Gábor Halász – Min Huang

Using university-industry integration to modernise university education in the Chengdu-Chongqing Economic Area: a case study

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DRAFT

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1 Introduction

This case study has been prepared in the framework of the project titled "*University-industry integration policies and practices in China - potential applications in Hungary*".[1] It is based on a fact-finding mission conducted to Chengdu and Chongqing between the 11th and 25th of October 2025 by the authors.[2] This is the second case study prepared in the framework of the above mentioned project (the first one was focusing on the Shenzhen and the Greater Bay Area).[3]

The aim of this case study – similarly to the previous one – is to enrich our knowledge about China's policies and practices related to university-industry integration (UII) and to provide input to the final report that will analyse how skills-development oriented policy measures and programs enhance the modernisation of university education in China. The target audience of this document is again the Hungarian (and possibly European) higher education development community, including both national policy-makers and institutional level leaders.

Given the special circumstances presented in the administrative report[4] on the case study fact-finding mission the Chengdu-Chongqing data collection was supported by two short visits to Singapore and Suzhou. This made it possible to extend the scope of the case study adding further new elements that can support the understanding of China's UII policies and practices beyond the specific target area of Chengdu and Chongqing (see the section "*Additional inputs*").

2 Background

In this section, we examine key elements of the social, political, and economic context in which China's university–industry integration (UII) policies and practices have taken shape in general at national level and in particular in the Chengdu-Chongqing area. Throughout the text, we primarily use the term UII to refer to the distinctive Chinese model of deep, systemic partnership that encompasses governance, curriculum, and pedagogy. In some instances, however, the term UIC (university–industry cooperation) is also employed, typically when referencing the broader, more general phenomenon of collaboration between higher education institutions and industry. While "cooperation" suggests a more conventional and often

[1] This project, funded by the Hungarian government, is hosted and implemented by Wekerle Business School (WBS) in cooperation with Mathias Corvinus College (MCC). See for the project concept the document titled "*University-industry integration policies and practices in China - potential applications in Hungary - Project proposal - (2024. November)*".
[2] See Gábor Halász – Min Huang: „*Report on the second case study fact-finding mission to China (October 2–25, 2025)*" This report contains a full list of people met and institutions visited in Singapore, Suzhou, Chengdu and Chongqing. It is presented also in the annexes of this case study (see *Annex 2: Report on the fact-finding mission*).
[3] See Halász Gábor – Min Huang (2025b).
[4] See Gábor Halász – Min Huang: „*Report on the second case study fact-finding mission to China (October 2–25, 2025)*",

transactional relationship, "integration" denotes a more embedded and transformative approach that characterizes China's policy innovations in this domain.

2.1 China's UII policies and practices

Local or regional policies and practices related to UII, such as what we could observe in the Chengdu-Chongqing Economic Area, can be understood only in the broader context of China's national level UII policies and practices. These policies and practices have been presented in detail in a separate document of our project, entitled "*University-industry integration policies and practices in China: exploring policy documents and literature*" (Halász– Huang, 2025a), and also in two publications by the authors of this case study (Huang, & Halász, 2024; Halász & Huang, 2025c). Here we only present a short summary of the general national background.

Analyses of the history of UII in China typically describe three main developmental stages of this policy: (1) early integration in the fifties, the sixties and the seventies, (2) separation or detachment, from the late seventies till the middle of the 2010s, and (3) a new integration phase since the middle of the 2010s (Nan, 2019). Some authors (Ouyang, 2020) distinguish two sub-periods since the middle of the nineties: (1) strengthening cooperation in the first period and (2) deep integration since the middle of the 2010. The main turning point in this history is the shift in the economic development policy of the Chinese government in the 2010s towards what is often described as a move towards *innovation-driven* and *skills-driven* economy or intelligent industry (Xinhua News Agency, 2016; Naughton, 2021).

One of the key implications of China's recent policy shift has been an intensified focus on advanced skills and a significant increase in investment aimed at cultivating them. Skills development – or "talent development," as it is commonly termed in the Chinese policy discourse – has emerged as a central national priority. A core objective of China's higher education strategy is to align university education with the most advanced sectors of industry, ensuring that academic programs respond directly to evolving economic and technological demands.

This emphasis on skills and innovation forms part of a broader economic development agenda that has positioned China as arguably the most ambitious investor in human capital in recorded history. The country's aspiration is not only to become a global "educational power," but also to construct a new model of education – one that departs fundamentally from the historical paradigms that have shaped educational systems over centuries (Jinpeng, 2025). A defining feature of this emerging model is the deliberate opening of education to the outside world, dismantling the traditional boundaries between education and its wider societal context.

This transformation is accompanied by a radical rethinking of inherited educational structures. A core methodological principle guiding this shift is encapsulated in one frequently cited, double slogan: "jumping out of education to see education" and "jumping out of education to run education." These expressions, widely referenced in national and local policy documents (see, for example, China Education Online, 2022; Zhejiang Normal University, 2025), signal a profound reconceptualization of how education is understood and governed.

Rather than concentrating solely on internal processes such as teaching and curriculum design, this approach foregrounds the functional role of education in driving national social and economic modernization. Universities are increasingly viewed not merely as producers of knowledge, but as strategic nodes within broader ecosystems of skills development, industrial

innovation, and technological advancement. This reflects a growing convergence between education policy and industrial, economic, and technological strategies. The notion of "jumping out" implies a dynamic integration of education with national priorities: not only in strategic planning, innovation, regional and workforce development, but also in facilitating societal adaptation to the realities of what we may call post-industrial era.

What we could observe during both our first and second fact-finding missions stands in stark contrast to the pessimistic portrayal of Chinese higher education that occasionally appears in both Chinese and Western media. These accounts often depict the system as offering outdated curricula, prioritizing theoretical knowledge over practical experience, failing to prepare students for real-world employment, and ultimately wasting talent (see, for example, Peng, 2025). Our findings suggest that two competing narratives currently coexist regarding Chinese higher education: one, rooted in past perceptions, characterizes it as obsolete and disconnected from societal needs; the other highlights a radical and rapid modernization process, driven largely by university-industry interaction. These contrasting narratives are examined and contextualized in the Annexes (see *Annex 3: Two narratives and two modernities*).

As will be demonstrated in greater detail in the sections "*UII and new pedagogy*" and "*The Suzhou input*", the current developments unfolding in Chinese universities can be described – probably without exaggeration – as a *pedagogical revolution*. This transformation is both initiated and sustained by UII policies and practices. Embedding UII into the daily operations of higher education institutions necessitates a radical reconfiguration of pedagogical approaches. Conversely, the broader transformation of Chinese higher education would be inconceivable – or at the much least significantly slower – without the catalytic role played by UII. The two processes are mutually reinforcing: UII drives pedagogical innovation, while pedagogical reform enables the institutionalization of UII.

A pivotal moment in the emergence of the policy of university-industry integration as a cornerstone of China's modernization strategy was the adoption of the 2017 policy document on "*Deepening the Integration of Industry and Education*" issued by the State Council (State Council, 2017). This document not only elevated UII to the status of a national policy priority, but also introduced a series of conceptual, governance, and coordination innovations. Among its most significant contributions was the encouragement of local policy experimentation and the cultivation of a diverse array of regionally tailored solutions.

For many Western observers, understanding the nature and scope of China's UII policy presents a challenge. As we presented I our first case study, the concept goes far beyond conventional notions of "cooperation" or "partnership." The term "integration" itself fails to fully capture the depth of the transformation underway. In the original Chinese expression – "产学融合" (chǎn xué róng hé) – the character "融合" conveys meanings such as "fusion", "blending", "melting together", or "merging", all of which suggesting a far more profound and systemic convergence than the English term implies. A defining feature of China's UII policy is the emergence of new institutional forms characterized by shared ownership and joint management, encompassing virtually all dimensions of teaching, learning, and skills development.

As mentioned, one of the most distinctive aspects of China's UII strategy is its close linkage with curriculum and pedagogical reform. UII is not merely a mechanism for aligning educational outcomes with industrial needs; it is also a deliberate tool for transforming the very processes through which education is delivered. In parallel with the launch of the UII policy, the government initiated reforms in curriculum and teaching across multiple disciplinary

domains, including engineering, medicine, agriculture, and also liberal arts. Incited by these initiatives, industrial actors are actively involved in curriculum design, instructional delivery, and student evaluation, thereby embedding real-world relevance into academic programs.

To operationalize these reforms, the Ministry of Education introduced pilot initiatives such as the Modern Industrial Colleges (现代产业学院) and the Industry-Education Integration Communities (产教融合共同体). These entities function as pedagogical laboratories, fostering innovation in teaching organization and encouraging universities to restructure curricula, co-develop teaching standards, and reform assessment methods in collaboration with enterprises. In this context, industry partners are not merely sponsors but co-educators, employing innovative pedagogies such as project-based learning, work-integrated learning, and scenario-based instruction.

Another defining characteristic of China's UII policy is the innovative nature of its design and implementation. A new, decentralized governance model appears to be emerging – one that relies on the proactive engagement of multiple local stakeholders and facilitates the development of original, context-sensitive solutions. Policy experimentation, conceptual innovation, and iterative learning play a particularly prominent role in shaping both national and local practices in this domain (Han & Fu, 2022; Li, 2024; Li, 2025). A key milestone in this process was the launch of the "National Pilot Implementation Plan" in 2019 by the National Development and Reform Commission, which designated specific cities to develop localized UII models (NDRC, 2019).

A further element of China's UII policies and practices that should be stressed in the context of this case study is the differences and similarities between the two distinct sectors of higher education, namely research universities and universities of applied sciences or technical universities. UII is implemented differently in these two sectors: the former focusing mostly on research-cooperation while the second mostly on skills-development orientation of cooperation. It is worth being noted that the role and weight of UII might be quite different within the research university sector in case research is conceived rather in the Mode2 than in the Mode1 model.[5] A further important development, indisputably strengthened by UII, is the blurring of borderlines between these two sectors of the higher education system: many universities of applied sciences are increasingly involved in projects enhancing technological innovations through common research, and, on the other side, many research universities are building strong partnerships with industry with a clear focus on skills-development.

2.2 The Chengdu/Chongqing context

In this section we present the specific local (provincial/municipal) context of university-industry integration in the Chengdu/Chongqing area, exploring different perspectives, such as geography, economic development, transformations of industry, higher education institutional structures, social changes and culture.

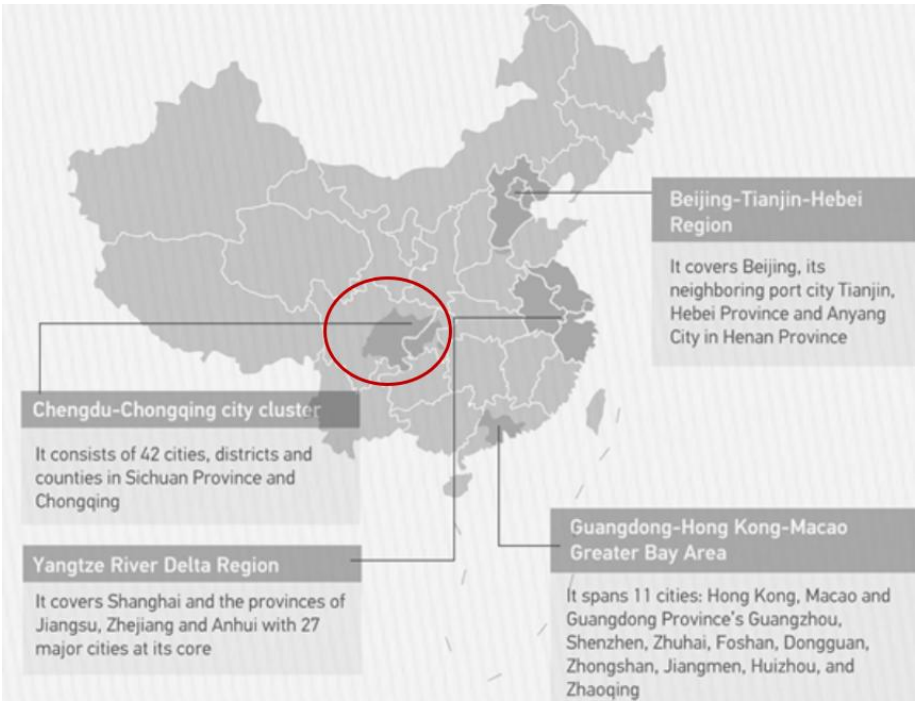
[5] The distinction between Mode1 (traditional, academic form of research) and Mode2 (more interdisciplinary and more oriented towards client needs, problem solving and application) has been widely recognised since the middle of the nineties when it was proposed by Gibbons et al. (1994).

