

SCHOOL-ENTERPRISE COOPERATION MODEL FOR VOCATIONAL COLLEGES IN HENAN PROVINCE

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ABSTRACT

This article provides a systematic literature review on school-enterprise cooperation models in vocational colleges within Henan Province, China. The review synthesizes findings from recent empirical and theoretical studies to examine how structured partnerships between vocational institutions and industry partners can enhance educational quality and graduate employability. The analysis is structured across four thematic areas: (1) the theoretical foundations of cooperation, including the Triple Helix, stakeholder, and co-creation frameworks; (2) the core components of effective models, such as curriculum co-development and dual tutor systems; (3) the implementation pathways and persistent challenges related to enterprise participation and governance; and (4) a synthesized research framework for the Henan context. The review critically evaluates the literature, revealing a strong consensus on the necessity of multi-dimensional integration but significant divergence in implementation effectiveness. Key gaps are identified, particularly the lack of systematic, longitudinal evaluations of partnership outcomes and a dearth of stakeholder-centered perspectives on collaboration challenges. The review concludes that while foundational policies are in place, sustainable cooperation requires more robust incentive mechanisms and adaptive governance structures. This review contributes a comprehensive synthesis of the field and proposes clear directions for future empirical inquiry.

Keywords: School-Enterprise Cooperation, Vocational Education, Literature Review

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INTRODUCTION

In the context of educational transformation driven by technological advancement and industrial upgrading, the implementation of effective school-enterprise cooperation models in vocational colleges presents both significant opportunities and pressing challenges. The Fourth Industrial Revolution has necessitated substantial reforms in vocational education to meet the evolving needs of the labor market (Ministry of Education of the People's Republic of China, 2020). In China, the government has introduced a series of policies to encourage college students to find employment, providing support through initiatives such as employment subsidies and entrepreneurship support (Deng & Rattanasiraprapha, 2025). In Henan Province, educational administration has implemented specific strategies aligned with the national "Double High Plan" to enhance the quality of vocational education, emphasizing school-enterprise cooperation as a fundamental strategy (Zhu, 2023). This review aims to systematically synthesize the current literature on school-enterprise cooperation models in Henan's vocational colleges. By critically analyzing theoretical frameworks, core components, and implementation challenges, the review seeks to provide a comprehensive understanding of the field, identify gaps in existing knowledge, and offer a robust foundation for future research. This study employed a systematic literature review approach to ensure a comprehensive, transparent, and replicable synthesis of the existing research on school-enterprise cooperation in vocational colleges in Henan Province. The review process was guided by the following steps: Search Strategy: A systematic search was conducted in major academic databases, including CNKI (China National Knowledge Infrastructure), Scopus, and Google Scholar. The search targeted peer-reviewed journal articles, doctoral dissertations, and master's theses published in English and Chinese between January 2015 and June 2025. The primary keywords used were combinations of "school-enterprise cooperation," "vocational education," "industry-education integration," "Henan Province," and "co-creation." Inclusion and Exclusion Criteria: Studies were included if they (a) focused on vocational education at the college level; (b) specifically addressed school-enterprise cooperation models, mechanisms, or outcomes; (c) were empirical or theoretical in nature; and (d) were published within the specified timeframe. Studies were excluded if they (a) focused on secondary vocational education or other educational levels; (b) only peripherally mentioned cooperation without substantive analysis; or (c) were not peer-reviewed or formally published (e.g., conference abstracts, opinion pieces). The initial search yielded 127 potential sources, which were screened by title and abstract. After applying the inclusion and exclusion criteria, 35 sources were selected for full-text review and synthesis. Key sources are cited throughout this review. Analytical Approach: The selected literature was analyzed using a thematic synthesis approach. Key concepts, findings, and methodological approaches were extracted from each study and grouped into thematic categories, which form the structure of this review: theoretical foundations, core components, and implementation pathways/challenges. The analysis focused not merely on summarizing findings but on critically comparing and contrasting them, identifying areas of consensus and divergence, evaluating methodological strengths and limitations, and synthesizing the collective contributions to knowledge.

