size enterprises (SMEs) — lack the motivation or resources to play a meaningful role in collaboration with schools. Such companies might be considered lower preference clients since they might not want to develop long-term education partnerships and would instead hire short-term ones. Consequently, the integration mechanism can straggle, and some regions and sectors of the economy can lose out over others.

Last but not least, the high-level strategy for how the government wants industry-education integration to take shape remains in flux, as does the policy framework. Most policies are short-funded, either seeking to increase enrollment in vocational programs or reduce unemployment rates, without addressing more deeply rooted issues in the education and training systems. In addition, mechanisms to assess whether the integration efforts are effective are often either insufficient or missing, and this further impedes policy amendment according to premises and technical work requirements offered by the sectors concerned and teaching institutions.

Nonetheless, China's industry-education integration model, which has delivered certain benefits in better aligning education with the needs of the labor market, remains not without notable challenges. Some of the challenges include resource constraints, silos between stakeholders, rigid educational systems, and shallow long-term planning. By and large, these challenges demand greater coordination from the government, enterprises and educational organizations to ensure that integration goes ahead in relevant and adaptable to the development needs of entire industries and students themselves.

4. Development of the Vocational Education Systems in Developed Countries in the West

The vocational education systems of developed Western countries encompass both certain country models and general educational paradigms governing the existing structure of vocational education throughout the world. Such models can provide useful approaches to the ongoing improvement of vocational education in any country, given the constant enhancement in industries and demands in employment sectors.

4.1. The Dual Education System in Germany

Vocational education is best known for its success story in Germany, where the so-called dual education system plays a central role. It combines theoretical instruction in vocational schools with practical training in companies. A characteristic of this system is that students split their time between classroom education and on-site training, which enables them to practice what they study in practical environments. The dual system is a well-established model in Germany, contributing to the country achieving a highly skilled labor force [7]. The system is also integrated deeply with industries, as companies help design the curriculum and teach students, so the skills of the students are well aligned with market needs. Vocational training is, however, closely aligned with the needs of the current industry and labor market (local government) needs to bridge the skills gap. Students are also compensated through paid apprenticeships to earn a living while learning.

4.2. U.S. Under the Vocational Education Act and Community-Based Training

In the United States, vocational education developed under separate conditions shaped by the country's complex education systems. Traditionally, this kind of education had a separate, lesser pedigree from academic education, though in recent decades it has gained traction. The genesis of

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 6: 1740-1747, 2025
DOI: 10.55214/25768484.v9i6.8237
© 2025 by the authors; licensee Learning Gate

today's vocational education was the introduction of the Vocational Education (VEA) Act in the 1960s with subsequent amendments. The act sought to align education with industry needs by creating more opportunities for students to obtain technical skills to enhance their employability.

In contrast to Germany's dual system, the United States has a more decentralized approach to vocational education, with community colleges and trade schools being more commonly relied on to provide technical programs. These institutions work with local businesses to provide internships and apprenticeships. However, the structure is not as decentralized as in Germany. Vocational education in the United States is not viewed as a standalone endeavor but as part of a continuum of education that includes numerous pathways for students to receive technical training or continue with academic classes. This gives students more varied choices but may lead to less immediate alignment of schools with industries.

4.3. Australia: The Australian Apprenticeship Scheme

Australia's system of vocational education and training was built on an education- and apprenticeship model, similar but organized differently than that of Germany. For example, in Australia, Australian Apprenticeships enable students to gain on-the-job experience working for an employer while completing course requirements through a registered training organization. The system is supposed to ensure that students have the training to enter sectors of the economy that require trade, engineering, healthcare, or whatever else isn't receiving enough external applicants.

Training packages are developed in consultation with the industry in Australia, ensuring that the subjects that students are learning are the exact skills (or the closest to) to what is being demanded from employers. It is intended to be flexible; people can take apprenticeships at various points in their careers, and the system puts a premium on lifelong learning. Vocational education in Australia isn't tied to the industries as closely as in the U.S. or Germany, but it is much more closely related to real jobs and employers than in Germany, albeit through apprenticeships or training schemes.

To sum up, the vocational education systems of developed Western countries—especially Germany, the United States, and Australia—exemplify diverse approaches to aligning industry requirements with educational provisioning. Germany's dual education model, the U.S. community-based training model, and Australia's apprenticeship model each have lessons to offer for improving global vocational education. Models like the learning factory, competency-based education, and work-integrated learning recognize the importance of practical, hands-on learning and align training with industry needs, further ensuring that vocational education is relevant and effective. Table 1 shows the characteristics of education models in three countries.

Table 1.
Comparison of Education Models in Different Countries.