2.2.1 Chengdu-Chongqing Economic Circle

2.2.1.1 Economic aspects

The Chengdu-Chongqing Economic Circle is one of the a major national development initiatives launched by China to build integrated, innovation-driven metropolitan regions (see *Figure 1*). Centred on the twin cities of Chengdu (capital of Sichuan Province) and Chongqing (a provincial-level municipality) in the upper Yangtze River basin, this initiative aims to create a highly coordinated mega-urban cluster that links the region's population of more than 96 million people, its rapidly growing manufacturing and tech industries, and its extensive transport and logistics networks. The Chengdu-Chongqing Economic Circle promotes deep integration in areas such as industrial development, transportation, ecological protection, higher education collaboration, and innovation ecosystems. Its strategic goal is to form a "new growth pole" for western China – comparable in scale and ambition to the Yangtze River Delta and the Pearl River Delta or more recently the Greater Bay Area – while balancing national development through strengthening the economic capacities of China's interior regions.

Figure 1.
China's four major city development clusters[6]



Note: The official scope of the Beijing–Tianjin–Hebei (Jing–Jin–Ji) coordinated development strategy includes Beijing, Tianjin, and Hebei Province, but Anyang (Henan Province) is not part of the nationally defined Jing–Jin–Ji initiative

The national strategic growth pole and innovation hub named *Chengdu–Chongqing Twin Cities Economic Circle* represents one of the most dynamic regional economies in Western China. In 2023, the combined GDP of Sichuan Province and Chongqing Municipality reached approximately 8.6 trillion-yuan, accounting for about 6.7% of the national total (National Bureau of Statistics of China, 2024). Chongqing's economy is strongly manufacturing-oriented, according to the Top 100 Enterprises in Chongqing 2023 report, In 2023, among Chongqing's

[6] Source: the website "Explainer: China's Chengdu-Chongqing economic circle" of China Global Television Network (https://news.cgtn.com/news/2021-10-23/Explainer-China-s-Chengdu-Chongqing-economic-circle-14Bck3mgs0g/index.html).

top 100 enterprises, 44 manufacturing enterprises generated revenue of 1.19 trillion-yuan, accounting for 50.01% of the total operating revenue of the top 100 enterprises. The automotive sector accounted for 23.66%, materials for 20.08%, and electronics for 19.93% (Chongqing Daily. 2023).

In 2023, Chengdu's GDP reached 2.21 trillion yuan, with the tertiary sector accounting for 68.4% of total output, reflecting the city's strong transition toward a service- and innovation-oriented economy (Chengdu Municipal Bureau of Statistics, 2024). The city's industrial composition is supported by three major pillars: electronic information, advanced manufacturing, and cultural and creative industries.

The electronic information industry remains Chengdu's most significant economic driver, with total output value reaching approximately 1.3 trillion yuan in 2023 (Sichuan Daily, 2024). Within this sector, the integrated circuit industry alone generated 67.47 billion yuan in revenue (Chongqing Daily, 2024). Chengdu's software industry also demonstrated rapid growth, achieving 616.43 billion yuan in business income from January to November 2023, a 14.6% year-on-year increase (Ministry of Commerce of the People's Republic of China, 2024). These data reveal the city's consolidation as a major technological hub in Southwest China, where high-tech industries and digital services foster innovation spillovers to surrounding cities.

Chengdu can be characterized as a nationally influential cultural and creative industry cluster integrating traditional crafts with modern design, fashion, and digital media. In 2023, the added value of Chengdu's cultural and creative industries reached 257.49-billion-yuan, accounting for 11.65% of its GDP (Tencent News, 2024). The sector encompasses diverse fields such as film, advertising, performing arts, and tourism, but it is most distinguished by the creative revitalization of intangible cultural heritage, including Shu embroidery, lacquerware, Sichuan opera, and bamboo weaving. These cultural assets have been reimagined through collaboration between artisans, designers, and technology companies, giving rise to high-value cultural products that merge aesthetics and commerce. As a UNESCO "City of Gastronomy" and a national creative-industry demonstration base, Chengdu has successfully transformed its cultural heritage into a dynamic source of soft power and economic growth.

The development of the New International Land-Sea Trade Corridor, connecting Western China with Southeast Asia through multimodal transport routes, has further strengthened the region's integration into global supply chains and logistics networks. This initiative, proposed in 2017 and elevated to a national strategy in 2019 was incorporated in the Chengdu-Chongqing Economic Circle plan in 2021. Through the corridor's expanding logistics network and trade platforms, manufacturing clusters in Chongqing gain more efficient access to international markets, while Chengdu's creative and digital industries benefit from increased cross-border collaboration and market exchange. It also catalyses growth in transportation engineering, intelligent logistics, and international trade—industries that now serve as pillars of the Chengdu–Chongqing economic ecosystem.

The key policy document about Chengdu-Chongqing Twin Cities Economic Circle was issued in October 2021 by the highest level national level decision making bodies (The Central Committee…, 2021). This document set out the goal of developing the Chengdu-Chongqing Twin Cities Economic Circle into a major economic centre with national influence: a hub of scientific and technological innovations, a new frontier for reform and opening up, and a high-quality liveable destination (The Central Committee…, 2021). The document is often referred to as the "Masterplan", guiding development in the Chengdu-Chongqing area (see *Box 1*).

Box 1.
Five principles of "high-quality development" of the Chengdu-Chongqing Economic Circle Master Plan[7]

Dual-core driving and regional linkage. Besides enhancing the competitiveness of Chongqing and Chengdu as central cities, the Economic Circle development must also properly address the relationship between the central cities and the region, with big cities supporting small cities, and cities supporting townships, to form highly integrated, efficient city clusters with reasonable layouts.

Innovation-driven reform and opening-up. Give full play to the market's decisive role in allocating resources, strengthen the pioneering role of government institution reform, intensify institutional innovations, give a positive boost to higher-level opening, and promote deep integration between technological innovation and application, along with industrial transformation and upgrade.

Ecology-first green development. Fully put into practice the concepts of ecological civilisation, optimise the spatial development pattern, improve the efficiency of land, water and energy use, and build green and low-carbon work and lifestyle, along with construction and operation models.

Improving people's livelihood with sharing and inclusiveness. Increase the supply of high-quality public goods and services, make sustained improvements to people's livelihood and well-being, and build a diverse and inclusive pattern of social governance so that the fruits of reform and development can benefit more people in a fair way.

Overall co-ordination for joint development. Leverage the advantages of all sides for staggered development to achieve unified planning, integrated planning, mutual collaboration and joint implementation with the integrated development of Sichuan and Chongqing in mind.

2.2.1.2 Cultural aspects

The specific economic and industrial features of the Sichuan and Chongqing area can be connected to some unique social and cultural characteristics. During our fact-finding mission we often had the impression that Sichuan and Chongqing universities exhibit a flatter organizational hierarchy than universities visited in other regions of China. This phenomenon might be related to the "Ba-Shu cultural traditions" (see *Box 2*). Chengdu and Chongqing express two distinct versions of the Ba-Shu cultural archetype: Chengdu retains the Shu tradition of refinement and gentle sociability, which manifest itself in the strength of creative industries, design, digital economy, and cultural tourism. Chongqing, rooted in Ba culture, rather seems to emphasize toughness, mobility, and industrial pragmatism: traits visible in its engineering universities, logistics hubs, and heavy manufacturing. Together they form a complementary pair: when implementing national UII policies Chengdu seem to focus more on cultural-creative integration and Chongqing on industrial-technical integration.

Box 2.
Ba and Shu cultures

Ba-Shu culture refers to the shared historical traditions of today's Chengdu–Chongqing region, rooted in the ancient cultures of the Ba people around Chongqing and the Shu kingdom in the Chengdu Plain. Although originally separate, these

[7] Source: The "Chengdu-Chongqing Economic Circle: Objectives and Planning Rationales" website of Hong Kong Trade Development Council (HKTDC) (https://research.hktdc.com/en/article/MTA2NDU4NjExNw?utm_source=chatgpt.com).

cultures gradually merged after the Qin unification more than 2,000 years ago, forming one of China's most distinctive regional civilizations.

Shaped by the mountainous geography of the upper Yangtze River, Ba–Shu culture developed strong traits of pragmatism, resilience, local identity, and adaptive problem-solving. The region has been known since ancient times for technical creativity (e.g., the Dujiangyan Irrigation System) and sophisticated craftsmanship (e.g., the Sanxingdui bronzes). Over centuries, Ba–Shu people cultivated a lifestyle that is open, inclusive, and oriented toward practical wisdom and everyday well-being.

These cultural characteristics also help explain why the Chengdu–Chongqing region is today one of China's most dynamic areas for university–industry integration (UII). The local emphasis on practicality and innovation aligns naturally with applied learning, industry-aligned programs, and experimental institutional models such as modern industry colleges and co-governed training platforms. Openness to new ideas encourages universities and enterprises to collaborate flexibly, while the region's historic cooperative ethos supports stable long-term partnerships.

In this sense, Ba–Shu culture forms part of the cultural foundation enabling the region's rapid expansion of UII practices. It contributes to a local environment where universities and industries not only collaborate, but actively co-create new forms of education connected to regional development and societal needs.

The cultural perspective might help explain why Sichuan's universities often link industrial cooperation with well-being and self-fulfilment, not merely with employability. UII here functions as both an economic and a humanistic project: it is a means of harmonizing creativity and livelihood. In pedagogical terms, it can relatively easily translated into an emphasis on project-based, experiential, and collaborative learning, where enjoyment and self-expression coexist with technical skill formation.

The seemingly flatter organizational hierarchy observed in the universities of Chengdu and Chongqing area can perhaps be explained, at least partly, by the leisure culture of the Ba-Shu region. Rooted in the historical spirit of the "Shu Road", Ba-Shu culture values harmony, relational trust, and inclusivity rather than bureaucratic control. The local idioms An Yi (安逸) and Ba Shi (巴适) often used to describe comfort, ease, and human warmth, also reflect a cultural tendency toward negotiation and mutual understanding in social relations. As one author notes, the cultural legacy of the "Shu Road"[8] emphasizes moral integrity and cooperation: principles that still shape social and institutional behaviour today (Liu, 2025). As a result, universities in Sichuan and Chongqing tend to exhibit gentler Daoist cultures, where communication between administrators and faculty is more horizontal and collegial. This contrasts with the fierce competition, emphasizing performance evaluation, focusing on efficiency found in eastern universities, where competition, publication output, and research prestige dominate institutional priorities. As one local author described: "From the perspective of natural resources, we have the beautiful and rich resource Sichuan; from the perspective of cultural resources, we have the poetic Sichuan; and from the perspective of the highest level of spiritual enjoyment, we have the tranquil Sichuan. Tranquillity is the highest level of cultural tourism in Sichuan" (He, 2020).

This kind of "tranquil Sichuan" refers not merely to a geographic or aesthetic quality but to a deeply rooted cultural disposition toward harmony, natural, and relational balance. Although

[8] The mountain passes and pathways connecting the Chengdu-Chongqing (Ba-Shu) region to the Central Plain.

the Shu culture has been criticized by some scholars as laziness and enjoyment, the Geographical Records in the History of Song (宋史·地理志 - Sòng shǐ·dìlǐ zhì), a famous ancient Chinese book, described the Ba-Shu region as a place where "the people diligently cultivated the land, leaving no inch uncultivated; they harvested three to four times a year, and much of the produce was spent on leisure activities", and "excursions and gatherings at herbal markets were especially popular, sometimes lasting for months." As one of the most influential modern scholars of Ba-Shu culture, Yuan Tingdong commented about the saying "The money was all spent on recreation, it could last a month, but the prerequisite was that the people worked diligently", this lifestyle is very different from laziness (Ba-Shu culture international communication research centre, 2023).