Theoretical Foundations of School-Enterprise Cooperation

Understanding the theoretical foundations of school-enterprise cooperation is essential for analyzing how partnerships are conceptualized, structured, and sustained. The literature draws upon multiple theoretical perspectives that collectively provide a comprehensive lens for examining the dynamics of industry-education collaboration. This section critically reviews three dominant theoretical frameworks that inform research on school-enterprise cooperation in vocational education: the Triple Helix model, stakeholder theory, and the co-creation paradigm. For each framework, the review examines its core concepts, its application in vocational education contexts, and the critical limitations and gaps that emerge when these theories are operationalized in empirical research. The analysis reveals that while these frameworks offer

valuable analytical tools, their application often remains superficial, with insufficient attention to the contextual specificities of China's vocational education system.

The Triple Helix Model

The theoretical underpinnings of school-enterprise cooperation in vocational education are grounded in the Triple Helix model, which theorizes the dynamic interactions between government, academia, and industry as fundamental to knowledge production and innovation (Leydesdorff & Etzkowitz, 1996; Xue & Ooi, 2025). This model, originally developed in the context of Western innovation systems, posits that the boundaries between these three spheres are increasingly blurred, leading to the emergence of hybrid organizations such as technology transfer offices and science parks. In the context of China's vocational education, scholars have adapted this model to emphasize the role of government as a central coordinator, reflecting the country's distinctive political and economic structure. A critical analysis of the literature reveals that while the Triple Helix is widely cited as a foundational framework (e.g., Deng & Rattanasiraprapha, 2025; Wang, 2025), its application in vocational education is often metaphorical rather than analytical. Few studies critically examine how the dynamics of this model play out differently in a centrally planned economy like China's compared to the Western contexts where the model was originally developed. Moreover, the literature largely overlooks the internal heterogeneity within each helix—for instance, the diverse interests of different types of enterprises (state-owned vs. private, large vs. small) or the varying capacities of different vocational colleges. This represents a significant gap in applying the model with critical nuance, as it assumes a level of institutional coherence that may not reflect reality. Furthermore, Xue and Ooi (2025) note that existing research rarely examines the feedback loops and recursive interactions that are central to the Triple Helix framework, instead treating the three actors as static and independent.

Stakeholder Theory

Building upon the Triple Helix framework, stakeholder theory provides a complementary lens for analyzing the diverse interests, expectations, and power relationships among key actors in school-enterprise cooperation. Originating from management studies (Freeman, 1984), stakeholder theory emphasizes that organizations must consider the legitimate interests of all parties affected by their actions, not merely shareholders. In the context of vocational education, Fan (2025) identifies four primary stakeholder categories: government as the leading entity, industry associations as intermediary bodies, enterprises as driving forces, and vocational colleges as the foundational implementers. Each stakeholder brings distinct resources and expectations to the cooperation process, and the effectiveness of collaboration depends critically on the alignment of these diverse interests. A synthesis of the literature indicates a strong consensus that stakeholder alignment is critical to successful cooperation. However, there is significant divergence in how this alignment is understood and achieved. Some studies (e.g., Wang, 2025) focus on formal governance structures, such as joint steering committees, memoranda of understanding, and legally binding contracts, as mechanisms for aligning interests. Others (e.g., Zhu, 2023; Inada, 2022) highlight the role of informal relationships, mutual trust, and boundary-spanning individuals who can bridge institutional cultures. This divergence points to a methodological gap: most studies rely on single-case analyses that capture specific contextual factors but lack comparative designs that could explain when and why certain alignment mechanisms are more effective. For instance, formal governance may be more appropriate in contexts involving large state-owned enterprises and public institutions, while informal relationships may be critical in partnerships with small and medium-sized enterprises. Additionally, the literature rarely examines power asymmetries among stakeholders, particularly the subordinate position of vocational colleges relative to government and enterprises in China's policy context.

