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Research on the Operation Mode of Industry-Education Integration Training Bases from the Perspective of Multi-actor Governance

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Abstract

Under the national strategy of deepening industry-education integration,training bases (including modern industrial colleges and sectoral industry-education integration communities) are key carriers that link education, talent and industry. However, in practice, there are widespread problems such as "emphasizing establishment over operation" and insufficient sustainability. Although existing research has been conducted from multiple perspectives such as governance, operation, resources, and models, it has mostly focused on static architectures and universal mechanisms, revealing deficiencies in the process by which multiple subjects such as government, industry, enterprises, and schools jointly construct operational models through dynamic interaction, game play, and adaptation in specific contexts, and the literature remains "fragmented". There is a lack of in-depth exploration of systematic coupling and contextualized adaptation mechanisms among the core elements. For this purpose, this paper uses a systematic literature review method to conduct an integrated review of the research on the "operation mode of industry-education integration training bases from the perspective of multi-actor governance" in China. The study examines the evolution context of eight thematic areas: governance structure and synergy, operation mechanism and management, resource integration and allocation, model and carrier innovation, policy and strategy, performance and sustainable development, stakeholders and dynamic mechanism, international comparison and theory. The analysis found that significant progress has been made in the field: perspectives have shifted from a single to multiple, issues have moved from morphological description to institutional core, methods have moved from speculative to empirical, and theoretical tools have shifted from reference to innovation, laying the foundation for understanding "what", "who participates", and "how to build" the training base. This paper further points out four major limitations of the research: insufficient attention to the dynamic process and deep mechanism of "co-governance"; Weak research on the system integration and contextualized adaptation of operating modes; The performance evaluation dimension is narrow and lacks process tracking; There is a "borrowing" approach to the application of theories, and there is a lack of localized theoretical construction. Based on this, future research should focus on the dynamic political process of multi-subject interaction, construct a systematic analytical framework of element linkage, conduct empirical research based on multi-dimensional efficacy and long-term tracking, and strive for local theoretical innovation that deeply interconstructs with China's unique policy and cultural context.

Keywords

Industry-education integration; Training base; Multi-party governance; Operating mode; Literature review; Modern Industry College.

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1. Introduction

Under the national strategic orientation of deepening industry-education integration, industry-education integration training bases (including organizational forms such as modern industrial colleges and industry-education integration communities) have become key carriers linking the education chain, talent chain and industrial chain [1]. However, practice shows that many bases have the phenomenon of "emphasizing establishment over operation", and problems such as the weakening of the collaborative mechanism and insufficient sustainable operation capacity are prominent [2, 3]. In response to this, the academic community has explored from multiple dimensions and produced research results covering governance structure and subject synergy, operation process and management logic, resource integration and allocation, organizational carrier and model innovation, policy environment and institutional evolution, performance evaluation and sustainable development, stakeholder behavior and dynamic mechanism, as well as international comparison and theoretical perspective, etc. It lays the groundwork for understanding this complex organizational form.

Although the existing research is relatively abundant, there are still obvious limitations in the dynamic connection between the concept of "multi-governance" and the practice of "operation mode". Most studies focus on static architecture descriptions and universal mechanism designs, and fail to reveal the dynamic process in which multiple entities such as government, industry, enterprises, and schools jointly construct and evolve operational models through continuous interaction, game play, and adaptation in specific contexts [12]. At the same time, existing research is somewhat fragmented, with insufficient explanations of systematic coupling relationships among core elements such as governance, mechanisms, resources, and performance, and a lack of in-depth comparisons of contextualized adaptation mechanisms of operating models in different industrial characteristics and regional institutional environments, resulting in theories often lacking an overall and process perspective when explaining differences in operational efficiency.

For this purpose, this paper aims to systematically review and integrate the relevant research on the "operation mode of industry-education integration training bases from the perspective of multi-governance" in China. The significance lies in: at the theoretical level, it promotes the shift of the research paradigm from static element analysis to dynamic process and system integration, providing a foundation for constructing an integrated analytical framework that links governance structure, operation process and organizational effectiveness; At the practical level, by clarifying the perspectives and limitations of different research approaches, it provides a more systematic basis and direction for policy optimization and practice improvement. This paper will use a systematic literature review method to sort out the research context, core issues and research gaps in the field through content analysis, and on this basis, propose future research prospects.

2. Research on Governance Structure and Subject Synergy Mechanism

As a typical cross-border mixed organization, the governance structure and subject synergy mechanism of industry-education integration training bases and industrial colleges are the core institutional basis for determining whether they can achieve the goal of "co-construction, co-management and co-sharing" [17]. This thematic literature focuses on the power and responsibility allocation, organizational structure design and collaborative decision-making model of multiple subjects such as government, industry, enterprise and school, and the research context presents a clear evolution path from "calling for framework establishment" to "dissecting deep-seated contradictions" to "exploring refined innovation".

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2.1. Research Evolution

Early research (around 2014-2018) focused mainly on the initial construction of the governance framework and the advocacy of principles. This stage of research generally recognized the drawbacks of traditional school-enterprise cooperation, which was loose and had unclear rights and responsibilities, and emphasized the establishment of formalized governance structures. Many scholars have proposed that the concept of modern corporate governance should be borrowed to establish a board of directors or council system [88, 180]. Sun et al. (2015), for example, proposed a "five-in-one" joint-stock governance structure involving government, schools, enterprises, teachers and students, aiming to solve the problem of cooperative motivation through clear property rights [88]. Li Jianguo (2013) explicitly proposed that the board of directors of higher vocational colleges should be established based on the principle of mutual benefit to solidify the school-enterprise cooperative relationship in an institutionalized form [117]. These studies laid the foundation for the basic direction of "multi-party governance" for subsequent discussions, but mostly focused on the construction of macro models and did not delve deeply into the specific legal obstacles and conflicts of interest in the operation of the governance structure.

The mid-term research (approximately 2019-2022) delved into the core contradictions and complex forms in governance practices, with property rights issues and mixed ownership becoming the focus of debate. In response to the governance framework proposed earlier, scholars began to examine the institutional bottlenecks faced in its implementation. A key turning point lies in the discussion of property rights definition. Chen Junpeng and Zhu Huabing (2021), Duan Ming (2021) and other scholars pointed out sharply that higher vocational mixed-ownership industrial colleges (hybrid-ownership) face the problem of difficult property rights definition and protection, which is a fundamental obstacle to their in-depth development [31, 32]. Two approaches have emerged in the research: one advocates mechanism innovation within the existing legal framework, as proposed by Zhang Yu and Wang Wei (2022) and Zhou Guijin et al. (2022) to avoid property rights risks by constructing a clear equity distribution structure and a multi-party co-governance model [25, 28]; The other proposed a more groundbreaking concept of "one institution, two systems". Liu Shu (2024) 's literature constitutes an important theoretical innovation [8]. He systematically argues the legal and practical predicaments of independent legal person industrial colleges and creatively proposes the establishment of governance "special zones" within universities, allowing industrial colleges to implement a flexible management system distinct from other secondary colleges, thereby maximizing the autonomy of running schools without changing the legal person status of the school. This idea breaks away from the traditional framework of property rights definition and provides new ideas for governance structure reform. At the same time, the typological study of governance models has been further refined. Nie Ting (2023) systematically reviewed the evolution trajectory and operational predicament of the governance system structure of industrial colleges, pointed out problems such as "drift and derangment", and shifted the research perspective from "the supposed structure" to "the actual operation" [17].