2.2.2 Higher education in the Chengdu/ Chongqing area

2.2.2.1 General aspects

Sichuan Province with Chengdu as its capital exhibits one of the most diversified higher-education systems in Western China. As of June 20, 2024, this province had 139 universities, of which 83 were public institutions and 56 were private institutions (Sichuan provincial MOE, 2024). Chengdu, as the regional educational hub, hosts 59 of this whole quantity (42%), including comprehensive and research universities (N=14, percentage=10.1), applied science university (N=40, percentage=28.8%) and skill/vocational university (N=85, Percentage=61.2).

Chongqing municipality has a total of 80 higher education institutions, including 75 higher education institutions, 3 adult colleges, and 2 military academies. In addition, there is one postgraduate training institution — the Party School of the Chongqing Municipal Committee of the Communist Party of China. Among these 75 higher education institutions, there are 43 publication institutions and 32 private schools. Among these institutions, there are 9 comprehensive and research universities (12%), 23 application-oriented undergraduate universities (30.7%), and 43 vocational and technical colleges (57.3%).

The 'Masterplan", mentioned earlier, includes several references to higher education. It has encouraged cooperation not only between the higher education institutions within the economic circle but also cooperation between universities and industry (see *Box 3*). It stressed the strategic role of higher education in driving regional modernization and innovation in Western China. The document positioned the Economic Circle not only as an emerging economic powerhouse but also as a national centre for scientific and technological innovation and talent cultivation. Within this framework, higher education has been recognized as a critical pillar for achieving these goals. By establishing university alliances, joint construction of world-class universities/disciplines, and encouraging the expansion of universities into regional centres this policy indicates a shift from competition between cities and provinces to regional collaboration. This reflects a new governance paradigm of educational integration and spatial coordination, where academic resources are shared across administrative boundaries to form a multi-centred higher education network.

Box 3.
Higher education related excerpts from the Chengdu-Chongqing Economic Circle Master Plan

"Promote educational cooperation and development. ...Coordinate the layout and professional settings of vocational education, expand enrolment, and establish a number of vocational education bases. Construct a number of practical training bases and national-level entrepreneurship incubation bases, jointly create the 'Bashu

Craftsmen' vocational skills competition brand, and foster industry-education integration sectors, enterprises, and institutions with regional characteristics. Establish a university alliance within the Chengdu-Chongqing economic circle, jointly develop world-class universities and disciplines, and support universities in expanding their presence in regional central cities...Support the introduction of high-level overseas universities to conduct Sino-foreign cooperative education programs, allow foreign educational institutions, other organizations, and individuals to independently establish non-academic vocational training institutions and academic vocational education institutions within the free trade zone, and support the construction of international cooperative education parks."

Source: The Central Committee…, 2021).

The "Masterplan" explicitly emphasized university-industry integration, promoting the creation of vocational education/training bases, and entrepreneurship incubation centres. It also supported initiatives, such the "Bashu Craftsmen" vocational skills brand. This regional talent-development initiative, jointly promoted by Sichuan Province and Chongqing Municipality, aims to build a high-level, regionally distinctive skilled-worker brand that supports the economic upgrading of the area. These measures support the transformation of higher education from a purely academic system to a practice-oriented and innovation-driven ecosystem, directly supporting industrial restructuring and encouraging universities to function as intermediary actors linking education, research, and production.

Although the Chengdu–Chongqing economic circle has made significant progress in building a regional higher education system, from many respects it still lags behind China's major economic regions such as the Yangtze River Delta and the Beijing–Tianjin–Hebei region. *Table 1* shows that the Chengdu–Chongqing region appears less developed in higher education than China's eastern provinces, which concentrate elite research universities and long-standing academic resources. Chengdu- Chongqing have only 10 double first class universities, compared with Bejing-Tianjin-Hebei region (46) and Yangeze river delta region (23).

Table 1

Comparison of higher education resources in the Chengdu-Chongqing region with developed regions and the national average

Region	**Centrally administered universities (per million people)**	**Double first-class universities (per million people)**	**Proportion of university teachers with doctoral degrees (%)**	**Number of university teachers with senior professional titles (%)**	**Number of doctoral students (per 10,000 people)**	**Number of master's students (per 10,000 people)**
National average	118 (0.08)	147 (0.11)	41.42	16.88	509453(3.61)	2822920(19.88)
Beijing-Tianjin-Hebei region	46(0.42)	40(0.36)	51.89	22.70	658777(59.83)	3279795(297.89)
Yangtze river delta region	23(0.10)	37(0.16)	53.49	18.66	120779(5.11)	612418(25.90)
Chengdu-Chongqing region	8(0.07)	10(0.09)	35.42	14.27	28275(2.44)	215603(18.61)

Source: Liu & Huang (2023; 33）

At first sight, the higher education system of the Chengdu–Chongqing region appears significantly less developed than that of China's eastern provinces, concentrating elite research universities models. However, our field trip revealed a striking paradox: these western universities demonstrate particularly advanced practices in UII. This might be related to some of the industrial, social and cultural features mentioned above. Since 2017, national and provincial governments have positioned Chengdu and Chongqing as policy laboratories for UII. The region's strong industrial base in electronics, manufacturing, and logistics, combined with pragmatic local governance and flexible institutional cultures create favourable conditions for universities to embed teaching directly into production processes. Unlike eastern institutions constrained by academic hierarchies and research prestige, western applied universities seem to be particularly bold in encouraging pedagogical innovations. Although the region lags in traditional academic rankings, it seems to lead in skills-oriented, practice-based educational modernization.

2.2.2.2 Centre-periphery relationships

Before 1978, higher education in Sichuan Province was highly concentrated in Chengdu, which hosted almost all major provincial universities such as Sichuan University, Southwest Jiao tong University, and Southwest University of Finance and Economics (three universities we had the opportunity to visit). Outside Chengdu, higher education institutions were extremely limited, with only five local institutions – Sichuan Agricultural College, Southwest Petroleum Institute, Nanchong Teachers College, Nanchong Medical College, and Luzhou Medical College –and a few branch campuses established during the "Third Front Construction.[9]" This reflected the centralized and elite-oriented educational pattern under the planned economy (Liu & Huang, 2023).

Since the Reform and Opening-up, Sichuan's higher education landscape has undergone four distinct stages of decentralization and expansion (Luo, 2024). From 1978 to 1998, development remained slow, with only 17 new institutions added outside Chengdu. During 1999–2007, following the national policy of university massification, the province experienced a significant increase of 28 new institutions, many created through mergers or upgrades, such as the establishment of Southwest University of Science and Technology. The third phase (2008–2015) saw a moderation in growth but a strong rise of private higher education. By 2013, every city and prefecture in Sichuan had at least one local university or college. The fourth phase (2016–2023) marked the fastest expansion, with 26 new institutions and 15 branch campuses established as local governments-built university towns and attracted high-quality universities from Chengdu and other provinces to open campuses.

This developmental trajectory demonstrates a clear radiation effect of higher education from Chengdu – the academic and technological centre – to surrounding cities and prefectures. The number of regular higher education institutions in the 20 cities and prefectures outside Chengdu increased from only five before 1978 to 79 institutions and 22 branch campuses by 2023 (Luo, 2024), signifying a profound transition from an elite, centralized model to a more inclusive, regionally balanced multi-cluster structure.

[9] The "Third Front Construction" refers to a national strategic campaign carried out in China during the 1960s and 1970s, aimed at relocating key industrial, research, and educational institutions from coastal areas to the inland regions of Southwest and Northwest China in order to strengthen national defense and promote balanced industrial development.

As Liu and Zhou (2023) pointed out, Chengdu and Chongqing evolved into the dual centres of a multi-cluster structure, forming five major higher education clusters across the region: the Chengdu Metropolitan Area Cluster, the Chongqing Metropolitan Area Cluster, the Southern Sichuan Cluster, the Nanchong–Suining–Guang'an Cluster, and the Dazhou–Wanzhou Cluster (see *Figure 2*). This spatial configuration reflects a shift from fragmented provincial planning to a regionalized system emphasizing unity without uniformity, where each cluster develops distinctive strengths while maintaining mutual connectivity.

Figure 2.
Higher education clusters in the Chengdu-Chongqing area

Source: Liu, & Zhou (2023; 113)
Legend: 成都市都市区高等教育集群体系: Chengdu Metropolitan Higher Education Cluster System; 重庆都市圈高等教育集群体系: Chongqing Metropolitan Higher Education Cluster System; 成渝德眉乐高等教育集群带: Chengdu-Chongqing-Deyang–Meishan–Leshan Higher Education Belt; 南充–广元高等教育集群体系: Nanchong-Guangyuan Higher Education Cluster System; 达州–广安高等教育集群体系: Dazhou-Guang'an Higher Education Cluster System; 川南高等教育集群体系: Southern Sichuan Higher Education Cluster System; 成都: Chengdu; 重庆: Chongqing; 德阳: Deyang; 绵阳:Mianyang, 眉山: Meishan; 乐山: Leshan; 自贡: Zigong; 内江: Neijiang; 宜宾: Yibin; 泸州: Luzhou; 遂宁: Suining; 南充: Nanchong; 广元: Guangyuan; 广安: Guang'an; 达州: Dazhou

The emergence of the higher education clusters of the Chengdu-Chongqing area seems not only enhancing the effective allocation of educational resources but also strengthening the integration of education, industry, and science, and supporting the aligning of higher education development with the industrial and innovation layout of the Chengdu–Chongqing Economic Circle. Each clusters have some representative higher education institutions: some of them are among those we had the opportunity to visit (see *Table 2*).

Table 2
Representative universities of the five higher education clusters in the Chengdu-Chongqing area

Higher Education Cluster System	Main Cities / Prefectures	Representative Universities / Colleges
Chengdu Metropolitan Area Higher Education Cluster System	Chengdu City, Deyang City, Meishan City	Sichuan University, University of Electronic Science and Technology

		of China, Southwestern University of Finance and Economics, etc.
Chongqing Metropolitan Area Higher Education Cluster System	Chongqing Central Urban Area	Chongqing University, Southwest University, Southwest University of Political Science and Law, etc.
Southern Sichuan Higher Education Cluster System	Neijiang City, Zigong City, Yibin City, Luzhou City	Sichuan University of Light Chemical Technology, Neijiang Normal University, Yibin University, etc.
Nanchong–Suining–Guang'an Higher Education Cluster System	Nanchong City, Suining City, Guang'an City	China West Normal University, North Sichuan Medical College, etc.
Dazhou–Wanzhou Higher Education Cluster System	Dazhou City, Wanzhou District (Chongqing)	Sichuan University of Arts and Science, Chongqing Three Gorges University, etc.
Chengdu–Mianyang–Deyang–Meishan–Leshan Higher Education Cluster Belt	Chengdu City, Mianyang City, Deyang City, Meishan City, Leshan City	Sichuan University, University of Electronic Science and Technology of China, Southwestern University of Finance and Economics, etc.

Source: Liu, & Zhou (2023; 113)

The authors of the paper analysing the higher education clusters of the Chengdu-Chongqing area presented above conclude that higher education clustering is essential for transforming the Chengdu–Chongqing region into China's next major growth pole. They argue that the region's strong geographic, economic, and cultural foundations make such clustering both feasible and necessary, but success depends on strong top-level coordination guided by the principle of "harmony without uniformity," allowing universities to collaborate while maintaining differentiated missions. The also contend that regional development should follow a "dual-centre" model led by Chengdu and Chongqing, using science, technology, and education as the core engines of integration. Ultimately, they see higher education clusters as critical for strengthening talent pipelines, innovation capacity, and long-term regional competitiveness.