The Co-creation Paradigm

The co-creation paradigm offers a more process-oriented and participatory view of collaboration, moving beyond structural analysis to focus on how stakeholders jointly produce value. As articulated by de Hei and Audenaerde (2023), co-creation in higher education is defined as a collaborative process in which all stakeholders—students, teachers, and working field professionals—equally contribute to generating innovative products, processes, or knowledge. Essential elements of effective co-creation processes include positive interdependence, individual accountability, collaboration, shared mental models, safe and supporting conditions, creative community, and group evaluation (de Hei & Audenaerde, 2023). This paradigm aligns with the pedagogical shift toward active, experiential, and work-integrated learning that characterizes contemporary vocational education reform. While this paradigm is highly relevant to school-enterprise cooperation, the literature reviewed shows a notable gap between aspiration and empirical scrutiny. Most studies (e.g., Deng & Rattanasiraprapha, 2025; Sutinen et al., 2016) apply the co-creation concept to describe the intended goals of partnerships but do not critically evaluate whether these principles are actually realized in practice. There is a lack of empirical research that assesses the conditions under which "equal contribution" is possible, particularly given the structural power imbalances between educational institutions and enterprises. Ramírez-Montoya et al. (2024) note that co-creation processes often reproduce existing hierarchies rather than challenging them, with enterprise partners typically holding greater decision-making power due to their control over resources and employment outcomes. Furthermore, Bradley (2024) argues that the co-creation literature in vocational education has yet to develop robust instruments for measuring the quality of collaborative processes, limiting the ability to compare outcomes across different contexts.

Core Components of School-Enterprise Cooperation Models

Building upon the theoretical foundations, a comprehensive understanding of school-enterprise cooperation requires identifying and examining the specific structural elements and operational mechanisms that constitute effective partnership models. This section critically reviews the empirical literature on the core components of cooperation, analyzing how these components are conceptualized, implemented, and evaluated. The review focuses on three key areas: the multi-dimensional framework that structures cooperation, the curriculum co-development processes that align educational content with industry needs, and the dual tutor system that bridges academic instruction and workplace learning. For each component, the analysis synthesizes findings from multiple studies, identifies areas of consensus and methodological weakness, and highlights gaps in the existing evidence base that warrant further investigation.

Multi-dimensional Framework of Cooperation

Empirical research has identified several core components that characterize effective school-enterprise cooperation models, often organized into multi-dimensional frameworks that capture the complexity of these partnerships. Deng and Rattanasiraprapha (2025), through ethnographic futures research involving expert interviews, developed a comprehensive framework comprising ten dimensions: (1) laws and regulations, (2) policy support, (3) capital investment and resource allocation, (4) curriculum setting and teaching reform, (5) teachers and professional training, (6) training base and practice platform, (7) employment guidance and career planning, (8) scientific research cooperation and technological innovation, (9) quality supervision and evaluation mechanism, and (10) information exchange and resource sharing. Similarly, Zhou and Song (2026) proposed a quality evaluation system for industry-education integration in Henan's higher vocational colleges, emphasizing the need for both process and outcome indicators. A synthesis of the literature shows a broad consensus on these macro-level components, with most frameworks including elements related to policy support, resource allocation, curriculum alignment, faculty development, and quality assurance. However, a critical analysis reveals that these frameworks are often presented as ideal-type models, with little critical examination of

their feasibility or internal coherence. For instance, the simultaneous requirement for "capital investment" and "information exchange" assumes a level of resource parity and trust that may not exist, particularly between public institutions and private enterprises. Moreover, Gao et al. (2011) note that these frameworks rarely account for the significant variation across different industries and enterprise types. A manufacturing enterprise with substantial capital resources may prioritize training base construction, while a service-sector enterprise may emphasize curriculum co-development and soft skills training. The literature lacks a contingent approach that would specify which components are most critical under different conditions.