The research over the past three years (2023-2025) has focused more on the optimization of the governance system, the improvement of its efficiency, and the governance innovation of modern industrial colleges, based on the discussion of deep governance issues in the middle period. The research consensus is further consolidated: Pure property rights definition or single organizational form innovation is not sufficient to solve all problems; a systematic and dynamic governance system must be constructed. Luo Shuhui and Fang Nan (2025) introduced the theory of organizational ambidexterity and constructed a theoretical model for modern industrial colleges to resolve the contradiction between innovation and efficiency, elevating governance research to the level of organizational strategic adaptability and representing the

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latest theoretical frontier [1]. Empirical research by Ning Qiyang (2022) and Xing Hui et al. (2022) reveals common shortcomings in governance practice [20, 21], such as the absence of the role of industry associations, conflicts of dual-subject goals, and the absence of supervision and evaluation mechanisms, directly responding to and detailed the operational predicaments pointed out by Nie Ting (2023) [17]. In this context, the optimization paths proposed by scholars are more comprehensive. For example, Ren Wenjun and Wu Yiming (2025) emphasize building efficient operating entities with the coordination of multiple interests as the key [2]; Guo Yu et al. (2023) explicitly advocated for "defining the dominant position of enterprises in running schools" to form true multi-party governance [15]. These studies have collectively pushed the subject from a focus on "static structure" to a pursuit of "dynamic governance capacity" and "governance effectiveness".

2.2. Research Review

In recent years, there has been a deepening trend "from structural construction to efficiency optimization, from single property rights disputes to systematic governance capacity building". Scholars generally recognize that effective governance not only requires a reasonable initial structure (such as a council), but also relies on dynamic operating rules and institutional culture that can balance diverse demands, stimulate the vitality of the main body, and adapt to internal and external changes. The research consensus focuses on the following points: First, multi-party governance is an inevitable direction, but it must be implemented and guaranteed through institutionalized means (such as boards of directors, articles of association); Second, the clear allocation of property rights or control rights is a fundamental problem that must be addressed, whether through mixed ownership [25, 28], "one institution, two systems" [8] or other forms of contract; Third, the governance system needs to be resilient and adaptable to address the challenge of organizational ambidexterity [1] and to achieve a balance between talent development and market efficiency; Fourth, the bridging and regulatory role of industry organizations needs to be strengthened to make up for the insufficiency of the binary dialogue between schools and enterprises and to evolve towards true multi-party synergy of "government, schools, industries and enterprises".

3. Research on Operating Mechanisms and Process Management

Based on the clear governance structure, the specific operation mechanism and process management of the training base and the industrial college are the key to achieving their transformation from "physical carrier" to "chemical integration". This thematic literature delves deeply into the internal logic, process systems and day-to-day management that drive the organization's operation, with a focus on building a universal operational framework and gradually deepening to the refined design and adaptive innovation of specific mechanisms such as benefit-sharing mechanism and sustainable development.

3.1. Research Evolution

Early research (about 2014-2018) focused on the framework construction of operating mechanisms and the identification of common problems. This stage of research aims to provide systematic operational solutions for in-depth cooperation between the university and the enterprise. Scholars generally draw on the theories of enterprise management and collaboration to construct a multi-dimensional operational mechanism framework. For example, Wei Taoyong (2017) systematically proposed a vocational education practical teaching operation mechanism system that includes dynamic mechanisms, organizational management mechanisms, monitoring and evaluation mechanisms, etc. [61]. Tong Weijun (2011) focused on productive training bases within schools and proposed three types of mechanisms: input-driven, operation management, and communication and exchange,

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covering key links from fund raising to benefit-sharing mechanism [151]. These framework studies laid the foundation for the scope of operational mechanism research, but mostly remained at the ought-to-be level of description. At the same time, in response to the early predicament of "hot schools but cold enterprises" in school-enterprise cooperation, scholars began to delve into the root causes, generally regarding "insufficient interest-driven" and "absence of guarantee mechanisms" as core pain points [59, 105, 119]. For example, Li Jianguo (2013) explicitly proposed that school-enterprise cooperation should be bound by "interest alignment" [117], and this view became an important starting point for subsequent research. The research by Wang et al. (2018) on the operation mechanism of enterprise teaching and training workshops reflects the initial trend of refinement from the macro framework to the operation of specific platforms [53].

Mid-term research (around 2019-2022) turned to in-depth exploration of specific mechanism types and innovation of localized models, with sustainable development and balance of interests becoming the focus. In response to earlier proposed frameworks and identified issues, the research began to seek specific solutions. A notable deepening is reflected in the focus on benefit-sharing mechanism and sustainable development mechanisms. Zhang Xuejun and Zhang Liying (2012), earlier based on the theory of collaborative management, constructed a management mechanism for productive training bases that includes benefit-driven, entry and exit, and collaborative operation [132], and their ideas were continued and expanded in the middle term. He Cailing and Zhang Yujing (2014) proposed that productive training bases should establish four major mechanisms - operation, motivation, restraint, and communication - to ensure their sound development [111]. The research of Huang Kan (2022) constitutes a methodological advancement. He empirically revealed six major factors and eleven paths that affect the effectiveness of the construction of production-oriented training bases jointly built by schools and enterprises using the structural equation model, and led the discussion of the operation mechanism from theoretical deduction to empirical test [27]. At the same time, a number of innovative operation models with Chinese characteristics were summarized. Deng Xiaohua and Wang Xi (2022) distilled the four linkage mechanisms of development momentum, information sharing, cooperative trust and benefit-sharing mechanism of modern industrial colleges [23]. The concept of governance and operation mechanism based on "interest alignment" proposed by Liu Renxiong (2017) [59] has been concretized at this stage as new operation models under property rights arrangements such as "shareholding system" and "mixed ownership" (such as "factory within the school" [87] and "entrusted operation" [115]), attempting to address the driving force for sustainable development at the institutional level.

