Accounting Industry-Academia Collaboration in the Chengdu-Chongqing Economic Circle Based on SECI Theory

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ABSTRACT
Under the strategic background of the Chengdu-Chongqing Economic Circle development, the study investigates innovative pathways for accounting industry-academia collaboration grounded in the SECI model of knowledge creation and conversion. Confronting structural dilemmas in accounting education, particularly the theory-practice divide and inadequate corporate participation incentives, we construct a four-phase dynamic model: (1) Socialization: tacit knowledge transfer via authentic corporate projects; (2) Externalization: articulating practical expertise into teachable cases; (3) Combination: systematic curriculum restructuring through multi-case integration; and (4) Internalization: embodied knowledge acquisition through simulation training. The proposed framework encompasses: implementing a "dual-mentor mechanism" (industry-academia synergy) to enable bidirectional knowledge flow, establishing a regional PBL case repository to form a closed-loop pedagogical ecosystem, incorporating immersive training modalities (e.g., financial decision-making simulations platforms), and enhancing policy instruments to institutionalize collaboration.

Keywords*: Chengdu-Chongqing Economic Circle, Accounting industry-academia collaboration, SECI theory, Project-based learning (PBL).*

1. INTRODUCTION

Urban agglomeration economies have emerged as a new engine for China's regional development [1]. As China's fourth national-level city cluster, the Chengdu-Chongqing Economic Circle represents a pivotal regional strategy, succeeding the Beijing-Tianjin-Hebei region, the Yangtze River Delta, and the Guangdong-Hong Kong-Macao Greater Bay Area. This initiative marks a strategic transition in China's urbanization paradigm [2].

A persistent imbalance between theoretical instruction and practical training in higher education has resulted in insufficient professional adaptability among graduates [3]. In response, universities have actively implemented industry-academia collaboration models to deepen university-enterprise partnerships and integrate teaching with industrial practices, thereby comprehensively enhancing students' holistic competencies [4]. The 2012 Action Plan for Combining Science and Education to Foster Collaborative Talent Development advocated establishing an education system integrating scientific research with teaching, promoting tripartite synergy among education, research, and industrial development [5]. The 2017 Guidelines on Deepening the Integration of Industry and Education mandated implementing a cooperative education system between universities and enterprises, with particular emphasis on dual-system vocational education [6]. In 2020, Sichuan and Chongqing signed the Framework Agreement on Educational Collaboration for the Chengdu-Chongqing Economic Circle, laying the institutional foundation for regional educational synergy [7]. The 2021 Action Plan for Educational Collaboration in the Chengdu-Chongqing Economic Circle further proposed establishing a national demonstration zone for collaborative educational development, specifying reform directions for higher education [8]. Most recently, the 2024 Outline for Building a Strong Education

System (2024-2035) articulated the construction of an "industry-education integrated vocational education system" to achieve a systemic transition from quantitative expansion to qualitative enhancement in higher education [9].

However, Chinese universities still face multiple challenges in establishing effective industry-academia collaborative talent cultivation models, which adversely affect institutional transformation, talent development, and teaching quality [10]. These challenges include: (1) motivational misalignment, with insufficient corporate participation willingness [11]; (2) resource scarcity, as practical training courses lack authentic industry case support; (3) institutional gaps in knowledge transfer, with constrained channels for translating academic research into industrial applications [12]; and (4) curricular disconnection, where experimental teaching fails to keep pace with technological advancements [13][14].

Building upon the SECI model of knowledge creation and conversion, this study innovatively develops a "bidirectional transformation" pathway for industry-academia collaboration in accounting education, offering a dynamic solution to address the structural supply-demand imbalance in accounting talent provision.