Curriculum Co-development

Curriculum co-development represents a central operational component of school-enterprise cooperation, involving collaborative efforts between academic institutions and industry partners to design educational programs that meet workplace requirements. Ho et al. (2023) emphasize that vocational education activities must be directed toward achieving the goals of improving human intelligence and training human resources, meeting the requirements of improving comprehensive education quality. Their proposed model organizes curriculum development around four steps: establishing consulting groups, implementing counseling content, notifying parents of results, and organizing counseling conferences for students. This structured approach ensures that educational content aligns with both student aspirations and industry demands. The literature is largely consistent in advocating for structured, participatory approaches to curriculum co-development. Pimthong et al. (2022) describe the development of dual vocational education models that integrate curriculum development aligned with international standards, teaching and learning management, development of teaching personnel, and cooperation with domestic and foreign enterprises. However, a significant gap in the literature is the lack of research on the process of co-development itself. While outcomes such as aligned curricula and improved graduate competencies are frequently described, few studies (with the exception of Lui et al., 2025) critically examine the power dynamics, intellectual property issues, or the extra workload for faculty and industry professionals involved in the co-development process. Lui et al. (2025) found that curriculum co-development often places disproportionate burdens on faculty, who must simultaneously maintain academic standards and accommodate industry preferences, leading to potential burnout and resistance. Furthermore, the literature rarely addresses the challenges of sustaining curriculum co-development over time, particularly when industry partners change or when economic conditions shift.

The Dual Tutor System

The dual tutor system, where students are guided by both college teachers and enterprise mentors, represents an innovative approach to bridging theoretical knowledge and practical skills. Xi et al. (2024) propose "embodied modules" of design education that achieve learning embodiment through observation, simulation, and dialogue, supported by a well-proportioned curriculum system. This approach establishes on-campus workshops in collaboration with industry partners, facilitating project-based learning and fostering an environment of active embodied practice. The dual tutor system enables students to benefit from both academic expertise and industry experience, developing competencies that are directly applicable to workplace contexts. The literature consistently reports positive outcomes associated with the dual tutor system, including enhanced student competencies, improved employability, and stronger industry connections (Inada, 2022; Pimthong et al., 2022). However, a critical review reveals significant methodological weaknesses in the evidence base. Most studies rely on case studies and descriptive accounts, with few employing comparative or quasi-experimental designs that would allow for rigorous testing of the dual tutor system's added value. For instance, it remains unclear whether the positive outcomes attributed to the dual tutor system are due to the dual mentorship itself or to other factors such as student self-selection into these programs, the quality of the industry partners, or the specific characteristics of the participating students.

Additionally, the literature largely overlooks the challenges of implementing the dual tutor system at scale. Wang (2025) notes that maintaining a sufficient number of qualified enterprise mentors is difficult, particularly in regions with limited industrial development. The literature also lacks systematic analysis of the training and support provided to enterprise mentors, many of whom have no background in education or student supervision.

Implementation Pathways and Challenges

While the theoretical foundations and core components of school-enterprise cooperation have been extensively discussed in the literature, the actual implementation of these models in practice reveals a complex landscape of diverse pathways and persistent challenges. This section critically examines the literature on how school-enterprise cooperation is operationalized in vocational colleges, focusing on the implementation approaches that have been adopted and the obstacles that hinder deep, sustainable collaboration. The review synthesizes findings across three interrelated areas: the challenges related to student development and employability outcomes, the barriers to meaningful enterprise participation, and the governance and coordination issues that complicate multi-stakeholder collaboration. For each area, the analysis identifies areas of consensus, unresolved debates, and methodological limitations that constrain current understanding.