2.2.3 UII in the Chengdu/Chongqing area

University-industry integration in the Chengdu–Chongqing Twin Cities Economic Circle - similarly to other regions – is guided by the government policies presented in the section "*China's UII policies and practices*", but it is further reinforced through provincial and local policy initiatives and innovations. Sichuan province localized national policies to adapt them to the local economic and industrial context. The government of Sichuan Province classified the main development economy areas, to combine the local economy development character with higher education. This is reflected in the following excerpt form a provincial policy document:

> "Implementing the "One Core, Multiple Branches" development strategy, Sichuan Province has optimized the layout of vocational education according to the development needs of its five major economic zones, guiding the differentiated development of vocational education. In the Chengdu Plain Economic Zone, the focus is on intelligent manufacturing, aviation manufacturing, and civil–military integration. Relying on international cooperation parks such as the Sino–French and Sino–German zones, the region seizes the opportunities brought by the Belt and Road Initiative to strengthen cooperation with overseas industries, enterprises, educational institutions, and research organizations in vocational education, technology, and industrial development. The Southern Sichuan Economic Zone centres on intelligent manufacturing and terminal industries,

> promoting the integration of vocational education with industrial clusters. The Northeastern Sichuan Economic Zone focuses on revitalizing the Sichuan–Shaanxi revolutionary old area, advancing targeted vocational education and deepening industry–education integration. The Northwestern Sichuan Economic Zone continues to implement the "9+3" free vocational education policy for ethnic minority areas and encourages joint talent training mechanisms with paired-support provinces and cities. In deeply impoverished regions, vocational colleges are encouraged to cooperate with those in the more developed coastal areas, thereby achieving growth through collaborative development and poverty alleviation" (The People's government of Sichuan Province, 2018)

Sichuan province encourages local institutions to cooperate with enterprises on the basis of innovative UII models designed by themselves. As a key provincial policy document has formulated: "Adhere to the principle of taking the lead through pilot implementation and demonstration. Uphold reform and innovation, encourage bold experimentation, and prioritize effectiveness. Promote development through selected pilot projects that radiate and drive broader reform, while taking into account both regional and industrial layouts. Support projects with strong foundational conditions, a high willingness to reform, and distinctive institutional characteristics to take the lead in development, so as to accumulate replicable and scalable reform experiences and models that can serve as demonstrations for others" (Sichuan Provincial Department of Education, 2023).

Similar localisation can be seen also in Chongqing, where the municipal government created a specific, innovative model of clustering industry and education. As the relevant municipal policy documents states: "we will establish industry-education consortia…build a 'flyover' that vertically connects secondary, higher, undergraduate, and master's degrees and horizontally integrates vocational and general education, achieving collaborative innovation in vocational education, higher education, and continuing education and establish a modern vocational education system that integrates vocational and general education, industry and education, and science and education. The overall strength of vocational education in the city will lead the central and western regions and rank among the top in the country, significantly enhancing its ability to serve economic and social development…We will construct open regional industry-education integration practice centres. Adopting methods such as "factory within a school" and "school within a factory," we will jointly build a number of practice centres with enterprises, promoting seamless integration between school talent cultivation and enterprise production operations" (Chongqing Municipal People's Government, 2023):

This localisation of the national policy demonstrates Chongqing's strategic ambition to establish a systematic, multi-level, and practice-oriented model of higher education. Connecting education with industry happens through both vertical articulation (from secondary to postgraduate education) and horizontal integration (between vocational and general education). The promotion of the "factory within a school" and "school within a factory" model marks a deepening of practical collaboration, where learning and production processes are merged in real industrial settings.

These initiatives reflect a regionalized response to the national call for integrating education with industrial transformation, aligning vocational and higher education with Chongqing's innovative model, the "33618" modern manufacturing cluster system". This systemic model seems to be one of Chongqing's most important industrial-development strategies, formally launched around 2021–2022 to guide the city's manufacturing transformation, talent development, and innovation upgrading. It is a strategic blueprint that structures Chongqing's entire manufacturing sector using a numerical logic: 3 major leading industries, 3 strategic

emerging industries (high-growth, forward-looking industries supporting industrial upgrading), 6 characteristic advantage industries (sectors where Chongqing has existing comparative advantages and strong industrial foundations) and 18 industrial chains (subsectors/industrial chains that connect the whole system into an actionable plan for cluster-based development). Chongqing's UII policy is one of the examples of the transition from cooperation to integration: from loosely connected partnerships to an embedded, ecosystem-based model that tightly links institutions, industries, and innovation chains.

The localisation of UII policies typically happen in direct cooperation with the national government: this is what characterizes also Chongqing. The Chinese ministry of education, cooperating with Chongqing government, issued a common policy document (Ministry of Education & Chongqing Municipal People's Government., 2023) which included four key points:

(1) Joint Construction of Educational Platforms and Talent Training Models:
"Sichuan and Chongqing are encouraged to jointly develop vocational education alliances and regional talent training models across administrative boundaries ...The two regions will mutually recognize academic credits, qualifications, and vocational skills, promoting the integration of secondary, higher vocational, and undergraduate education in both provinces...A cross-regional education collaboration platform will be established to support lifelong learning and the sharing of educational resources."

(2) Collaborative Development of UIC Platforms and Industrial Integration:
"The plan proposes the formation of cross-regional university–industry cooperation communities based on the "33618" modern manufacturing cluster system, encompassing modern services and agriculture … Sichuan and Chongqing will co-establish industry–education integration demonstration zones (such as Wanzhou–Dazhou, Luzhou–Yongchuan–Jiangjin, and Suining–Tongliang) to link industrial chains with educational ecosystems…Within these consortia, a multi-party governance model—"government guidance, market orientation, enterprise leadership, and institutional support"—is implemented to deepen the integration of education, industry, and innovation."

(3) Co-construction of Science–Education Integration Platforms:
"Universities and research institutes in Sichuan (e.g., Sichuan University, University of Electronic Science and Technology of China) will support vocational institutions in Chongqing to improve their research capacity…the two regions will jointly establish high-end collaborative innovation platforms such as the New-Generation Information Technology Innovation Centre and the Vocational Education Big Data Application Centre…Cross-provincial cooperation in R&D, applied technology transfer, and joint innovation projects will be encouraged to strengthen the western China innovation ecosystem."

(4) Collaborative Internationalization of Vocational Education:
"Sichuan and Chongqing will jointly promote the Belt and Road Initiative (BRI) vocational education alliances, including the Western Land–Sea New Corridor Vocational Education International Cooperation Alliance … The regions will co-host international forums, skill competitions, and exchange programs to enhance the global visibility of western China's vocational education…Joint efforts will be made to build overseas branch schools, Luban Workshops, and bilingual ("Chinese + vocational skills") education programs."

The Ministry of Education's policy document reveals that China is advancing a systematic synergy among education, industry, and science through the coordinated development of the Chengdu-Chongqing Economic Circle. centred on the principle of "three integrations" – industry-education integration, integration of vocational and general education, and science–education synergy – the reform seeks to build a regionalized, open, and ecosystem-based modern vocational education system. Specifically, industry–education integration emphasizes

aligning educational provision with industrial transformation and strengthening collaborative training platforms between schools and enterprises; integration of vocational and general education breaks down institutional barriers to promote mutual recognition, flexible mobility, and inclusive learning pathways; while science–education synergy enhances the interaction between research, innovation, and talent cultivation through the joint participation of universities, research institutes, and industries. Collectively, these initiatives signify a paradigm shift in university–industry cooperation from isolated project-based collaboration toward a more systematic, governance-oriented, and innovation-driven regional model.

3 New insights from the Chengdu/Chongqing case

Our second fact-finding mission to the Chengdu/Chongqing area has provided many new insights and brought significant new elements enriching our knowledge about China's UII policies and practices. In this section we present the most important new insights. In the first part of this section we focus on some specific issues and problem areas, and in the second part we analyse two broader problem areas that have so far been missing from our reflection about China's UII policies and practices.

3.1 Specific issues and problem areas

3.1.1 Regional and institutional commitment to UII

As mentioned earlier in the section "*China's UII policies and practices*" – illustrated also by the AI generated "two tales" comparative analysis in "*Annex 3: Two narratives and two modernities*" – universities visited in the Chengdu and Chongqing, as well as interviews with entrepreneurs demonstrate a very strong commitment both to UII and to the UII generated pedagogical modernisation processes. As we shall see, *practically all of our visits and interviews provided evidences confirming this*.

To illustrate this, it is worth presenting in detail the case of a municipal tertiary-level institution in Chongqing: the *Chongqing City Management College* (CCMC).[10] While officially classified as a vocational college and not a "university" under Chinese nomenclature, the institution functions in many respects like universities of applied sciences in Europe. It places strong emphasis on vocational training, industry collaboration, and applied learning, offering diploma-level education typically spanning three years. This example reflects the increasingly blurred boundaries between university and non-university sectors of higher education – a trend that characterizes the development of the Chinese system and mirrors similar dynamics observed in Europe. Through its deep and multifaceted engagement with UII, CCMC exemplifies China's shift toward skills-driven modernization. It demonstrates how vocational institutions can function not only as education providers but also as strategic actors in regional development and global cooperation. CCMC's model might offer valuable insights for countries such as Hungary, where strengthening university-industry linkages in vocational education is a key policy objective, but the level of implementation of this objective in the tertiary sector, compared with China, is still rather low.

CCMC is recognized for its strategic commitment to UII and its role in advancing practical talent development. Established in 1984 (originally as the Chongqing Civil Affairs School) the college has evolved into a full-time public higher vocational institution jointly supported by the

[10] See the presentation of the school's profile at CCMC's website here: https://www.cswu.cn/25/list.htm.

Chongqing Municipal Government and the Ministry of Civil Affairs. It holds the status of a National Backbone Demonstration Vocational College and is widely regarded as a model institution within the region. The college has positioned itself as a regional hub for UII, integrating educational programs with the needs of industry and public service. It serves as a major training base for professionals in urban management, social services, and civil affairs, aligning its curricula with the practical demands of the labour market.

International engagement is a cornerstone of CCMC's development strategy: the college actively participates in Sino–foreign cooperation projects. This reflects a strong commitment to internationalize vocational education and enhance its relevance in a global context and illustrates the growing commitment of China to export vocational education models to other countries. This is supported also by CCMS's involvement in Chinese language training and cultural exchange as part of its international cooperation portfolio, reinforcing the soft power dimensions of vocational education This kind of commitment to internationalisation, backed by strong cultural and linguistic orientation, reflects what we said about the blurring boundaries between university and non-university sectors.

A key feature of CCMC's UII engagement is its collaboration with government agencies and enterprises. The college regularly undertakes commissioned projects that ensure its programs remain responsive to evolving regional policy priorities and industrial transformations. As a pilot institution for teaching quality review and improvement under the Ministry of Education, CCMC integrates feedback from industry partners into its pedagogical practices and assessment systems, thereby fostering a culture of continuous innovation. CCMC is involved in several cross-regional and sectoral alliances, sometimes hosting their headquarters and taking coordination responsibilities, showing that it has a key role not only connecting education and industry (sectoral commitment) but also Chongqing and Chengdu (geographical/regional commitment).[11]

The commitment of CCMC to UII is demonstrated also by the fact that – similarly to other universities – it has a specialised unit responsible for UII (Industry-Education Integration Centre). This unit functions as an internal coordinating hub that liaises between the college's academic units, enterprise partners (e.g., SF Express), and external stakeholders (logistics industry, government policy). It handles the organisational and governance dimension of UII. The centre plays several essential functions, such as

- *Governance and Partnership Broker* (it acts as the institutional interface for school-enterprise articulation: hosting meetings with industry, such as SF Express, to negotiate cooperation outlines, curriculum, research nodes, ensuring that the idea of "looking at education from outside of education" and "running education from outside of education" can be operationalised by aligning external industry contexts with internal teaching units).
- *Curriculum & Pedagogy Connector* (e.g. through the school's logistics management professional branch, visiting companies, managing apprenticeship frameworks, tying curriculum to real-world enterprise operations).
- *Infrastructure and Practice Platform Facilitator* (e.g. through overseeing the "Smart Logistics Full-Process Productive Industry-Education Integration Training Base" and SF Industry College – to be presented in more details below).