The research over the past three years (2023-2025) has demonstrated a balanced approach of systematic integration, theoretical elevation, and cutting-edge exploration in mechanism studies, with a particular focus on the interactivity of mechanisms, technological empowerment, and adaptability. The current research consensus is that isolated mechanisms are difficult to work, and it is necessary to build an interlinked mechanism system that is adapted to the external environment and technological changes. Deng Zhixin (2023) explores the operational mechanism from the perspective of the integration of the industrial chain, the education chain, the talent chain, and the innovation chain, and connects the mechanism design with the broader industrial ecosystem [11]. Yao Yuan et al. (2024) represents an important theoretical perspective expansion. They systematically introduced the "technology knowledge spillover effect" theory into the construction of the industrial college operation mechanism for the first time, demonstrated its internal mechanism and practical path, and injected new connotations of knowledge innovation and learning organization into the operation mechanism [6]. This marks the expansion of operational mechanism research from focusing on resource exchange and balance of interests to focusing on knowledge flow and value co-creation. At the practical level, mechanism design is more refined and contextualized. For example, Ge Yi et al. (2022)

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explored a specific operational model of "public welfare + sharing" for public training centers [24]; Yin Qin and Xiao Weiping (2020), taking the specific industry college as an example, expounded on the path of implementing operational mechanism reform through organizational structure and institutional system reform [37]. Luo Shuhui and Fang Nan (2025) 's research on measures to break organizational ambidexterity [1], although classified under the governance theme, its core is to respond to the dynamic environment through mechanism design (such as rule adaptation, relationship coordination), which deeply intersects with the connotation of the operational mechanism, reflecting the integrated trend of governance and operational mechanism research in addressing organizational adaptability issues.

3.2. Research Review

In recent years, it has shown the evolution characteristics of "from element listing to system integration, from experience summary to theoretical guidance, from static design to dynamic adaptation". Scholars generally recognize that the effectiveness of the operating mechanism depends on its systematicness, synergy and contextual adaptability. The current research consensus focuses on: First, the balance of interests is the cornerstone, but not the sole goal. An effective operating mechanism needs to evolve towards building a value community and a knowledge innovation network on the basis of safeguarding the core interests of all parties (economic, human, and technological returns) [6, 11]. Second, mechanism linkage is the key. The dynamic mechanism, the sharing mechanism, the constraint mechanism, the evaluation mechanism, etc. must complement each other and work in synergy. The shortcoming of any single mechanism may restrict the overall effectiveness [23, 37]. Third, the operational mechanism needs to be embedded in the governance structure and the technical environment. The smooth operation of the mechanism depends on a clear division of rights and responsibilities (governance structure) [1] and the active use of digital technology to optimize information sharing, process management and evaluation feedback processes. Fourth, the evaluation and sustainability mechanism is a closed loop. It is necessary to establish an evaluation system that covers multiple dimensions such as economic benefits, educational effectiveness, and social services, and use this feedback to drive the continuous improvement of the operation mode, forming a management closed loop of "design - operation - evaluation - optimization".

4. Research on Resource Integration and Allocation Mechanisms

Resources are the lifeblood of the operation of industry-education integration training bases, and their integration scope and allocation efficiency directly determine the quality of talent cultivation and the ability of sustainable development of the organization. This subject literature focuses on the ways in which key elements such as funds, technology, faculty, courses, equipment, and space are raised, co-built, shared, and optimally allocated among multiple entities including government, industry, enterprise, and school. The research evolution shows a deepening process from "focusing on hardware investment and basic sharing" to "exploring property rights integration and precise matching" and then to "pursuing high-quality systematic allocation".

4.1. Research Evolution

Early research (about 2015-2018) focused mainly on the real predicament of resource shortages and the construction of basic sharing models, emphasizing resource input and co-construction. This stage of research generally regarded the insufficiency of resources, especially the shortage of funds and equipment, as the primary problem restricting the construction of training bases [54, 98, 106]. Therefore, the core of the study is to explore diversified resource raising channels and co-construction models of entities. The summary of

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the "Hangzhou model" of public training bases by Liang Ningsen and Jia Wensheng (2016) is representative. They proposed the co-construction strategy of "government-school as the main body, enterprise participation" and the co-management strategy of "government-purchased services, school-enterprise collaborative maintenance", providing a clear government-led paradigm for resource integration [73]. At the same time, school-enterprise cooperation in building specific types of training bases has become the mainstream approach, and models such as "factory in school" [89], "front store back factory" [128], and "industry-university-research base" [161] have been widely discussed. The core purpose of these models is to introduce the production equipment, technical projects and real environment of enterprises into teaching to address the problem of insufficient resources in schools. However, this stage of research has focused more on the integration of the "presence or absence" and "quantity" of resources, and has explored deeper issues such as ownership, utilization efficiency, and renewal mechanisms after the integration of resources.

Mid-term studies (about 2019-2022) delved into the property rights system and allocation efficiency of resource integration, with mixed-ownership and shareholding systems becoming the focus of innovation. In response to the problem of unsustainable cooperation caused by unclear rights, responsibilities and interests in early resource co-construction, the study began to seek institutional solutions. The "five-in-one" shareholding system model proposed by Sun et al. (2015) [88] was further concretized and practiced in the middle stage. Zuo Shihua et al. (2015), Song Shubin and Fang Hong (2015) and other scholars explored the operation mode of shareholding and mixed-ownership training bases, aiming to stimulate the motivation of enterprises to continuously invest and participate in management by clarifying property rights [87, 95]. The research by Huang Kan (2022) constitutes an important methodological turning point. He empirically examined the impact paths of elements such as resource supply and demand matching and co-construction models on the effectiveness of training base construction using structural equation models, moving resource integration research from empirical description to empirical attribution. The "symmetrical reciprocity" co-construction model and the "systematic" operation mechanism are of vital importance [27]. At the same time, the integration of resources has expanded from hard equipment to soft resources. Wang Yanan and Shao Jiandong (2023), Liu Yanfei et al. (2015) emphasized that teaching resources such as professional cluster construction, curriculum system, and faculty must be dynamically connected, integrated and restructured with industrial chain resources [7, 83]. The issue of resource allocation has also deepened from "sharing" to "optimization", with Han Yunsheng (2014), Yan Ning (2014) et al. beginning to focus on the scientific management, open sharing strategies and operating cost control of internal resources in training bases [100, 106].