2. THEORETICAL FOUNDATIONS OF ACCOUNTING INDUSTRY-ACADEMIA COLLABORATION

2.1 Industry-Academia Collaboration

Industry-academia collaboration originates from collaborative governance theory, referring to a process where enterprises and higher education institutions integrate and optimize their respective advantageous resources through equal consultation, resource sharing, and complementary strengths to jointly address societal public issues [15]. This model represents a collaborative process among enterprises, governments, universities, and research institutions to achieve knowledge value-added [1], promoting industrial and regional development [16]. Governments worldwide are increasingly establishing university science parks as strategic platforms to facilitate such cooperation [17].

Industry-academia collaboration enhances the articulation between higher education and industrial needs by incorporating authentic industry cases and developing cooperative models between corporate mentors and academic faculty, thereby improving the relevance and effectiveness of talent cultivation [3]. Such collaborative curricula strengthen students' practical operational skills, foster innovative thinking and problem-solving abilities, and achieve organic integration of theory and practice, ultimately contributing to the development of high-quality professionals [14]. However, persistent challenges remain in the selection, assessment, incentivization, and substantive engagement of corporate mentors, necessitating institutional support and resource coordination.

Industry-academia collaboration in accounting fosters endogenous drivers for high-quality regional economic development through multiple pathways: optimizing talent supply structures, enhancing corporate financial management efficacy, and strengthening industrial innovation capabilities [15][18]. Research demonstrates that the industry-academia integrated "Financial Planning and Accounting" professional degree program significantly improves accounting students' professional competencies while also elevating their overall evaluation of institutions and faculty [19]. Furthermore, studies on cross-boundary knowledge transfer reveal that non-accounting majors participating in tax collaboration projects successfully transcend disciplinary boundaries, develop tax compliance awareness, and pioneer innovative approaches to taxpayer education [20].

2.2 SECI Knowledge Creation and Conversion Theory

The SECI theory, proposed by Japanese scholars Ikujiro Nonaka and Hirotaka Takeuchi [21], elucidates the dynamic spiral process of knowledge creation (as shown in "Figure 1") [22][23]. This theory posits that explicit and tacit knowledge undergo continuous transformation through four phases: (1) Socialization (tacit-to-tacit knowledge transfer), (2) Externalization (tacit-to-explicit knowledge articulation), (3) Combination (explicit-to-explicit knowledge systematization), and (4) Internalization (explicit-to-tacit knowledge embodiment).

As a knowledge management model, the SECI theory systematically explains the encoding and transformation process of teachers' tacit knowledge (primarily acquired through direct experience or informal exchanges) into discipline-level or institutional-level explicit knowledge (formally expressed through systematic channels) [24],

providing a theoretical foundation for educational innovation.

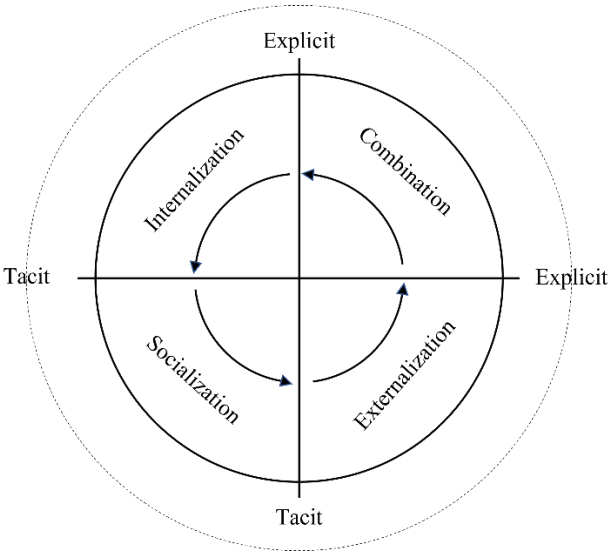

Figure 1 The SECI model of knowledge creation and conversion.

Given that accounting professional competencies encompass substantial tacit knowledge, including professional judgment and business-finance integrated thinking, which is difficult to effectively convey through traditional classroom teaching and requires practical experience for assimilation and transformation, the SECI knowledge creation and conversion model provides a conceptual framework for industry-academia collaboration in accounting education.