[11] See for example the websites "*Two industry-education consortiums led by our school were selected as municipal industry-education consortiums in 2024*" (https://www.cswu.cn/cjrhzx/2025/0418/c1639a87326/page.htm); and „*School-enterprise collaboration and integration of industry and education The Chengdu-Chongqing Twin Cities Economic Circle Business Circulation Vocational Education Group was established*" here: https://www.cdp.edu.cn/info/1222/1067.htm.

Talent Pipeline & Employer Linkage (through ensuring that students are placed or connected to enterprise partners, based on the example of modern apprenticeship and enterprise visits and also supporting social training for incumbent workers, and serving both pre-service and in-service population).

Research & Innovation Enabler (through increasingly connecting teaching with applied projects, technology diffusion and partner-driven innovation, such as SF's unmanned logistics zone).

A remarkable example of practicing UII through co-managed industrial colleges at CCMC is the *SF Industry College*, created and managed together with SF Express, the largest logistics service provider in China and probably also in Asia (with global presence in many countries and regions).[12] The involvement of this company in advanced logistics (cold chain, unmanned systems, air and ground integration) implies that the educational/skills side needs to align with cutting-edge industry demands. SF's multi-domain complexity means that its university partners must integrate curriculum, infrastructure, and pedagogy accordingly, making the UII challenge richer but also more demanding.

Figure 3.
SF Industry College

Source: photos taken by the authors.

This industrial college is – similarly to many other industrial colleges – is co-built, co-funded and co-managed with industry. It is a production-type training base, operating within the university campus. CCMC and the partner company (SF Express Chongqing Co., Ltd.) jointly invested ~RMB 3 million to build this "Smart Logistics Full-Process Production Training Base" under the guidance of the MOE's National Logistics Teaching Steering Committee. This is one of the many examples of genuine industry-education integration hubs which achieve UII at a much higher level that conventional university labs.

As another similar case exemplifying the strong commitment to UII in the Chengdu/Chongqing area it is worth mentioning *Chengdu Jincheng College* (CDJU), which represents also particularly instructive example of how institutional transformation, ownership restructuring, and national skills-development policy converge in China's evolving higher education landscape. Founded in 2005, this university was originally established as an independent college affiliated with a key public university. Like many such institutions, it combined the regulatory supervision of a public university with the managerial and financial autonomy of a private sponsor. Over time, CJC developed into a comprehensive undergraduate college offering programmes in management, engineering, and the arts, with a declared focus on applied education and talent development. In 2021, the China Education Group Holdings Limited (CEG) – a Hong Kong-listed company, one of China's largest private higher-education operators – acquired a 51 percent equity interest and an equivalent school-sponsorship interest

[12] See the website „*SF Industrial College*" here: https://www.cswu.cn/cjrhzx/_t152/2023/0915/c1657a72062/page.htm.

in CDJC Through the CEG acquisition, CDJC gained access to shared management systems, branding, and a nationwide ecosystem of partner enterprises. This transformation has had far-reaching implications for the internal dynamics of the school: CDJC as an independent college has evolved into a corporate-governed private university, and – under the new governance structure – it adopted an applied and practice-oriented approach to teaching, based on an innovative talent-cultivation model (see more about this later in the next section).

The particularly strong embeddedness of CDJC in the industry ecosystem is well illustrated by the high number of co-managed industrial colleges within the university campus (see *Figure 4* and *Annex 4: Industry colleges at Chengdu Jincheng College*). The list presented here is not complete: an additional new industry college is being organised in the field of foreign language teaching, connecting CDJC to relevant companies, such as tourism agencies, languages schools and translation service providers.

Figure 4.
Industrial colleges at CDJC

Source: photos taken by the authors.

CDJC's institutional strategy reflects the national policy orientations presented in the introduction of this case study. In this institutional strategy it uses the slogan mentioned earlier (in the section "*China's UII policies and practices*"): "Look at education from outside of education, and run education from outside of education" (Chengdu Jincheng University, 2024). We shall present more details about CDJC's practices later also in the sections "*UII and new pedagogy*" and "*Broadening the scope of industry*".

3.1.2 UII and new pedagogy[13]

Our fact-finding mission to Chengdu and Chongqing provided further evidence supporting the postulation that China's UII policies and practices have created an exceptionally favourable environment for disruptive innovations in higher education teaching and learning. These policies not only deepen cooperation between universities and industry but also reshape the organisation of teaching and learning within universities themselves.

The deep integration of academic and industrial activities appears to have produced a *self-reinforcing loop*: the more intensively universities design and deliver teaching in partnership with industry, the more they are driven to adopt innovative pedagogical methods such as

[13] It is recommended to read this section together with the section „*The Suzhou input*".

problem-based and project-based learning. Conversely, as universities expand the use of these innovative forms of teaching, they become increasingly capable of engaging in more authentic and sustained cooperation with industry. This reciprocal dynamic has given rise to what can aptly be described as a "pedagogical revolution" in Chinese higher education.

The current radical transformation of pedagogy in Chinese universities is naturally not generated only by UII-related policies and practices. In the section entitled "*Curriculum reform and disciplinary integration*" of our document and literature analysis (Halász & Huang, 2025a) we presented the curriculum-related reforms promoted by the Chinese government parallel to the policy of UII, especially in the disciplinary areas of engineering, medicine, agriculture, and liberal arts. These reforms have a transformative impact (1) on the organizational characters of universities (e.g. the creation of domain-based structures replacing traditional disciplinary silos), (2) on the content of courses (e.g. the development of cross-disciplinary, application-rich courses), (3) on the way teaching and learning is organised (e.g. the use of flexible, customized study pathways, modular learning and micro-credentials), and (4) assessment/evaluation practices (e.g. combining traditional examinations with project-based assessments made together with industry professionals).

The connection between UII and pedagogical reform, as mentioned earlier in the background section, is a deliberate policy strategy in China. Our second fact finding mission provided several pieces of evidence that this is leading to a radical transformation of the way teaching and learning is organised in Chinese universities, often leading to disruptive teaching innovations (see also the section '*The Suzhou input*' below). One of the many examples we have had the opportunity to observe is the pedagogical reform implemented by Southwestern University of Finance and Economics (SWUFE) in Chengdu, in the field of business education.

Pedagogy reform in the area of business education started at SWUFE around 2019. By 2025 the university developed about 100 pilot courses and 93 exemplary lesson cases.[14] For the next five year SWUFE' business school plans several actions and activities connecting pedagogy reform with UII. As the list of planned actions in *Box 4* shows UII is deliberatively and strategically used to promote the reform of teaching and learning, and it is perhaps the most important tool to achieve this reform.

Box 4.
Connecting UII with pedagogy reform – the case of business education at SWUFE

Partner with leading technology enterprises and research institutes to co-create immersive teaching scenarios.
Develop project-based courses centred on enterprise-defined problems,
Build practice platforms for financial risk simulation and intelligent investment advisory development, and promote full coverage of the "academic supervisor + industry mentor" dual-mentor system.
Implement the "Golden Course" teaching design project to optimize classroom content and learning scenarios.
Encourage teachers to organically integrate disciplinary frontiers, industry cases, and ideological-political elements, and construct a "theory + practice + ideology" tri-integrated teaching content system.
Innovate the mechanism for industry-education integration in talent cultivation.
Build a "collaboration–linkage–co-construction–sharing" UII ecosystem.

[14] Source: interview with the head of SWUFE's staff development centre.

Using real enterprise production scenarios and actual cases, advance reforms in project-based, mentorship-based, and training-based teaching.

Each discipline will co-develop at least one high-quality industry-education integration course with leading enterprises, and create a curriculum, project, and case library centred on industrial practice.

Innovate the "dual-mentor" mechanism and promote scenario-based project learning through "enterprise posing problems – mentors guiding – students solving."

Enable two-way flows of "industry professors entering classrooms + faculty and students entering enterprise workstations," achieving deep integration of enterprise projects into teaching, experts into the podium, teachers into industry, and student outcomes into the market.

Source: SWUFE (2025).

The planned initiatives shown in *Box 4*, together with other developments (such as the creation of AI-driven technology platforms) serve several overlapping purposes, such as (1) curricular innovation (turning traditional finance and economics programs into AI-augmented "New Finance" disciplines), (2) teacher development (encouraging teachers to redesign courses with AI tools and real industrial data), (3) scenario-based learning (embedding corporate problem-solving into classroom projects) and (4) dual-mentor model: (institutionalizing cooperation between professors and industry mentors). Besides UII, digital technology, especially the intensive use of AI is becoming a driver of reform. This is illustrated by SWUFE's AI-driven pedagogy model (see *Figure 5*) which contains six parallel forms of using AI to boost business (financial) education.

Figure 5.
AI-driven pedagogy in business education – the SWUFE model

Source: Photo taken by the authors

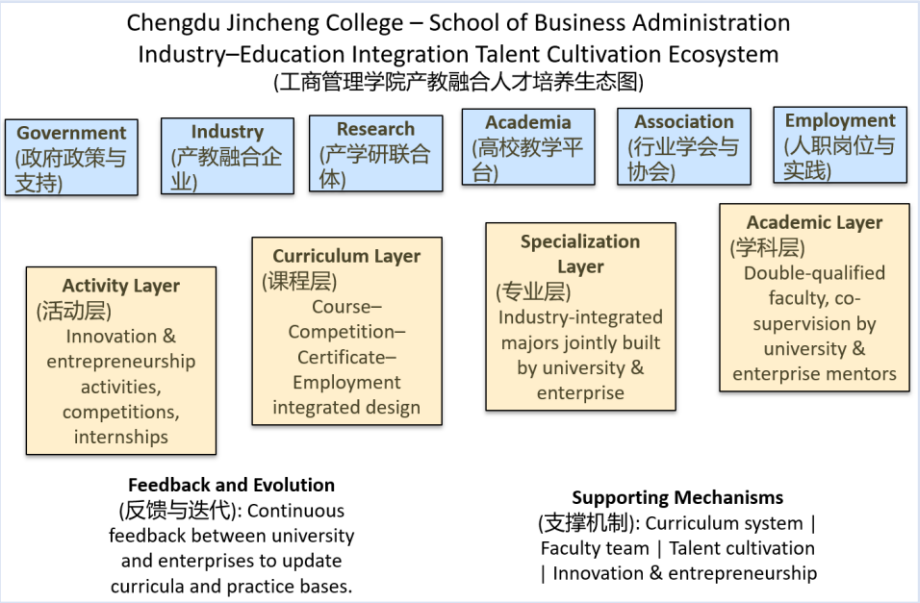
*Legend: **智慧教育领航者** - Pioneer of Smart Education; **财经图谱解构者** - Deconstructor of Financial Knowledge Maps; **教育范式革新者** - Innovator of Educational Paradigms; **数智决策分析师** - Digital Intelligence Decision Analyst; **智能交互翻译官** - Intelligent Interaction Translator; **科技创新引航人** - Navigator of Technological Innovation*

The model presented in *Figure 5* displays the six interrelated forms of using of AI to enhance the quality educating business (financial) students. This model translate SWUFE's strategic agenda into concrete skills clusters both for students and teachers.

- "*Navigator of Smart Education*" (applying AI to personalize learning, improve teaching analytics, and reform pedagogy)
- "*Financial Knowledge Graph Architect*" (building AI-driven financial data graphs for economic analysis and risk modelling).
- "*Innovator of Educational Paradigms*" (redesigning teaching models using AI - e.g., blended, immersive, and scenario-based learning).
- "*Pilot of Technological Innovation*" (bridging academic research with technological R&D and enterprise innovation).
- "*AI-Enabled Interaction Translator*" (AI-mediated communication - e.g., human-AI interfaces, translation, cross-disciplinary collaboration).
- "*Data-Intelligent Decision Analyst*" (using AI, data analytics, and modeling for strategic and financial decision-making).