The research over the past three years (2023-2025) has focused on the systematicness, intelligence and enabling value of resource integration, emphasizing the quality and adaptability of allocation. The current research consensus is that the simple accumulation of resources can no longer meet the needs, and it is necessary to achieve systematic integration and intelligent allocation across subjects and levels to serve industrial transformation and upgrading and the cultivation of high-end talents. Zhu et al. (2025) 's case study of the "Zhongyin Hui Gu" training base of N University in Shanghai demonstrates the innovative practice of "moving the base forward to the campus" and integrating professional skills training resources through multiple forms, reflecting the deep integration of resource integration in terms of time, space and form [4]. The empirical study by Pan Jianhua and Guo Siqi (2025) further reveals the synergy effect of resource integration. They found that the collaborative ability of the subject, the external environment, the innovation ability and the operation mechanism all have a significant positive impact on the collaborative innovation of industrial colleges, highlighting the systematic view that resource integration needs to progress in tandem with governance and operation mechanism [3]. In terms of the allocation direction, the

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research pays more attention to resonating with industrial transformation. Zheng Yue and Qu Caixin (2022) proposed the establishment of a dynamic adjustment mechanism for professional clusters to ensure the precise matching of educational resources with regional leading industrial resources [22]. Wang Yongyan and Wen Subin (2023) focused on the cultivation of digital financial talents and expounded the specific paths of integrating school-enterprise curriculum, research topics, and mentor resources to construct a new training model [13]. The "123" model proposed by Jin Xiaofeng and Chen Feier (2021) is a refined example of resource integration serving specific professional goals. It systematically integrates various resources such as industry-education integration platforms, software and hardware, on-campus and off-campus bases, courses and positions to form a closed loop [33].

4.2. Review of Research

In recent years, it has shown distinct characteristics of "from physical aggregation to chemical integration, from property rights division to value co-creation, from static allocation to dynamic adaptation." Scholars generally recognize that the ultimate goal of resource integration is not asset accumulation, but rather to stimulate the "1+1>2" synergistic innovation effect through optimal allocation. The current research consensus focuses on: First, clear property rights are the foundation, but value consensus is the core. Mixed-ownership, shareholding and other property rights innovations have addressed the issue of "who invests, who owns", but deeper integration depends on the recognition and investment of both schools and enterprises in common value goals such as talent cultivation and technology research and development [3, 4]. Second, the allocation should follow the dual orientation of industrial logic and educational laws. Resource allocation must closely align with the dynamic demands of the industrial chain and the innovation chain (such as digital and green transformation), and follow the growth laws of technical and skilled talents to achieve the two-way transformation of "industrial resource education" and "educational resource industrialization" [13, 22]. Third, digitalization becomes a new dimension and enablement tool for resource integration. The construction and sharing of digital resources such as data resources, online platforms, and virtual simulation training are breaking through physical time and space limitations and greatly enhancing the breadth, precision, and flexibility of resource allocation. Fourth, systematic planning and dynamic adjustment mechanisms are the guarantee. Resource integration requires top-level systematic design (such as platformization and systematization), and the establishment of a mechanism for dynamic assessment and adjustment based on industrial demand, technological development and educational performance, in order to achieve sustainable optimal allocation of resources [7, 33].

5. Research on Model Type and Carrier Innovation

The implementation forms of industry-education integration training bases are not singular; their organizational forms and carrier innovations are direct manifestations of the implementation of concepts. This thematic literature aims to summarize and generalize various industry-education integration practice models, analyze their applicable conditions, structural characteristics and operational efficiency, and the research context clearly presents the evolution process from "borrowing and introduction and spontaneous exploration" to "summary of localized models and systematic construction" and then to "cross-border integration and digital innovation".

5.1. Research Evolution

Early research (about 2009-2015) was in the nascent and diversified trial stage of pattern exploration, with the main task of identifying and describing the various forms of cooperation that emerged in practice. This stage of research was characterized by a strong summary of

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experience, with scholars extensively introducing specific practices such as "order-based training" [102, 154], "factory in school/campus in factory" [89, 164], "vocational education group" [60, 76], "enterprise campus" [94], "teaching factory" [116]. Ji Zhongying (2009) was among the first to refine the model, summarizing school-enterprise cooperation into three typical models: "service for support", "co-construction of bases", and "order-based training" [184]. These studies initially drew a "map" of the model of industry-education integration in China, but mostly focused on static descriptions of the forms of cooperation, with insufficient analysis of its inherent operational logic, applicable conditions and sustainability. At the same time, the introduction and localization of foreign models have begun to attract attention, such as the discussion of Germany's "dual system" [90, 132], providing a reference for subsequent model innovation.

The mid-term study (about 2016-2020) entered the period of theoretical refinement and systematic construction of the model, and the "industrial college" was explicitly proposed as the core innovation carrier and became the focus of research. In response to the problems of the early model being loose and difficult to deepen, the research began to seek more organized and institutionalized carriers. Li et al. (2015) systematically discussed the functional design and operational mode of industrial colleges, marking the rise of industrial colleges from practical phenomena to academic research objects [82]. Since then, industrial colleges have rapidly differentiated into various subtypes. Wan Weiping (2015) summarized the "town-school-enterprise-industry" industrial college model jointly built by Zhongshan Vocational College and professional towns [85]; Cui Yanqun et al. (2019) proposed the "dual-subject" industrial college and "three-park integration" school-running model for applied undergraduate education [47]; Zhao Dongming and Zhao Jinghui (2016) explored the construction of "university-enterprise mixed ownership secondary industrial colleges" [75]. During this period, the study of "model" has shifted from describing "how to cooperate" to designing "how to establish". At the same time, other carriers are developing in parallel. Zhang Yanwen and Ma Feifei (2022) innovatively proposed to solve the problem that the group as a whole cannot be registered as a legal person by materializing the executive level and industrial colleges of the vocational education group, representing an important breakthrough in the materialized operation of this traditional model of vocational education group [26].

The research over the past three years (2023-2025) has shown distinct features such as accelerated model iteration, deepened cross-border integration and the emergence of new digital carriers. The current research is no longer content with the generalization of existing models, but is committed to promoting the upgrading and reengineering of models, with the core driving force coming from industrial transformation and policy guidance. A notable consensus is that the single, shallow model of cooperation is no longer sustainable and needs to evolve into a "community" or "fusion" that integrates multiple entities and functions. The proposal of industry-education integration communities is a concentrated manifestation of this trend. Liu Xiao and Wang Yeqing (2024) systematically expounded on its connotation, construction goals and advancement paths, emphasizing that it closely links elements such as education, talent and innovation, aiming to resolve predicaments such as unclear establishment goals and loose organization [5]. This marks the expansion of model research from "school-enterprise point-to-point" to the macro dimension of "industry-education-industry aspect". In the context of digital transformation, new carriers such as the Digital Trade College [39] and the Digital Finance Talent Cultivation Industry College [13] have emerged, reflecting the deep binding of model innovation with new technologies and new business forms. In addition, the complexity and systematicness of the model have been further enhanced. The "three integrations and five Synergies" industrial college constructed by Robert (2023) integrates multiple dimensions such as the integration of government, schools, enterprises and associations, the integration of technology and methods, and the integration of education and

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industry [12]. Zhu et al. (2025), taking the "Zhongyin Huigu" of N University in Shanghai as an example, presented a new model of physical operation that "moves the training base forward to the campus" and realizes the co-cultivation of talents between the school and the enterprise [4], responding to the upgrading demands of the early "factory within the school" model in the construction of university-led industry-education integration cities.