Country	Vocational education system	Training objectives	Teaching mode	Student development pathways	Government support
Germany	Dual system	Skill enhancement	On-the-job and classroom learning	Career-oriented, practical training	Strong government funding and policies for vocational education
United states	Varied system	employablility and workforce readiness	Hands-on interships and theory-based instruction	Career-focused with emphasis on technical skills	Localized support, diverse policy models across states
Australia	National framework	Industry relevant skills	Apprenticeships, school-based learning	Pathways to full-time employment or higher education	Significant government funding and regulations

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 6: 1740-1747, 2025
DOI: 10.55214/25768484.v9i6.8237
© 2025 by the authors; licensee Learning Gate

5. Optimizing China's Industry-Education Integration

Looking ahead, the successful implementation of China's industry-education integration strategy requires targeted enhancements in several key areas to improve its effectiveness and adaptability.

First, the "1+X certificate system"—which integrates academic credentials with vocational skill certifications—should be more extensively promoted and embedded within vocational education. This system offers students both theoretical understanding and practical competencies, thus enhancing their competitiveness in the job market and equipping them with skills that meet real-world demands.

Second, encouraging mixed-ownership models in vocational colleges should be a strategic priority. By introducing private capital and enterprise participation into the management and operation of public vocational institutions, these schools can become more innovative and responsive to market needs. This collaborative model promotes the development of demand-driven curricula and strengthens ties between schools and industry partners.

Third, the dual system of school-enterprise cooperation, modeled on the "work-study alternation" principle, must be more deeply integrated into China's vocational education structure. This approach allows students to alternate between classroom learning and hands-on training within enterprises, ensuring that theoretical instruction is closely aligned with practical application. Such a model not only enhances students' job readiness but also deepens their familiarity with workplace environments and industry-specific skills.

Fourth, international cooperation should be further emphasized. In an increasingly globalized labor market, establishing partnerships with vocational institutions in countries involved in the Belt and Road Initiative and other global networks can help China benchmark against international best practices. These collaborations facilitate knowledge exchange, curriculum innovation, and international mobility for students, enabling Chinese vocational education to meet global standards and demands.

Fifth, small and medium-sized enterprises (SMEs) must receive more targeted support. As the backbone of China's economy, SMEs often face challenges in accessing skilled labor and engaging in long-term educational partnerships. Encouraging vocational colleges to collaborate with SMEs can help close the talent gap while providing students with opportunities to gain experience in flexible, innovative working environments. Policies and incentives should be developed to support SME involvement in cooperative training programs and to ensure equitable access to vocational education partnerships across different sectors and regions.

In summary, China's future success in integrating industry and education will depend on continuous refinement and strategic innovation. Key priorities include the expansion of certification systems like 1+X, the promotion of mixed-ownership institutions, the deepening of dual education models, the strengthening of international cooperation, and the inclusion of SMEs in integration efforts. By focusing on these areas, China can build a more dynamic, market-responsive vocational education system that cultivates a skilled workforce aligned with industrial transformation and long-term economic growth.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Copyright:

© 2025 by the authors. This open-access article is distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 6: 1740-1747, 2025
DOI: 10.55214/25768484.v9i6.8237
© 2025 by the authors; licensee Learning Gate

References

[1] X. Gong, "Performance evaluation of industry-education integration in higher education from the perspective of coupling coordination-an empirical study based on Chongqing," *PloS one*, vol. 19, no. 9, p. e0308572, 2024. https://doi.org/10.1371/journal.pone.0308572

[2] R. Pereira and M. Franco, "University-firm cooperation and regional development: Proposal of a model of analysis," *Journal of the Knowledge Economy*, vol. 14, no. 2, pp. 676-690, 2023. https://doi.org/10.1007/s13132-022-00947-6

[3] M. Vivar-Simon, N. Errasti, and L. Markuerkiaga, "An analysis of the organisational factors that determine education-related university-business cooperation activities in manufacturing SMEs," *Studies in Higher Education*, vol. 47, no. 5, pp. 982-989, 2022. https://doi.org/10.1080/03075079.2022.2055322

[4] V. Braun, "Meritocracy and vocational education and training. An ideal-type reconstruction as an interpretative framework for the low standing of vocational education and training in Ukraine," *Journal of Vocational Education & Training*, vol. 74, no. 4, pp. 704-704, 2022. https://doi.org/10.1080/13636820.2022.2118954

[5] T. Seddon, S. Billett, and A. Clemans, "Politics of social partnerships: A framework for theorizing," *Journal of Education Policy*, vol. 19, no. 2, pp. 123-142, 2004. https://doi.org/10.1080/0144341042000186309

[6] D. Anthony, "Social partnerships and social relations: New strategies in workforce and economic development," *Contemporary Sociology*, vol. 33, no. 1, pp. 43-44, 2004.

[7] Y. Liu and Y. J. Li, "Promoting the innovative development of industry-education integration in vocational education," *People's Forum*, vol. 21, no. 24, pp. 59–61, 2023.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 6: 1740-1747, 2025
DOI: 10.55214/25768484.v9i6.8237
© 2025 by the authors; licensee Learning Gate