Among the many examples of UII driven pedagogical transformations it is worth mentioning again the case of Chengdu Jincheng College (CDJC). The UII driven innovative teaching model at this university is described as "hierarchical talent cultivation mechanism" or "echelon-based talent cultivation". This is a project-driven teaching model which engages alumni enterprises to create „talent echelons" including students from freshmen to seniors. As described in a paper presenting this model (Wang et al. 2024), "horizontal projects are used as entry points to reinforce project-based learning and foster the development of non-cognitive skills. Additionally, the construction of vertical project capabilities helps students build practical application skills over time." As the authors of this paper sate: „this comprehensive approach integrates real-world industry demands with academic learning, ensuring that students are better prepared for professional careers." CDJC's teaching model is conceived as part of a ecosystem where government, industry, research activities, associations and employment relations together constitute the background in which UII driven skills development is realised at four levels or layers: student activities, curriculum design, co-managed specialisations and teachers/industry mentors (see *Figure 6*).

Figure 6.
The skills-development model of CDJC's School of Business Administration



Source: Adapted from the PowerPoint presentation by LUO Yan, associated dean of CDJC's School of Business Administration

Chengdu Jincheng College illustrates well how UII policies and practices can evolve into a radical pedagogical transformation and how a university can became a laboratory for rethinking teaching, learning, and curriculum design in applied higher education. This university managed to translate a formal strategy – expressed through cooperation agreements, internship bases, or joint research centres – into a reorganization of pedagogical logic. This shift represents what might be called, without exaggeration, a pedagogical revolution.

The pedagogical model of CDJC's School of Business Administration has created an integrated skills-development ecosystem" structured around the government–industry–research–academia–association–employment chain. This model embeds students in a dynamic loop connecting classroom learning with enterprise problems, professional certification, and labour-market feedback. The four layers presented *Figure 6* include student competitions, innovation projects, and entrepreneurship challenges ("activity layer"); integration of "course–competition–certificate–employment" (课赛证岗) as a single learning trajectory ("curriculum layer"); industry-co-built majors where enterprise engineers co-design syllabi ("specialization layer"); and dual-qualified teaching team combining professors and corporate mentors ("academic layer"). This layered approach has replaced the traditional "lecture–exam–degree" sequence with a spiral of practice and reflection, a core feature of applied learning paradigms.

The array of industry colleges presented in *Figure 4* co-branded with influential companies (such as Huawei, Baidu, Inspur, OST Media, SUPCON, Oupeng Robot, and others) constitutes the physical manifestation of this pedagogical turn. Each industry college operates as a living laboratory in which teaching, experimentation, and production coexist.

In the Jincheng-Huawei IT College, for example, students design solutions for real client scenarios under joint supervision. In the OST Media College, live-streaming studios double as classrooms; and in the Oupeng Robot Integration College, applied engineering students participate in prototype development cycles. These arrangements not only deepen student engagement but also redefine the role of teachers. Faculty members evolve into learning designers and project mentors, often co-teaching with enterprise professionals (see more about

this in the section "*Impact on teachers*"). This form of dual instruction blurs the line between industry training and academic education, embodying the government's vision of deep integration of industry and education.

What makes the approach of the universities that we visited – including CDJC' –"revolutionary" is not merely the presence of enterprise partners, but the reconstruction of epistemology underpinning curricula. Knowledge is no longer valued for its theoretical completeness but for its transferability, iterability, and situational utility. The curriculum thus becomes a platform for problem-based, scenario-based, and project-based learning, where assessment depends on demonstrable competence rather than memorized content. UII acts here as a pedagogical catalyst, triggering innovation in instructional design, faculty development, and student identity formation. The "double-qualified" teachers (academic + industry experience) become the new archetype of professionalism, while students experience learning as a continuous cycle of design, action, and reflection rather than a linear path to graduation. CDJC can probably be legitimately be described as one of the most outstanding examples of UII-driven pedagogical revolution in contemporary Chinese higher education (similarly to XJTLU presented in the section "*The Suzhou input*"). It shows that when policy incentives, corporate partnerships, and academic creativity align, the outcome is not just closer cooperation between universities and enterprises, but a redefinition of what it means to learn and teach in the 21st century.

It is important to mention that the "pedagogical revolution" described in this section has to be analysed also (1) in the broader context of modernisation and development mechanisms in China (we shall come back to this later in the section "*UII as modernisation dilemma*"), as well as (2) in the context of implementation capacities and implementation mechanisms. UII policies, especially when we include the pedagogical transformation component of these policies, are extremely complex, therefore their implementation requires high level implementation capacities and "implementation intelligence" (Halász, 2017). Our Chongqing/Chengdu fact-finding mission gave a strong confirmation of our assumption that China possess the implementation capacities and implementation intelligence needed in the context of pedagogical reforms that aim at fundamentally transforming human and institutional behaviours in education.

3.1.3 Impact on teachers

Our Chongqing/Chengdu fact finding mission has strongly confirmed that UII related activities and practices can transform not only the way teachers teach but also their entire daily work practice. Our fieldwork revealed that the most profound impact of UII lies not only in institutional structures or curricula but in the transformation of teachers' professional roles, identities, and even job satisfaction and well-being. We could communicate with several educators who seem to see themselves increasingly as dual professionals: both teachers and practitioners and they seemed to be satisfied with this dual identity and professionalism.

Across different types of institutions – from comprehensive universities such as Southwest Jiaotong University (SWJTU) and Sichuan University (SCU) to applied institutions like Chengdu Technological University (CDTU) or Chongqing City Management College (CCMC) we could see that UII has turned many teachers into "boundary workers" mediating between the cultures of academia and industry. Instructors are frequently co-designing curricula with corporate partners, they co-supervise student projects with enterprise mentors, and participate in mixed teaching–research–production teams. This proximity to industry enhances their practical knowledge and pedagogical credibility, while also raising expectations for continuous

professional learning. Some teachers described this shift as a kind of second career inside teaching, a kind of re-entry into the world of work that renews motivation and relevance.

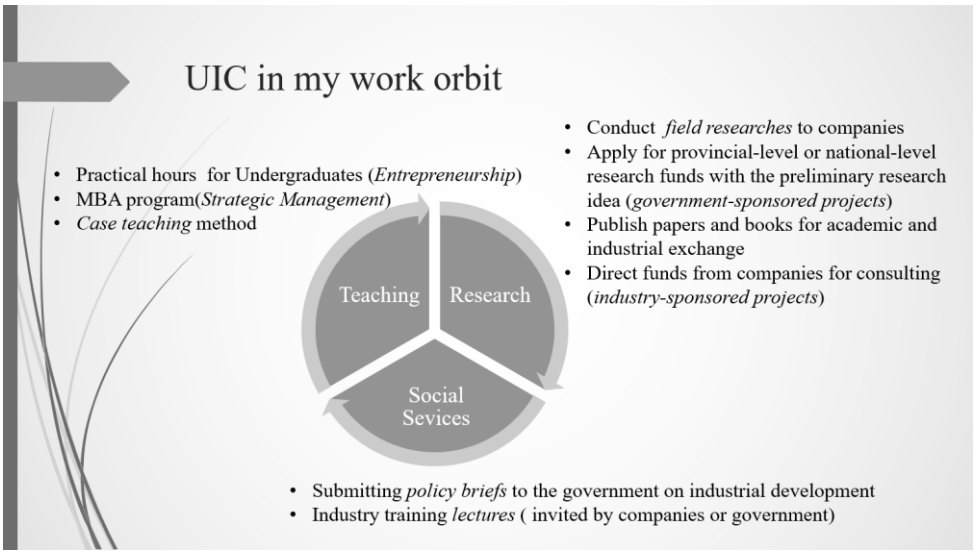
What we saw in the visited universities is – as mentioned earlier – in contrast with the traditional approaches of Chinese higher education, where teachers' professional confidence has long been anchored in scholarly achievement and publication output. UII seems to change this hierarchy. We met teachers now deriving self-efficacy from applied success – the ability to help students solve real problems, satisfy company partners, or co-develop training products recognized by industry. This "practice-based prestige" seems to democratize academic life: teachers in vocational or application-oriented universities now seem to gain recognition as innovators and co-creators of national modernization. Their sense of meaning stems less from academic hierarchy and more from contribution to social productivity

Teachers in Chengdu and Chongqing – and also in Suzhou as presented in the section "*The Suzhou input*" – consistently link UII to pedagogical innovation. Project-based learning, problem-driven scenarios, dual-mentor systems, and simulation labs are now common tools. These methods not only improve student engagement but also require teachers to redesign their instructional repertoires. The shift from "teaching knowledge" to "facilitating learning in production settings" demands new competences, such as curricular integration, teamwork with enterprises, and reflective practice. Institutions such as SWUFE explicitly connect pedagogy reform with UII policy, using joint courses and enterprise simulations as vehicles for the nationwide "classroom revolution".

Teachers frequently emphasized that involvement in UII increased their job satisfaction and sense of belonging. Working with industry provided concrete evidence of social relevance and often improved the institutional climate by valuing collaborative over competitive achievement. Pressures related to increased work burden, dual accountability and the difficulty of balancing academic expectations with enterprise deliverables was also mentioned but successful institutions managed this through mentoring networks, joint evaluation systems, and recognition of practice-based outcomes in promotion criteria.

This can be illustrated by the way one business teacher from a comprehensive, research oriented university in Chongqing presented "UIC in her work orbit" (see *Figure 7*). In the field of teaching UIC appears as including practical hours into her entrepreneurship undergraduate courses, teaching industry/business practitioners in an MBA program and particularly applying the case study method of teaching, often using cases created by herself on the basis of her field research in companies or consultancy activities. The latter appears in her description as research related activity, together with other research activities funded either by public authorities or companies. Finally, UIC also appears in the activity category described by her as social services, including submitting policy briefs to the government on industrial development and delivering training to adult worker on the basis of invitation by companies or by government.

Figure 7.
UIC related activities in the work of the teacher of a research university



Source: PowerPoint presentation of TAN Chang, associate professor, SWU College of Economics and Management, Department of Business Administration

Compared with Eastern China, where research-oriented universities still dominate, the western institutions we visited seem to operate with greater pedagogical flexibility and collective purpose. Teachers seem to be less constrained by publication metrics and more empowered to innovate teaching through partnership. This cultural and structural openness – perhaps rooted also in the Ba-Shu tradition of craftsmanship and pragmatism also evoked in the section "*The Chengdu/Chongqing context*" – has apparently turned the region into a laboratory of teacher-centred modernization (Yang & Huang, 2023).

3.1.4 The perspective of entrepreneurs/employers

Our meeting with entrepreneurs and company leaders in Chongqing and Chengdu[15] revealed a shared conviction that UII is not merely an educational reform but also a new model of social partnership between knowledge producers and economic actors. The three entrepreneurs/employers we had the opportunity to communicate in with length represent three distinctive but complementary understandings of UII's purpose and value.

The owner/leader of a company using advanced IT technology (Tangyuan Intelligent Control Ltd.) developed close cooperation with university partners in Chengdu, especially with Southwest Jiatong University (SJTU). This cooperation has led to the creation of a "living lab" model of integration: university research teams provide algorithmic design and testing environments: while Tangyuan contributes hardware infrastructure and real-time data streams. Collaboration with SJTU seems to give Tangyuan access to emerging technical talent and a faster innovation cycle, also providing students with authentic industrial contexts.

The founder a large supermarket chain (also active member of the Chengdu Municipal Committee of the Chinese People's Political Consultative Conference) thinks that education is both a civic duty and a form of legacy. Though describing himself as a "conservative" entrepreneur who prefers slow and steady growth, he sees teaching as a way to transmit entrepreneurial experience and moral insight. As an adjunct professor at Chengdu Technological University, he views the classroom as a social space for mutual inspiration where

[15] ZHANG Guoguo (Owner and vice president, Tangyuan Intelligent Control Ltd.); MENG Gangwen (owner and general manager of Leduo Chain Store; GU Juan (Owner and General m anager, Sichuan Wuzhou Tendering & Bidding Agency Co., Ltd. (see *Annex 2: Report on the fact-finding mission*)

students gain real business wisdom, while he refines his strategic business thinking through dialogue. His reflections seem to connect to a broader Western China trend: the rise of entrepreneurial mentorship within applied universities. His insistence on "quality over scale" mirrors the craftsman culture, perhaps associated with Ba-Shu traditions: patience, mastery, and human connection over rapid expansion. In the UII ecosystem, such entrepreneurs seem to serve as living role models who embody the integration of moral cultivation and economic productivity..