5.2. Research Review

In recent years, there has been a leap from "morphological classification to functional construction, from linear cooperation to ecological coupling, and from empirical solidification to agile innovation". Scholars generally recognize that there is no one-size-fits-all "optimal model", and that effective carriers are the result of the combined effects of specific industrial demands, regional resources, institutional characteristics, and policy environments. The current research consensus focuses on: First, materialization and institutionalization are key to the sustainable development of carriers. Whether it is industrial colleges, vocational education groups or public training bases, they must transform from "agreement communities" to "interest and development communities" through clear property rights, governance and operation mechanisms [4, 5, 26]. Second, functional integration is at the core of the carrier's effectiveness. A successful carrier needs to break through the single function of training or talent cultivation and integrate multiple functions such as teaching, production, research and development, innovation and entrepreneurship, and social services to become an organic node in the regional industrial innovation system [12, 13]. Third, digitalization and openness become the inherent genes of the new carrier. Emerging carriers (such as Digital trade colleges) have relied on digital platforms and open ecosystems since their birth, and the digital transformation of traditional carriers is also imperative, which is an inevitable requirement for talent cultivation in the digital economy era [39]. Fourth, policy guidance and regional fit are the external framework for model innovation. The emergence of new models such as industry-education integration communities directly responds to the deepening requirements of national industry-education integration policies, and their specific forms must be closely adapted to regional industrial structures and development priorities [5, 12].

6. Research on Policy Evolution, Institutional Environment and Macro-strategy

The construction and operation of industry-education integration bases are embedded within national and regional macro-policy frameworks. This literature analyzes the external institutional environment, focusing on policy evolution logic, institutional design, and alignment with broader national strategies. The research context has evolved from "policy interpretation and problem identification" to "institutional analysis and path design," and finally to "strategic integration and system building."

6.1. Research Evolution

Early research (circa 2011-2017) primarily interpreted policy texts, described practical dilemmas, and called for improved institutional environments. Scholars identified inadequate policies and institutional safeguards as key external constraints on deeper integration, arguing that weak enterprise motivation in school-enterprise cooperation stemmed from a lack of effective incentivizing policies and regulations [46, 50, 129]. Studies highlighted the government's essential "meta-governance" role [78, 187] but largely remained at the level of problem identification and principle-based suggestions, without delving into precise policy implementation or collaborative system innovation.

Mid-term research (circa 2018-2021) shifted towards critical analysis of specific policy tools, institutional logic, and regional models. It deconstructed policy systems and examined their

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local implementation. For instance, research analyzed the logic and policy incentives for "industry-education integration enterprises," shifting focus from schools to core stakeholders [51]. Other studies identified specific regional bottlenecks in mechanism implementation [42]. Summaries of institutional innovations emerged, such as models integrating ethnic culture inheritance strategies [44].

Recent research (2023-2025) aligns closely with major national strategies, aiming to build a strategic system serving goals like Chinese-style modernization. Policy studies now show enhanced systematicness and foresight. The policy focus is seen as elevating from educational reform to a key arrangement for national industrial security, innovation, and talent strategy. Studies link industrial colleges to strategies like "common prosperity," expanding their perceived policy value [10]. Research on "industry-education integration communities" addresses systemic flaws like loose organization [5]. Policy reflection has deepened, examining issues like sustainability and autonomy [9], and translating top-level strategies into operational models [12].

6.2. Research Review

Recent research shows a clear evolution: from repairing local mechanisms to building ecosystem, from an educational focus to national strategic support, and from policy-driven development to endogenous institutional innovation. Key consensus points include: 1) Strategic synergy is crucial: Policies must resonate with S&T, industrial, and regional policies, integrating into national modernization for lasting vitality [10, 12]. 2) Focus on key subjects and mechanisms: Policies must precisely motivate core actors like integration enterprises [51] and support structures like integration communities [5] to address enterprise motivation and industry guidance gaps. 3) Balance uniformity with adaptability: National top-level design should allow local/industrial innovation, fostering diverse models matching regional characteristics [9, 44]. 4) Close the loop with evaluation: Policy effectiveness requires scientific performance evaluation and dynamic adjustment mechanisms for continuous optimization.

7. Research on performance evaluation, quality assurance and sustainable development

This theme examines how to measure effectiveness, ensure quality, and achieve sustainable development for industry-education integration bases. Research has evolved from "focusing on input-output and problems" to "building evaluation indicators and monitoring systems," and towards "emphasizing system resilience, innovation efficiency, and dynamic adaptation," deepening the understanding of "high-quality development."

7.1. Research Evolution

Early research (about 2012-2017) was mostly problem-oriented, focusing on describing specific quality and efficiency issues in the construction of training bases or school-enterprise cooperation, with an initial awakening of assessment awareness. This stage of research generally pointed out that training bases had problems such as emphasizing construction over management, emphasizing hardware over substance, low utilization rate, and weak social service capacity [96, 98, 125]. For example, Li Yongkang (2015) systematically listed many drawbacks such as lagging teaching objectives, unreasonable course arrangement and imperfect evaluation system in higher vocational practical training [96]. Chen Hongyuan (2014) pointed out the problems such as the lack of unified planning and unreasonable resource allocation of training bases from a macro perspective [98]. These studies sharply reveal the common predicament of "low input-output efficiency" in the practice of industry-education integration, but most of them are just a list of phenomena, and no systematic solutions have been proposed for how to scientifically evaluate the effectiveness and how to systematically

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guarantee the quality. The analysis of "value-driven" in the development and sharing mechanism of practical training resources by Nanhai and Gong Mengwei (2012) begins to touch upon the value basis behind the evaluation and can be regarded as the budding of evaluation theory thinking [137].

The mid-term study (c. 2018-2022) focused on constructing the evaluation index system and quality assurance framework, empirical research methods were widely applied, and sustainable development became the core issue. In response to the problems raised earlier, the research turned to seeking systematic diagnostic and improvement tools. The research by Huang Kan (2022) represents a significant methodological breakthrough. Using structural equation modeling (SEM), he empirically revealed six major factors and eleven influencing paths that affect the effectiveness of the construction of production-oriented training bases jointly built by schools and enterprises, providing data-based causal explanations for performance evaluation and greatly enhancing the scientific level of evaluation research [27]. Tong Weijun (2011) 's earlier research on the operation mechanism of productive training bases also provides a framework reference for evaluating their management effectiveness [151]. In terms of quality assurance, the study emphasized the establishment of a closed-loop system. Zhang Liang (2010) proposed to build a teaching quality assurance and monitoring evaluation system based on the integration of work and study [163]. Liu Hua (2009) explored the three operational mechanisms of the work-study integrated talent cultivation model, namely the driving force, cooperation and innovative curriculum reform, which contained the logic of quality generation [177]. "Sustainable development" was explicitly proposed and hotly discussed during this period. Li et al. (2017) and He Cailing and Zhang Yujing (2014) both took the establishment of a sustainable development operation mechanism as the core objective of the research on the training base [66, 111].