Student Development Challenges

Despite the identified core components and theoretical commitment to student-centered outcomes, significant challenges persist in achieving the intended developmental goals for students. Zhanghua et al. (2025), utilizing the Career EDGE (Employment, Development, and Graduateness) model, conducted a comprehensive assessment of student outcomes in higher vocational colleges. Their findings reveal that while students demonstrate strengths in degree subject knowledge and emotional intelligence, they encounter significant gaps in career development learning and sustainable development skills. These gaps suggest that current school-enterprise cooperation models may be more effective at transmitting technical skills than at fostering the broader competencies needed for long-term career adaptability. While this study provides a valuable framework for assessing student outcomes, a critical review of the literature suggests that such comprehensive assessments are rare. Most studies (e.g., Ji & Chang, 2024; Zhu, 2023) focus on immediate employment rates as the primary outcome measure, often reported by institutions as evidence of success. This narrow focus represents a significant gap in the literature, which largely fails to capture the long-term impact of cooperation models on career trajectories, job satisfaction, or adaptability in the face of technological change. Furthermore, the literature rarely examines differential outcomes across student subgroups—for example, whether cooperation models benefit all students equally or whether they may inadvertently reproduce or exacerbate existing inequalities based on gender, socioeconomic background, or prior educational attainment. Zhanghua et al. (2025) call for integrating practical training programs with academic curricula, nurturing self-efficacy through mentorship initiatives, bolstering school-industry collaboration, and crafting personalized career planning frameworks—recommendations that have yet to be systematically implemented or evaluated.

Enterprise Participation Challenges

Enterprise participation remains a critical challenge for deep and sustainable school-enterprise cooperation. Zhu (2023), employing SWOT analysis and the QSPM quantitative strategic planning matrix, identifies issues such as insufficient enterprise motivation, misalignment between school teaching models and enterprise requirements, and inadequate practical skill development among students. A synthesis of findings across multiple studies (e.g., Wang, 2025; Fan, 2025) reveals a clear consensus on the problem: enterprises often lack sufficient incentives to invest deeply in educational partnerships. This is particularly acute for small and medium-sized enterprises, which may lack the resources for sustained engagement and may prioritize short-term operational needs over long-term talent development. However, there is significant

divergence in the literature regarding the most effective solutions to this challenge. Some research advocates for stronger government mandates and funding mechanisms, arguing that enterprises will only participate if required to do so by policy or if provided with direct financial incentives (Zhu, 2023; Fan, 2025). Other scholars suggest more market-driven approaches, such as creating clearer value propositions for enterprises through intellectual property agreements, joint research and development projects, or preferential hiring arrangements (Wang, 2025; Deng & Rattanasiraprapha, 2025). This divergence is not resolved in the literature, highlighting a need for empirical research that tests the relative effectiveness of these different policy approaches across different industry contexts. Additionally, the literature rarely examines enterprise participation from the perspective of enterprise managers themselves, relying instead on institutional or policy-level analyses. Understanding the decision-making processes, cost-benefit calculations, and organizational constraints that shape enterprise engagement remains a critical gap.

Governance and Coordination Challenges

Governance and coordination challenges further complicate the implementation of school-enterprise cooperation models, particularly given the multi-stakeholder nature of these partnerships. Fan (2025), applying the SFIC (Starting conditions, Facilitating leadership, Institutional design, Collaborative process) collaborative governance model, identifies problems including insufficient willingness to collaborate, inadequate government functioning, immature institutional frameworks, and rigid coordination mechanisms. The research recommends clarifying responsibility boundaries, strengthening government guidance, refining institutional design, and leveraging digital tools to improve communication and operational coordination among participants. A critical analysis of the literature on governance reveals a heavy focus on the structure of coordination—for example, the creation of joint steering committees, coordination offices, or digital platforms. What is missing is an in-depth understanding of the process and agency in governance. Few studies (with the exception of Fan, 2025) explore how conflicts are actually resolved, how informal networks operate, or how individual leaders and boundary-spanners can influence the success or failure of a partnership. The literature largely treats governance as a matter of formal institutional design, overlooking the micro-dynamics of collaboration that often determine outcomes. Additionally, the literature rarely examines the temporal dimension of governance—how coordination mechanisms may need to evolve as partnerships mature, and how governance failures in the early stages of a partnership can create path dependencies that are difficult to reverse. This represents a significant gap in the literature's ability to move beyond structural descriptions to explain the dynamics of successful governance.