Perhaps the most impressive entrepreneur we had the opportunity to meet is the owner and manager of a large tendering agency (Sichuan Wuzhou Bidding Agency Co., Ltd.). Being also a PhD student at Southwestern University of Finance and Economics (SWUFE) she seems to represent a new hybrid identity in UII: the scholar-practitioner. As both doctoral researcher and business owner, she brings real-life case problems from her firm into classroom discussions and thesis supervision. Students work on authentic consultancy projects in her company, producing data and analysis that she can feed directly back into her company's decision-making processes. She defines her engagement with SWUFE as "two-way learning": the university provides theoretical and analytical frameworks, while her enterprise contributes practical insights and access to live projects. She also mentioned the impact of being embedded into the university culture on her communication with clients. Her example illustrates the mutual learning logic central to Sichuan's regional UII culture: fluid boundaries between academic and professional knowledge.

Despite their differences, all three entrepreneurs articulated a common conviction: UII is a reciprocal relationship rather than a transaction. For them, collaboration with universities enhances innovation capacity, improves recruitment, strengthens regional reputation and in general empower them. Conversely, universities benefit from their practical intelligence, management expertise, and project resources. Their narratives reveal that in Sichuan and Chongqing, UII has become part of a broader *moral* economy of cooperation, in which business success and educational contribution are interwoven.

Compared with Eastern China's UII model – often characterized by large-scale industrial alliances and government-led coordination – the Chengdu–Chongqing approach seems to be more personalized and culturally embedded. It seems to rely on trust, mentorship, and craftsmanship rather than administrative formalism. Entrepreneurs often act less as financiers and more as educational partners, embodying the humanistic strand of the earlier mentioned Ba–Shu economic ethos.

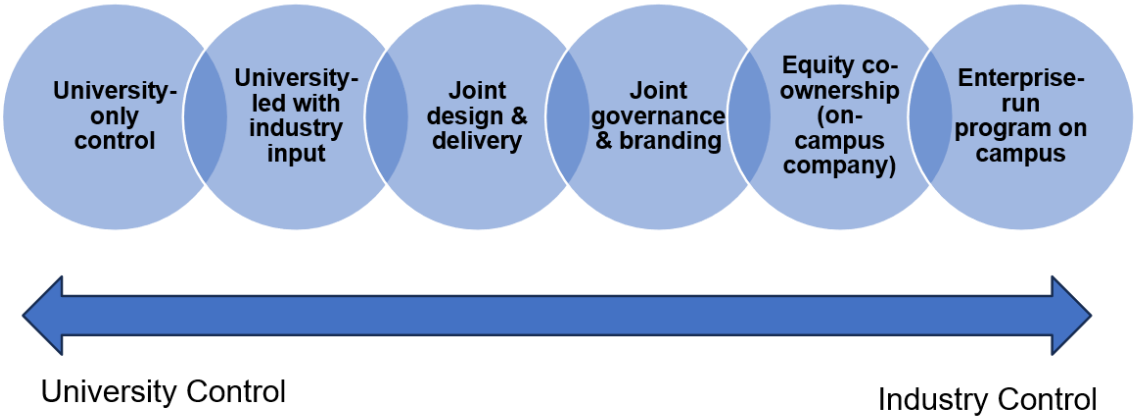
3.1.5 Developing skills together

Perhaps one of the most significant forms of skills-development-oriented UII is *co-teaching*. This occurs when university faculty and industry practitioners (often referred to as *industry mentors*) jointly engage in the teaching process, typically by (1) co-designing courses or project assignments, (2) co-creating learning environments or delivering instruction together, and (3) jointly assessing student performance. The depth and balance of this cooperation may vary. In some cases, the process remains largely under academic control, with companies providing supporting input or resources. In others, the collaboration evolves into a genuine form of co-creation, where the industry side assumes a substantial – sometimes even dominant – role in shaping and managing teaching activities.

This dynamic can be viewed as a continuum of co-creation, stretching from full university control at one end to full or strong industry control at the other. At the extreme industry-driven

end, universities allow enterprises to operate programs that are designed, managed, and delivered largely by the companies themselves, either within the university campus or under a jointly established institutional framework. Between these two poles, we can distinguish several intermediate stages reflecting progressively deeper enterprise participation. During our Chengdu–Chongqing fact-finding mission, we identified six distinct levels of such university–industry collaboration (see *Figure 8*).

Figure 8.
Levels of company involvement in skills development



As we shall see, these forms of university-industry collaboration often coexist within the same institution. In one of the annexes of this case study (see Annex *5: The university-industry control continuum*) we present concrete examples identified in the universities visited in Chengdu and Chongqing, corresponding to each form depicted in *Figure 8.*

The "*University-only control*" model can be illustrated by a scenario-based teaching example presented by teachers from Southwestern University of Finance and Economics (SWUFE) in a recent paper (Zhou et al., 2025). In this case, teachers simulated real-world conditions using industry-derived data and case studies; however, industry personnel were not directly involved in the design or delivery of the course. At the same university, we also found an example of the "*University-led with industry input*" model.[16] Here, enterprise experts were invited to co-teach and participate in student evaluation, and real enterprise data and cases were integrated into the course. Industry mentors designed selected elements and delivered specific modules, yet curricular authority remained entirely with the university, and no shared governance mechanism was established.

The "*Joint design & delivery*" model also appears at SWUFE, in an accounting program where the curriculum has been co-authored by academic and enterprise partners. Company executives and engineers helped design courses and case materials, while industry mentors jointly supervised projects and student theses within a formal partnership framework. Despite this deep collaboration, the program itself remained under university governance.[17] A similar other

[16] See the website „*The college and Ping An Property & Casualty Sichuan Branch jointly built an industry-education integration course*" [学院与平安产险四川分公司共建产教融合课程] here: https://jinrong.swufe.edu.cn/info/1096/30917.htm?utm_source=chatgpt.com.
[17] See the website „*School of Accounting, Southwest University of Finance and Economics: Deepen the integration of industry and education, innovate "enterprise mobile classrooms" to empower the independent*

example from the same university also illustrates how co-design support disciplinary integration. The teachers of the Department of Digital Media Art of the School of Humanities and Arts of SWUFE designed a project-based course together with industry practitioners, where students learned to merge digital technology, art, and financial culture. This course integrated open-source design tools and digital-tech methods used in the creative industry, and functioned as a teaching–industry co-production platform, where art and technology meet finance. The outputs of the project work were publicly exhibited which supported the turning a the learning process into a real-world professional event.[18]

The "*Joint governance & branding*" model can be illustrated – among several examples – by the Times College of Microelectronics, co-founded by Southwest Jiaotong University (SWJTU) and the national railway company CRRC.[19] This is a typical industry college, jointly established and governed by a university and an enterprise, and operating as a distinct entity within the university. In this case, CRRC provides equipment, technical staff, and production lines, all integrated into teaching. The company also defines practice projects and assessment tasks that count toward formal academic credits, thereby embedding industry practice directly into the degree structure.

As for the "*Equity co-ownership (on-campus company)*" model, it can be exemplified by the Chenggong Fuchuang Intelligent Manufacturing Industrial College, jointly established by Chengdu Technological University (CDTU) and Foxconn.[20] This joint legal entity operates within the university campus, equipped with enterprise machinery, personnel, and production lines, and governed by a shared profit-and-risk system. It represents a classic "factory-within-the-university" model that serves both production and training purposes. In this case, the enterprise holds structural and operational control: it co-owns the facilities and participates in curriculum design, teaching follows industrial production logic, the university acts as academic partner and credentialing body, and the production activities are fully integrated into formal teaching programs. At CDTU's campus there is an industry park where several similar co-founded companies operate, producing marketable products and, at the same time, providing training facilities. They provide a perfect illustration to the expression "factory in the school" (see *Figure 9*).

Figure 9.
Industry sites at the campus of Chengdu Technological University

training of high-quality talents" [西南财经大学会计学院：深化产教融合，创新"企业移动课堂"赋能高质量人才自主培养] here: https://kj.swufe.edu.cn/info/5142/56542.htm?utm_source=chatgpt.com.

[18] Source: „Digital Art Celebrates a Century of Glory—Southwestern University of Finance and Economics' First Digital Art Installation Exhibition Opens with Brilliant Awaits [数字艺术礼赞百年华章——西南财经大学首届数字艺术装置展璀璨启幕]. WeChat account post. Southwestern University of Finance and Economics, School of Humanities and Arts. June 1, 2025

[19] See the university's "College Introduction" website here: https://sic.swjtu.edu.cn/xygk/xyjj.htm; and also the website "*The college went to CRRC Times Semiconductor Research and Exchange to seek a new path for deep integration of industry, education and research*" [学院赴中车时代半导体调研交流 共谋产学研深度融合新路径] here: https://sic.swjtu.edu.cn/info/1381/2891.htm?utm_source=chatgpt.com.

[20] See, for example, the website "Platform colleges talk about innovation (3)｜ Chengdu Institute of Technology: Guided by serving local industrial needs, build a new ecology of innovation and development" [平台院校谈创新③｜成都工业学院：以服务地方产业需求为导向，构筑创新发展新生态] here: https://www.csdp.edu.cn/article/6283.html?utm_source=chatgpt.com.

Source: photos taken by the authors.

Regarding the "*Enterprise-run program on campus*" we could not identify a fully enterprise-run program in those universities that we visited in the Chengdu–Chongqing region. We found, however, one case that is quite close to this model in a collection of cases of industry-education integration in Sichuan Province (Sichuan Provincial Department of Education, 2022). The BOE Technology Group (京东方科技集团), which is one of China's largest display and semiconductor companies, established a complete optoelectronic manufacturing and training base within the campus of Chengdu Vocational and Technical College.

Similarly to the previously mentioned case this is also a typical case of "factory in the school", as the enterprise runs actual production units on campus, employing enterprise standards, staff, and assessment systems, and teaching activities occur inside the company's production line, led by BOE managers and engineers. Students participate in real production, not simulations, producing goods under BOE's management. Although the college provides degrees and institutional coordination, the operational control rests fully with the enterprise.

Similar arrangements have begun to emerge also elsewhere in China. One example is the JD College, jointly operated by Beijing Wuzi University and the company JD.com, where the enterprise exercises near-complete operational control. In this case the school is run under a Board of Directors that includes JD executives as board members and vice chairs, with the Executive Dean post also coming from the JD side. The board "uniformly leads the college's work" and appoints the dean/executive dean. This is a joint governance body that, in practice, gives JD an ongoing hand on management and operations rather than episodic input.[21]

3.1.6 Control versus motivation

While the question of control (who controls the skills development process) rarely appear in UII related discourses the question of motivation (how companies can be motivated to participate in skills development processes) is a recurrent theme of these discourses. Maintaining and enhancing the diversity of different forms of sharing control – as presented in the previous section – is in fact one way of generating company motivation. This appears explicitly, for example, in the practice of Chengdu Technological University (CDTU) which operates several parallel UII mechanisms. As they describe it, they have built a "three-tier dynamic mechanism to stimulate enterprises' intrinsic motivation for participating in industry–education integration and solve the problem of unwilling to integrate".[22] For the description of the three different levels of UII on CDTU see *Box 5*.

[21] See the website „*Management of Jingdong College*" [京东学院管理层] here: https://jdxy.bwu.edu.cn/info/1082/1933.htm?utm_source=chatgpt.com.

[22] See the website „*Chengdu Institute of Technology: Systematically innovate the industry-education integration mechanism of local application-oriented undergraduate universities*" here: https://fgbgjy.ycit.edu.cn/info/1012/2361.htm?utm_source=chatgpt.com

Box 5.
The Three-Tier UII model of CDTU[23]

Based on the diverse needs of different enterprises, the university adopts differentiated cooperation models to stimulate varying levels of intrinsic motivation among enterprises to participate in talent cultivation.