3. CURRENT STATUS OF INDUSTRY-ACADEMIA COLLABORATION IN THE CHENGDU-CHONGQING ECONOMIC CIRCLE

In recent years, the Chengdu-Chongqing region has consistently deepened industry-academia collaboration, precisely aligned with regional industrial demands, and actively explored innovative approaches to cross-provincial educational synergy. According to the Ministry of Education Briefing [2024] No. 31, by 2024 the region had established 186 provincial/municipal modern industrial colleges, 8 national-level model virtual simulation training bases for vocational education, 12 national-level high-quality specialty clusters, 25 distinctive specialty (groups) programs, and 128 practical training bases. The region has also conducted 1,263 technical service projects, developed 122 new products, achieved 265 technology transfers, and driven RMB 3.4 billion in regional output growth [25].

3.1 Significant Agglomeration Effects of Higher Education Resources

As shown in “Table 1”, Chengdu and Chongqing collectively host 62% of the Economic Circle’s higher education institutions (132 total), including 90% of its “Double First-Class” universities. In 2023, these two cities enrolled 2.46 million students (see “Figure 2”), accounting for 72% of the region’s total, further evidencing their human capital agglomeration effects and central role in talent cultivation.

Substantial progress has been made in establishing the Chengdu-Chongqing Economic Circle Higher Education Collaborative Development Alliance, which expands opportunities for industry-academia collaboration. The alliance, led by Sichuan University and Chongqing University, now includes 20 member institutions. Additionally, the Vocational Education Collaborative Development Alliance covers over 600 vocational colleges across both regions, facilitating nearly 200 collaborative activities, 1,000 faculty and administrator exchanges, 1,000 co-developed courses and teaching materials, and the joint cultivation of more than 20,000 professionals over the past three years, providing an institutionalized platform for collaboration [26].

Table 1. Distribution and institutional types of higher education institutions in Chengdu-Chongqing Economic Circle (2024)

Region	Institution Type		Total Institutions	Double First-Class	211 Project	985 Project
	Undergraduate	Vocational college				
Chengdu	29	30	59	7	4	2
Chongqing	28	45	73	2	2	1
Other Cities	25	45	80	1	1	0

a Data source: Compiled from the Ministry of Education's List of Regular Higher Education Institutions.

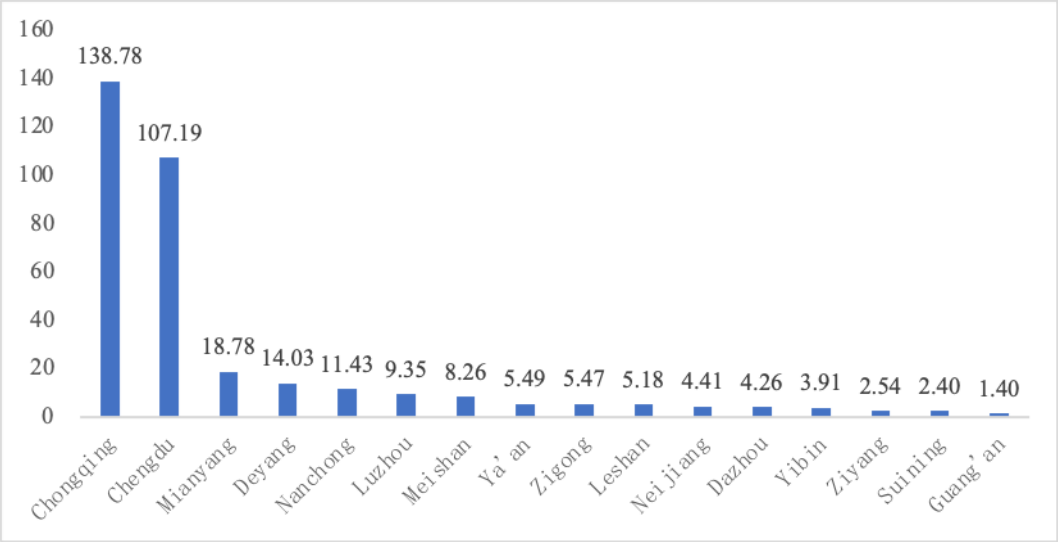

Figure 2 Enrollment in regular higher education institutions by representative cities of Chengdu-Chongqing Economic Circle(2023) (Unit: 10,000 students).