Comprehensive Research Framework for Henan Vocational Colleges

A critical synthesis of the literature reveals a clear and pressing need for a more robust, evidence-based framework to guide future research. While the field is rich in theoretical concepts and descriptive case studies, it lacks systematic, theoretically grounded, and empirically validated models that can guide practice and policy in specific contexts like Henan Province. This section synthesizes the gaps identified throughout the review and proposes a comprehensive research framework that addresses these limitations. The framework is organized around two interconnected components: first, a summary of the critical gaps in the existing literature that future research must address; second, a set of prioritized directions for empirical inquiry that can move the field beyond description toward explanation and evidence-based practice. Gaps in the Existing Literature: The review has identified several critical gaps: (1) an absence of longitudinal studies tracking the long-term outcomes of cooperation on students and enterprises; (2) a lack of stakeholder-centered perspectives, particularly those of students and enterprise mentors, which would balance the dominant institutional and policy-level analyses; (3) an over-reliance on single-case studies without sufficient comparative analysis across different types of institutions, industries, or partnership models; (4) a dearth of rigorous, quantitative testing of the relationships

posited by the theoretical frameworks; and (5) a lack of attention to the process and agency dimensions of governance and collaboration. The Proposed Framework: To address these gaps, a comprehensive framework for future research in Henan Province should prioritize:

Methodological Diversity: Moving beyond descriptive case studies to include longitudinal designs, comparative case studies, and quasi-experimental approaches that can assess the causal impact of different cooperation models. This includes the development and validation of instruments for measuring the quality of co-creation processes and partnership outcomes.

Multi-Stakeholder Perspectives: Systematically gathering data from administrators, teachers, students, and enterprise partners to understand the full range of motivations, experiences, and challenges. Particular attention should be paid to underrepresented perspectives, including those of enterprise mentors and students from disadvantaged backgrounds.

Outcome-Focused Inquiry: Focusing on a broader set of outcomes beyond immediate employment, including long-term career development, skill adaptability, job satisfaction, and enterprise satisfaction, using validated instruments like the Career EDGE model (Zhanghua et al., 2025) and the co-creation quality questionnaire developed by de Hei and Audenaerde (2023).

Contextual Nuance: Acknowledging the specific economic and policy context of Henan Province, comparing findings across its different sub-regions and industries (e.g., Zhengzhou vs. Luoyang; manufacturing vs. services). This includes examining how cooperation models vary across different types of enterprises (state-owned vs. private, large vs. small) and different types of vocational colleges (public vs. private, urban vs. rural).

Process and Agency: Moving beyond structural descriptions to examine the micro-dynamics of collaboration, including how conflicts are resolved, how trust is built and maintained, and how individual leaders and boundary-spanners influence partnership outcomes. This framework, synthesized from the identified gaps, provides a clear and structured agenda for the next generation of empirical studies, moving the field beyond description towards explanation and evidence-based practice.

CONCLUSION

This systematic literature review has synthesized existing research on school-enterprise cooperation in Henan's vocational colleges. The review critically analyzed the theoretical foundations, core components, and implementation pathways of these partnerships. Key findings indicate a broad consensus on the importance of multi-dimensional integration, but significant challenges persist in enterprise participation and governance. The critical analysis revealed methodological limitations in the current body of research, particularly a reliance on descriptive case studies and a focus on immediate outcomes. The review has identified clear gaps in the literature, including a lack of longitudinal and comparative studies and a dearth of stakeholder-centered perspectives. The findings of this review carry important implications for practice. For policymakers, the results suggest that effective school-enterprise cooperation requires not only policy mandates but also carefully designed incentive structures that align with enterprise motivations. For institutional leaders in vocational colleges, the review highlights the need to move beyond formal partnership agreements toward investing in relationship-building mechanisms, including regular communication channels, joint planning processes, and professional development for faculty involved in industry collaboration. For enterprise partners, the findings underscore the value of viewing educational partnerships not merely as corporate social responsibility but as strategic investments in talent development that can yield long-term returns. By synthesizing these findings, the review provides a comprehensive framework for future research, emphasizing the need for methodological rigor and contextual nuance. This synthesis contributes to the theoretical understanding of vocational education management and offers a clear roadmap for future empirical inquiry that can, in turn, provide more evidence-based guidance for policymakers and practitioners in Henan Province and beyond.

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