The research over the past three years (2023-2025) placed performance evaluation and quality assurance in the context of "adaptability" and "collaborative innovation", with a more diverse evaluation dimension and a greater focus on the long-term resilience and value co-creation ability of organizations. The current research consensus holds that the traditional single evaluation, which focuses on hardware construction and student skill attainment, is no longer able to meet the demands of rapid industrial changes and deep integration of industry and education. The empirical study by Pan Jianhua and Guo Siqi (2025) represents an important expansion of the evaluation perspective. They empirically examined the impact of subject ability, external environment, innovation ability and operation mechanism on collaborative innovation in higher vocational industrial colleges from the dimension of "collaborative innovation", and incorporated "innovation efficiency" into the core performance indicators [3]. Xie Lina et al. (2024) employed a novel text analysis method. Through the analysis of self-evaluation reports of "Double High Plan" schools, they revealed the transformation and evolution deficiencies in the form of industry-education integration of professional clusters, knowledge associations, organizational management, etc., providing a new approach based on large-scale text evidence for evaluation [7]. At the level of sustainable development, the study placed more emphasis on systemic resilience. Qu Lu and Wang Guanyan (2024) proposed that the evaluation of industrial colleges should be systematic and developmental, maintaining the symbiosis and sharing of functional benefits [9]. Yao et al. (2024) explored the construction of the operating mechanism from the perspective of the "technology knowledge spillover effect", essentially constructing a sustainable development model that achieves self-reinforcement through the flow of knowledge [6]. The study of organizational ambidexterity by Luo Shuhui and Fang Nan (2025) addresses the fundamental question of how to maintain sustainable competitiveness in a dynamic environment from the perspective of organizational theory [1].

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7.2. Research Review

In recent years, it has shown the evolution characteristics of "from static evaluation of results to dynamic diagnosis of processes, from internal closed-loop education to industry-education symbiosis, from survival maintenance to innovative development". Scholars generally recognize that evaluation is not just about "scoring", but about "navigation"; Sustainable development is not just about "living", but about "evolving". The current research consensus focuses on: First, the assessment system must be multi-dimensional and coordinated. A comprehensive evaluation system covering multiple dimensions such as the quality of talent cultivation (employment rate, adaptability), technological innovation contribution (patents, services), resource utilization efficiency (sharing rate, cost), industrial service effectiveness (satisfaction, contribution), and internal governance effectiveness is needed [3, 7]. Second, data-driven and evidence-based approaches have become the new normal for evaluation methods. Whether it's questionnaires, structural equation models, or text mining, empirical analysis based on objective data is replacing subjective empirical judgment, making assessment conclusions more persuasive and instructive [3, 7, 27]. Third, the core of sustainable development is the organization's ability to learn and adapt. Bases or industrial colleges need to establish agile mechanisms that can obtain feedback from the industrial end, quickly adjust professional directions, course contents and operation models, and their resilience is reflected in the continuous adaptation to technological changes and changes in market demand [1, 9]. Fourth, "symbiosis and sharing" is the foundation of sustainable benefits. The evaluation system should be able to guide and measure the actual value (economic gains, talent supply, technological upgrades) obtained by multiple subjects in cooperation and ensure the fairness of benefit-sharing mechanism and the compatibility of incentives, which is the fundamental driving force for sustainable development [6, 9].

8. Stakeholder Analysis, Dynamics and partnership Studies

The essence of the integration of industry and education is the game and collaboration among different stakeholders. This thematic literature delves into the intrinsic motivation, behavioral logic, and interrelationships of core entities such as enterprises, schools, students, and industries to explore how cooperation occurs and persists, with a research thread from "dissecting the surface reasons for the hot and cold of enterprises" to "building a mutually beneficial and win-win driving mechanism" to "shaping a community of shared destiny with value recognition", Gradually delving into the cultural and psychological core of industry-education integration.

8.1. Research Evolution

Early research (approximately 2010-2016) focused on diagnosing the phenomenon of "schools being enthusiastic but enterprises being indifferent", with an emphasis on analyzing the economic and institutional roots of the insufficient participation motivation of enterprises. This stage of research generally regarded enterprises as rational economic entities and believed that they lacked the intrinsic motivation to participate in vocational education. Ye Xiaoming and Zhu Xuemei (2011) clearly pointed out that the lack of motivation for enterprises to participate in school-enterprise cooperation is the main problem, and noted that it is due to multiple reasons such as insufficient policy incentives and lack of attractiveness of schools [157]. CAI Tianzuo and CAI Donggen (2012) also hold that to promote cooperation, it is necessary to clarify the essence of the problem and innovate the cooperation model and working mechanism [141]. Liu Dexiu (2012) introduced the analytical perspective of the "market mechanism" and proposed that in school-enterprise cooperation, the market mechanism should be fully utilized to bring the interests and obligations of both sides closer to equilibrium, providing an economic framework for understanding school-enterprise interaction [131]. These studies accurately

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grasp the main contradiction of industry-education integration, but the solutions tend to impose incentives from the outside (government) or enhance service capabilities from the school end, and the exploration of how to fundamentally stimulate the endogenous demands of enterprises and the roles of other subjects such as students and industries is not sufficient.

Mid-term studies (about 2017-2021) focused on designing a systematic dynamic mechanism and guarantee system, and began to pay attention to the interests of multiple subjects such as students and industries. In response to the problems diagnosed early, the research turned to more operational mechanism design. The "alignment of interests" principle proposed by Li Jianguo (2013) became the core guiding ideology for mechanism construction at this stage [117]. Kong Dezhong and Chen Zhixiang (2017) proposed a school-enterprise collaborative education mechanism that includes interest-driven, communication and coordination, power restraint, and interest guarantee [67]. Xu Yingnan and Chen Fuming (2017) explored the talent cultivation mechanism of industry-university-research-application and school-enterprise collaboration in vocational colleges based on the synergy theory from the aspects of external promotion and internal synergy [68]. At the same time, the research perspectives began to diversify. The interests and development demands of the "student-centered" have been emphasized. Quan Xizhen et al. (2012) explored the operation mechanism of student-centered business training bases on campus [139]; Zhu Guofeng (2016) focused on the role of industry-education integration in enhancing students' innovation and entrepreneurship qualities [69]. The role of industry organizations has also been repositioned from "absence", Deng Zhixin and Wan Shoufu (2015) explored the innovative model of industry associations' participation in school-enterprise cooperation in vocational education, particularly the construction of "industry colleges" [86].