a Data source: Sichuan Statistical Yearbook 2024.

3.2 Alignment between Talent Demand Structure and Regional Industrial Upgrading

The Chengdu-Chongqing Economic Circle Talent Demand Directory (Manufacturing Sector in Sichuan) [27] ("Table 2") reveals that accounting professionals are in moderate-to-high demand in key industries such as electronic information and healthcare, with demand indices significantly higher than in traditional sectors like equipment manufacturing. This underscores the necessity of aligning accounting talent supply-side reforms with regional industrial upgrading through industry-academia collaboration mechanisms.

Table 2. Accounting talent demand index (G) in Chengdu-Chongqing Economic Circle

Industry	Electronic Information	Equipment Manufacturing	Food & Textile	Advanced Materials	Healthcare	Others
Demand Index (G)	0.7626	0.4621	0.6219	0.5229	0.5899	0.7091

a Demand Level Classification: Severe Demand, $G \geq 0.6586$. Moderate Demand, $0.4461 < G < 0.6586$. Mild Demand, $G \leq 0.4461$.

The development of accounting industry-academia collaboration in the Chengdu-Chongqing Economic Circle currently faces three structural challenges: imperfect integration mechanisms, inadequate resource sharing, and insufficient collaborative engagement [26]. As a result, accounting talent cultivation has fallen into multidimensional dilemmas, including difficulties in matching talent supply with industry demand ("matching challenges"), restructuring curriculum systems ("restructuring barriers"), aligning industry-education collaboration ("integration obstacles"), and innovating teaching models ("innovation constraints") [28].

4. CONSTRUCTION OF ACCOUNTING INDUSTRY-ACADEMIA COLLABORATION PATHWAYS BASED ON SECI THEORY

This study constructs an industry-academia collaborative education pathway for accounting in the Chengdu-Chongqing Economic Circle based on Ikujiro Nonaka's SECI knowledge creation and conversion theory. The four-pronged mechanism, comprising a "dual-mentor system", "PBL case repository", "simulation training system", and "policy support framework", achieves complete transformation of accounting knowledge from industrial practice to classroom teaching, cultivating accounting professionals tailored to regional key industries' demands.

4.1 Implementation of the "Dual-Mentor System"

The "Dual-Mentor System" supplements existing university advisors with corporate mentors from collaborative enterprises [29]. Through authentic accounting project platforms provided by alliance enterprises, corporate mentors guide students in deeply engaging with business processes, cultivating professional competencies in authentic contexts and facilitating effective transformation of tacit knowledge such as professional judgment [30]. Academic mentors guide students in theoretically synthesizing experiences, assisting them in refining project experiences into research reports or teaching cases.

As the core mechanism of industry-academia collaboration, this system features "dual-subject education, dual-mentor instruction, and dual-identity development". It jointly establishes talent cultivation standards, achieves structural alignment between educational content and professional standards as well as between teaching processes and production processes, and enables "bidirectional transformation". In practice, enterprises may propose research topics through commissioned projects, using high-level applied talent cultivation as the nexus to realize value co-creation among universities, enterprises, and students [17].