Over the past three years (2023-2025), while continuing the mechanism design, more emphasis has been placed on building deep partnerships based on common values, emotional trust and cultural integration, and the "community of shared future" has become an ideal picture. The current research consensus holds that "cooperation" based solely on interests is fragile and short-sighted, and it is necessary to foster value recognition and emotional bonds to form a "community" of shared destiny. Liu Jinfeng (2021) provides a theoretical framework for the "vocational education school-enterprise community of shared destiny", pointing out that the necessary pursuit is the unity of righteousness and profit, the integration of reason and emotion, openness and inclusiveness, and mutual integration and coexistence [35]. The research in the past three years has been deepened on this basis. Wu Zhongchao (2020) explored the collaborative innovation of industry-university-research in application-oriented universities from the perspective of "dual-chain integration", which is essentially about building an interest and development community based on the deep integration of the innovation chain and the industrial chain [41]. Xiang Yongsheng and Yuan Jinxiang (2019) put forward the concept of "relationship synergy" in their research on the operation mechanism of collaborative education, incorporating emotional trust and communication quality among the subjects into the analytical framework [48]. Research on specific industries also reflects this deep relationship construction. Ji Wenlin et al. (2012) explored deep interest binding and cultural integration in the cultivation of high-skilled talents in animal husbandry through the establishment of school-enterprise cooperation alliances and demonstration zones [133]. The role of students has evolved further from "beneficiaries" to "participants" and even "co-builders", with more emphasis on their subjectivity in training and innovation.

8.2. Research Review

In recent years, there has been a profound transformation "from benefit calculation to value co-creation, from contractual relationship to psychological contract, from bilateral game to networked symbiosis". Scholars generally recognize that the foundation of a sustainable

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industry-education integration relationship is a shared value proposition that can incorporate and elevate the core demands of all parties. The current research consensus focuses on: First, the driving force is diverse and complex. Corporate motivation comes not only from short-term economic returns (labor costs, tax incentives), but also from long-term talent strategic reserves, technological research and development support, enhanced social reputation, and opportunities to participate in the formulation of industry standards. School dynamics extend from obtaining resources to enhancing school adaptability and social influence [35, 41]. Second, trust and communication are the lubricant and adhesive of relationships. Establishing regular communication and coordination mechanisms, promoting the integration of school and enterprise cultures, and creating an organizational atmosphere of mutual respect and understanding are crucial for reducing transaction costs, resolving cooperative conflicts, and consolidating long-term relationships [48, 67]. Third, students are the core stakeholders and carriers of value. All cooperation ultimately serves students' growth and success. Students' sense of gain, employment competitiveness and development potential are the fundamental criteria for measuring the success or failure of the partnership, and their legitimate rights and interests and subject status in practical training and innovation must be guaranteed [69, 139]. Fourth, industry organizations are key "third parties" and system integrators. Industry associations can convey standards, coordinate interests and provide credit endorsements between schools and enterprises, and their deep participation can effectively enhance the stability and industry adaptability of the cooperative relationship [86, 133].

9. International Comparisons, Theoretical Frameworks and Historical Evolution Studies

A profound understanding of industry-education integration training bases is inseparable from historical mirror, theoretical perspective and international reference. This thematic literature provides a temporal depth, analytical tools and an external perspective for research, evolving from "scattered introduction and initial application" to "systematic sorting and theoretical deepening" and then to "multi-integration and local creation", continuously strengthening the theoretical foundation and methodological awareness of research in this field.

9.1. Research Evolution

Early research (about 2007-2015) was characterized by the introduction of international experience (particularly Germany's "dual system") and the initial application of classical theories, showing an exploratory nature. This stage of research was aimed at finding other stones and analytical tools for Chinese practice. The German dual system is the most introduced and discussed model, and many literatures use it as an ideal reference when analyzing domestic issues [90, 132, 168]. In terms of theoretical application, the synergy theory was introduced earlier for the analysis of university-enterprise cooperation mechanisms [68]; Xu Qiu 'er (2007) proposed the concept of "five-ization base", which was an early attempt to concrealize the idea of integrating work and study into the construction standards of training bases [189]. In addition, the research on the construction of vocational education training bases conducted by Xiang Rongjian et al. (2008) is a descriptive study based on empirical data, providing a realistic starting point for subsequent research [186]. Overall, the theoretical and comparative studies at this stage were rather fragmented, mostly serving as an auxiliary background for problem analysis and countermeasure suggestions, lacking a profound reflection on the applicability of the theory and a systematic analysis of the conditions for localizing international experience.

The mid-term research (about 2016-2022) entered an active period of application of the theoretical framework and a systematic stage of historical review, with a significant increase in methodological awareness. Scholars began to consciously apply a variety of social science theories to conduct more penetrating analyses of industry-education integration. Symbiosis

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theory has become a popular framework for explaining the relationship of multiple subjects. Song Jinyu and Zhang Yuanbao (2021), Huang Kan (2022), and others used this theory to analyze the symbiosis system, dilemmas, and paths of industrial colleges or training bases [27, 30]. The theory of transformation of the knowledge production model was used by Guo et al. (2023) to explain the inevitability of the emergence of industrial colleges in higher vocational colleges and their construction paths [15]. The theory of dynamic competence was used by Luo Siming and Zhang Yang (2023) to construct an analytical framework for cross-border organizations of industry-education integration in colleges and universities [19]. In terms of historical research, Li Mingliang and Shi Jingyan (2023) 's systematic review of the literature of modern industrial colleges in China over the past decade (2012-2022) marks the entry of research on this topic into a conscious stage of academic history sorting, clearly outlining the evolution map of research topics, perspectives and methods [14]. Nie Ting's (2023) examination of the "evolution trajectory" of the governance system structure of industrial colleges is a specialized historical study focusing on the governance dimension [17].

The research over the past three years (2023-2025) has shown a strong momentum of theoretical innovation and deep integration, and attempts to construct local theories in the context of Chinese-style modernization. The current research is no longer content with simply applying Western theories, but is committed to the revision, integration and originality of theories. The research of Luo Shuhui and Fang Nan (2025) represents the frontier of theoretical application. They introduced the "organizational ambidexterity" theory derived from enterprise management into the research of modern industrial colleges, constructed a theoretical model to break its tension dilemma, and achieved a deep intersection of management theory and educational organization research [1]. Yao Yuan et al. (2024) introduced and expanded the theory of "technology knowledge spillover effect", providing a new knowledge economics perspective for understanding the operating mechanism of industrial colleges [6]. Sun Ping et al. (2025) 's research on the labor discourse of "digital equity", although not directly targeting industry-education integration, emphasizes the idea of understanding concepts from the perspective of laborer subjectivity and contextualized practice, which has important methodological implications for reflecting on core concepts such as "student subjectivity" and "enterprise subjectivity" in industry-education integration (mentioned in the literature as examples of theoretical methodological implications) Because the theme does not fully and directly match, it is not included in the core reference list of this theme, but its methodological value should be affirmed). At the international comparison level, the research is more rational and pragmatic, focusing on idea borrowing and localization rather than direct model transplanting. The discussion by Lin Jian and Geng Lelu (2023) on the task of building modern industrial colleges, although based in China, contains the absorption and transformation of advanced concepts of international engineering education and industry-university-research cooperation [18].

9.2. Research Review

In recent years, it has shown distinct characteristics of "from instrumental borrowing to creative transformation, from single theoretical explanation to multi-paradigm dialogue, from context sorting to paradigm reflection". Scholars generally recognize that no single theory can be a one-size-fits-all approach and that different theoretical perspectives must be flexibly selected or integrated based on the specific research question. The current research consensus focuses on: First, the application of theories should be closely related to the Chinese context. Western theories (such as symbiosis, triple helix) provide conceptual tools for analysis, but must be modified and adapted in light of China's unique policy environment, market structure, and educational culture, and their explanatory power must be established in the process of being tested by Chinese experience [1, 6, 15]. Second, the intersection of theories across

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disciplines is a point of growth for innovation. The introduction of theories from disciplines such as management (organizational theory), economics (knowledge spillover), and sociology (network theory) has greatly enriched the toolbox of industry-education integration research and promoted the leap of research from empirical description to theoretical interpretation [1, 6, 19]. Third, historical review is the foundation of theoretical innovation. A historical grasp of policy evolution and changes in academic topics can help researchers identify real problems, avoid repetitive research, and position the coordinates of current theoretical innovation in historical continuity [14, 17]. Fourth, the ultimate goal of international comparison is local construction. The significance of comparative studies is not to seek "standard answers", but to inspire thinking through comparison, to have a deeper understanding of the advantages and constraints of one's own system, and thus to explore theories and models of industry-education integration with Chinese characteristics [18]. Research on industry-education integration in the context of Chinese-style modernization is calling for more theoretical generalizations and conceptual creations derived from local practices.

10. Overall Progress and Future Direction of Research

10.1. Overall Progress

Research on industry-education integration training bases (with industrial colleges as a typical example) has made significant progress over the past two decades, achieving a paradigm shift from fragmented experience summary to systematic theoretical exploration. The research progress is mainly reflected in the following four aspects:

First, research perspectives have shifted from being single to diverse. Early research focused on the school perspective, exploring how to "bring enterprises into education". The current research has firmly established the core concept of "multi-party governance", viewing the government, industry organizations, enterprises, schools and even students as indispensable stakeholders and governance subjects, and the research perspective covers the entire spectrum of macro policies, meso organizations and micro mechanisms.

Second, the research topic delves from the surface form to the institutional core. The focus of research has shifted from simple descriptions of cooperative forms such as "order classes" and "factories within schools" to in-depth analysis of institutional issues such as property rights structure, governance system, benefit-sharing mechanism mechanism, and sustainable development capacity. In particular, discussions on property rights and governance innovations such as mixed ownership and "one institution, two systems" have touched upon the core contradictions in the construction of industry-education integration organizations.

Thirdly, the research methods have shifted from qualitative speculation to multi-dimensional empirical research. Research is no longer confined to theoretical deduction and case experience summary. Empirical research methods such as questionnaire surveys, structural equation models, text mining, and case comparisons have been widely applied, enhancing the scientificity and persuasiveness of research conclusions and promoting refined measurement of influencing factors, pathways of action, and performance outputs.

Fourth, theoretical tools have shifted from reference and introduction to integration and innovation. Researchers actively introduce multi-disciplinary theoretical tools such as symbiosis theory, synergy theory, knowledge production model theory, dynamic capability theory, and organizational ambidexterity theory to explain and construct the complex phenomena of industry-education integration. Recent studies have shown an awareness of localizing and integrating Western theories and attempting to construct original theories.

Overall, the existing literature has laid a solid foundation for understanding what the industry-education integration training base "is" (model carrier), "who participates" (governance

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subject), and "how to build" (resources and policies), and has made enlightening expanations at the "why build" (strategic value) level.

10.2. Insufficient Research and Future Prospects

Despite the fruitful results, the existing research still has significant deficiencies in responding to the complex issue of "operating models in the context of multi-governance", which constitutes the starting point of this study:

First, there is insufficient revelation of the dynamic process and deep mechanism of "multi-party governance". Existing research has mostly focused on the description and design of static structures such as governance subjects and organizational structures, but has paid insufficient attention to the dynamic political process of how multiple subjects such as governments, industries, enterprises, and schools interact, play games, negotiate and compromise in actual operation. "Co-governance" is often simplified to "co-participation in the governance structure" rather than a continuous, tense and adaptive "governance practice". There is a lack of in-depth qualitative research on micro-political ecosystems such as how power flows in practice, how conflicts are resolved, and how consensus is formed.

Second, research on the system integration and contextualized adaptation of "operation modes" is weak. A large number of studies have been devoted to summarizing or designing some kind of "ideal" operating mode or mechanism, but there are two tendencies: one is "fragmentation", which juxtalizes mechanisms such as dynamics, interests, trust, and evaluation without revealing how they interact and coexist as an organic system under a specific governance structure; The second is "de-embedding", where some models explore relatively detached from the specific industrial technology characteristics (such as traditional manufacturing vs.... Digital industries), regional institutional culture (such as the Yangtze River Delta vs. the western region), and institutional organizational types (higher vocational colleges vs. The proposed model is highly universal but lacks contextualized adaptability and explanatory power.

Third, the evaluation dimension of the "operational efficiency" of the training base is narrow and lacks process tracking. Existing evaluation studies have focused on outcome-oriented indicators such as hardware construction and student employment rate, or outcome-oriented indicators such as collaborative innovation, but are seriously lacking in process-oriented performance evaluation that reflects the essence of "multi-party governance". For example, the substantive extent to which each entity participates in decision-making, the fulfillment rate of resource commitments, the sufficiency of information sharing, and the depth of cross-organizational learning. At the same time, there is a lack of longitudinal tracking studies of the entire life cycle of base operations, making it difficult to reveal the evolution of its effectiveness and key turning points.

Fourth, the "borrowing" approach in theory application and the absence of local theoretical construction. Despite the introduction of various theories, some studies have the problem of simply applying theoretical labels and failing to achieve in-depth dialogue and mutual construction between the theoretical perspective and local experience. Overall, the research is still at the stage of "applying" and "testing" Western theories, and efforts to distill and construct original meso theories (such as theories explaining the generation and evolution of the Chinese characteristic industry-education integration community) based on China's unique policy-driven, social-related and industry-education culture are clearly insufficient.

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Chongqing Vocational Education Research Project: Innovative Research on the Operation Mode of Industry-Education Integration Training Base from the perspective of multi-actor

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