4.2 Enriching the "Chengdu-Chongqing Accounting PBL Case Repository"

Universities establish practical teaching bases within enterprises to achieve dual objectives: assisting corporations in summarizing and reflecting on past cases while utilizing authentic business cases to test theories through practice, thereby creating mutual benefits [31]. Using case development as an entry point, case-based teaching grounded in real business environments and management events facilitates the convergence of interests among universities, enterprises, and students, promoting industry-academia integration [32]. Through systematic consolidation of multi-source corporate cases, universities restructure curriculum frameworks and content to develop a Project-Based Learning (PBL) case repository, enabling the systematic refinement of explicit knowledge. The existing "China Medical Education PBL Case Repository", employing authentic and simulated clinical scenarios, has demonstrated enhanced student capabilities in self-directed learning, critical thinking, and teamwork, providing a reference model for constructing an accounting-specific PBL case repository.

The Chengdu-Chongqing Economic Circle University Alliance should focus on regional industrial needs to integrate authentic accounting practice materials from partner enterprises. Following knowledge extraction and standardization processes, these materials should be transformed into structured teaching resources for collaboratively building a regional accounting PBL case repository. Universities assist alliance enterprises in case debriefing through theoretical tools, while enterprises provide real-time business samples for teaching. This establishes a bidirectional interaction mechanism where theory guides practice and practice validates theory, ultimately forming a closed-loop education system of "practice-case-teaching-practice".

4.3 Developing Simulation Training Systems

Simulation training systems promote the internalization of explicit knowledge into tacit knowledge, enhancing practical competencies [33]. Universities should align with industry needs to ensure research meets industrial and societal demands, as disparities between academic theory and industrial practice may hinder knowledge conversion.

Building on the established "Accounting PBL Case Repository", universities should develop integrated simulation training systems incorporating financial decision-making simulations and enterprise-wide scenario training. These systems replicate complex decision-making environments with Chengdu-Chongqing regional characteristics, allowing students to apply professional knowledge to dynamic business challenges. Through repeated practice, students internalize systematic explicit knowledge as professional acumen, forming a progressive competency development cycle. Universities should also establish dynamic feedback mechanisms with industries to adjust training content according to evolving enterprise needs, ensuring continued alignment between academic theory and professional practice.

4.4 Improving the Policy Support System

Policy support serves as a crucial guarantee for the sustainability of industry-academia collaboration. Local governments should formulate long-term incentive measures to ensure the stability of accounting education-industry partnerships [34]. For instance, leveraging the synergistic advantages of the Chengdu-Chongqing Economic Circle, governments could promote pilot reforms such as establishing an "Industry-Academia Collaboration Special Fund" and implementing tax credit policies to enhance enterprise participation enthusiasm.

Furthermore, governments should strengthen the development of regional university-industry parks and establish advanced research institutes in central-western and northeastern regions. This facilitates strategic alliances between top-tier universities, leading disciplines, and key industries/enterprises, adopting a "demand-driven projects, project-driven teams" approach to create new models of industry-education integration that combine talent cultivation, scientific research, and technology transfer [35]. The Chengdu-Chongqing Economic Circle Industrial Park should be positioned as an innovation hub for industry-education integration, bringing together high-level universities, leading disciplines, and top enterprises to synergize talent development, applied research, and technology transfer. By expanding collaboration platforms and establishing benefit-sharing mechanisms for technology commercialization, it can safeguard stakeholders' interests while stimulating collaborative innovation.

5. CONCLUSION

This study addresses the structural imbalance between talent supply and industrial demand by proposing innovative industry-academia collaboration pathways for accounting education in the Chengdu-Chongqing Economic Circle, grounded in the SECI knowledge creation spiral theory. The proposed framework, implementing a dual-mentor system, enriching a regional PBL case repository, developing simulation training systems, and improving policy support mechanisms, collectively advances regional educational collaboration and high-quality economic development.

AUTHORS' CONTRIBUTIONS

Tingwei Lu was responsible for developing the theoretical framework, constructing the implementation pathways. Jinhua Zhang conducted the research background investigation, analyzing the current situation. All authors reviewed and approved the final manuscript.

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