First, it begins with specific projects, engaging in shallow-level cooperation with over 100 enterprises. By undertaking horizontal research projects commissioned by enterprises, jointly building practice teaching bases, providing employee training for companies, and giving priority to recommending excellent graduates, the university "makes friends" with enterprises.

Second, it focuses on the right of use, forming deep-level cooperation with enterprises such as the Changhong Group through jointly established laboratories and similar platforms. Centred on enterprise technological upgrading, the university uses its own space, equipment, and faculty resources to co-build engineering centres and laboratories that directly address enterprise needs, thereby enhancing corporate enthusiasm for participating in talent cultivation.

Finally, it achieves breakthroughs at the level of ownership, adopting modern enterprise systems such as joint-stock models to form a community of shared interests with enterprises, so that talent cultivation becomes an integral part of enterprise operations. In 2016, the university partnered with the leading electronics company Hon Hai Precision (Foxconn) to co-establish Chenggong Fuchuang Company on campus through a mechanism of "shared equity, shared benefits, shared risks, and complementary advantages." The university holds 51% of the shares and the enterprise 49%, creating a real factory that integrates production, teaching, external technology services, and training. With annual revenue of nearly 20 million RMB, it has achieved genuine "self-sustaining development."

3.1.7 Multidimensional/multilevel integration

When industry and higher education get connected and start living together in the same space a great variety of forms of co-existence may emerge. UII becomes a multidimensional phenomenon which takes various forms. This can be illustrated, among others, by the UII practices of *Polus International University*. This private higher education institution offers three year long (below bachelor level) programs relating to medicine, health industries, business management, arts/design, education and sports/tourism. As formulated in its mission statements it positions itself with a mission around "beauty & health raising life quality" and "international vision, rooted in Chinese culture, rebuilding educational forms, enriching resources, reshaping teaching process" to cultivate "high-skilled, international vision, humanistic, professional" talent.[24] In the cross-sectoral and skills development oriented UII practices of its Business Management Department one can see many elements focusing on student learning based on real enterprise engagement, teaching innovation and faculty development, as well as service activities supporting local communities and economy.

Conceiving UII as a multidimensional or multilevel phenomenon is a key element of the thinking and practice of Polus. Its teachers define four key dimensions of UII: (1) building strategic alliances with sectoral and professional associations to get strategic guidance, gain market insights, shape standards and assure professional relevance; (2) promoting the deep participation of enterprises in co-governed projects based on shared interests, alignment of

[23] I. e.
[24] See the website of the college here: https://www.polus.edu.cn/polus-at-a-glance/about-polus.

goals, co-using resources; (3) co-building virtual teaching-research units supporting shared curriculum design, teacher development, pedagogical knowledge co-creation and pedagogical innovation; (4) exploiting the dynamics of the quadruple helix, developing skills and creating knowledge together with industry, government and communities, especially related to rural revitalization.

Although the term quadruple helix does not appear explicitly in Polus' discourse what they call "Four-Party Cooperation" (sìfāng hézuò - 四方合作) is a clear form of this phenomenon. In this skills-development oriented quadruple helix, the government provides policy and funding support, industry associations provide standards, information, and links to employers, enterprises (including student and funded companies) provide projects, mentors, technology, and real-world environments, and the university integrate these into curricula, mostly in the form of teaching projects and practice based courses (see *Figure 10*). In this model we can see (1) joint governance (mixed committees, co-managed labs, co-chaired programs), (2) operational mixing (shared management and operational platforms, joint budgets, shared performance indicators), (3) resource mixing (co-investment in labs, facilities, curriculum materials, intellectual property) and personnel mixing (dual-appointed staff, teachers in enterprises and engineers as adjunct faculty).

Figure 10.
The "Four-Party Cooperation" model of Polus International University

Source: Presentation of teacher DING Nanjuan at Polus International College
Legend: 四混机制 - Four-Integration Mechanism; 政府 – Government; 共建; 企业 / 校友 - Enterprises / Alumni; 行业协会 - Industry Associations; 学校 – University/school; 四方协同工作组 - Four-Party Collaborative Working Group; 政策支持 - Policy Support; 资源支持 - Resource Support; 行业标准 - Industry Standards; 共建 - Co-construction; 共享 - Co-sharing

One specific form of UII is when the industry partners are startup companies created by students and the university uses these student-owned companies for stills development for the whole

student community. Similarly to other universities, this element also appears in the skills-development project repertoire of Polus (see *Table 3*). These projects serve not only the development of the entrepreneurship competences of students but also the creation of new industrial spaces that can used to enrich the whole university teaching environment.

Table 3
Examples of education projects of the Business Management Department of Polus International School

UII Project	Area/focus	Industry partner	Key activities	Outcomes
1. Faculty enterprise residency	UII driven teacher professional development	China National Petroleum Corporation	Teachers joined enterprise teams in four functional roles (control, anchor, design, and copywriting) in a live-commerce context. They rotated positions to develop comprehensive professional capability.,	Linking UII with teacher development; 4 "star teachers" trained (each completed ~90 days in-company). 3 million yuan cumulative benefits generated.
2. Livestream marketing in rural environment	Student skills development combined with service learning and rural development	IMS (a top influencer-marketing firm)	Four-party collaboration (linking marketing and rural revitalization) Students created digital content to sell product	Integration of industry logic and social mission. 200+ students trained; 180 anchors, 120 controllers
3. Student competition	Applied skills in live marketing	Watsons; Hotwind	Organising a live-stream marketing competition involving real product promotion on campus. Students managed background design, sales talk, and product selection Building a practice-based learning lab	Sustainable university–enterprise co-branding model; 350+ students; 5-year cooperation; 200K RMB output
4. Auto Sales Project	Practical marketing & local industrial linkage	Longquan Automobile Association	Joint car-sales marketing initiative integrating online traffic generation with offline experience	Demonstration of industrial ecosystem embeddedness. 50+ students trained; 10+ enterprises involved
5. Store Operations Project	Entrepreneurship & retail operation	Alumni Startup Brand (Caishiwu)	Educating store managers and employees for chain stores in cooperation with local communities	Incubation-based learning and alumni-driven UII (80+ students; annual 100K RMB benefit)
6. Agricultural Product Storage and Marketing)	Development of agricultural business skills, and social commitment	Longquanyi District Agricultural Cooperative	Students participate in agricultural product warehousing and marketing, learning to connect rural production with urban markets	Cooperation with local streets and communities; 21 students trained; 130,000 yuan benefit generated in six months

Source: Teacher presentation at Polus International College. Table created with AI assistance.

UII based skills development is realised the most frequently in the form of real-life projects co-designed by university teachers and industry mentors and delivered as common activity. Project-based collaboration opens quasi unlimited spaces for connecting the worlds of universities and industry. As Polus' example shows this connection can reach practically every activity area, including the building of pedagogical knowledge and pedagogical research.

One of the most remarkable features of the UII project repertoire of Polus is the creation of virtual teaching and research units (*xūnǐ jiàoyánshì*- 虚拟教研室) in some of its projects. Combining teaching activity and pedagogical inquiry is a well known institutional feature of Chinese schools: these teaching and research units (*jiàoyánzǔ* - 教研组) function as pedagogical laboratories supporting teaching experimentation, innovation and pedagogical knowledge sharing. Accordingly, one of the unexpected but natural and unavoidable implications of UII is the opening the doors of reflection, inquiry and research to industrial partners. It is natural and unavoidable because co-designing and co-delivering curriculum is naturally generating pedagogical dialogues between teachers and industry partners, which can also lead to common research. As an outcome studies published by academics and industry partners appear in some pedagogical journals. This shows that industry has penetrated not only into the classroom but also into the realm of pedagogical knowledge creation or research on teaching and learning.

3.1.8 UII and the knowledge triangle dynamics

Although our study focuses primarily on skills development oriented university-industry cooperation or education-driven university-industry cooperation (EUIC), in practice this dimension is often inseparable from those forms of cooperation which are directed toward research and technological innovation. UIC/UII can and should be analysed in the framework provided by the knowledge tringle model where both the education and research poles are present. This shows that EUIC often happens embedded into activities driven by research or technological innovation, especially in the case of research universities.

A good illustration is the symbiotic partnership between *Southwest Jiaotong University*, an institution historically associated with rail transport, and Chengdu Tangyuan Electric Co., Ltd. Founded in 2010 by a professor from the university, Tangyuan Electric evolved within just a few years from a startup into a large publicly listed company whose products are now sold not only across China but also in South Asia, South America, and Africa.

Initially, the company specialized in railway safety and maintenance technologies, yet its advanced engineering capabilities enabled it to expand into other sectors, developing a diverse portfolio of products such as robotic inspection systems and safety and emergency management solutions beyond the transport field (see *Table 4*). Our interview with one of the company's owners and senior executives highlighted that Tangyuan's rapid growth would not have been possible without its deep and sustained ties to the university. One important form of this linkage is the university's use of the company as a "living laboratory", where graduate students engage in project-based learning focused on solving real-world technological challenges faced by the enterprise.

Table 4
The product repertoire of Chengdu Tangyuan Electric Co., Ltd

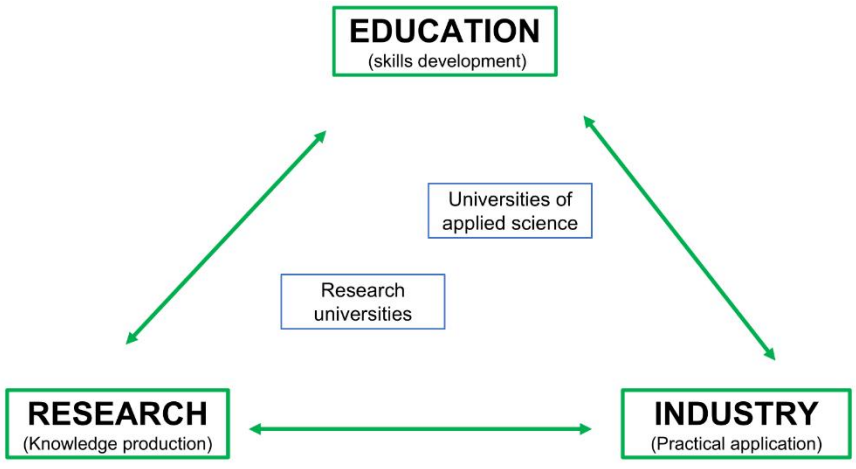
Smart Transportation	Rail Transit Power Supply, Infrastructure, Electromechanical, Intelligent Maintenance of Rolling Stock
	Smart Highway Incident Detection and Proactive Management
Robots	Smart Factory Robot

	Intelligent Inspection Robot
	Safety Protection Robot
New Materials	Anti-Icing Materials
	Nano Insulation Materials
	Anti-Corrosion Materials
	Glass Fiber Composite Reinforcement Materials
Public Transit-Style Railway and Smart Station	Adaptive Full-Height / Adaptive Half-Height / Fixed Full-Height / Fixed Half-Height / Wide-Opening Platform Screen Doors
	Lifting Platform Safety Protection System
Public Safety Emergency Control	Railway Line Safety Monitoring System
	Coal Mine Safety Monitoring System
	Hazardous Chemical Enterprise Safety Monitoring System
	Intelligent Flood Prevention Equipment
Green Energy Saving	Intelligent Low-Carbon Management Platform
	Electromagnetic Compatibility Energy Meter
	Comprehensive Utilization of Vanadium-Titanium Resources

Source: the PowerPoint presentation of Tangyuan's representative

Southwest Jiaotong University is a research university with exceptionally strong and long-standing connections to industry. Evidence from our first case study in the Greater Bay Area (Halász & Huang, 2025b) indicates that research universities tend to display distinctive patterns of university–industry integration (UII) compared with universities of applied sciences (including vocational, technical universities and polytechnics). In particular, they balance the three elements of the knowledge triangle – education, research, and industrial practice or application – in different ways. While research universities typically prioritise the research dimension and place skills development in a secondary position, universities of applied sciences tend to emphasise skills formation and practical training more strongly, giving comparatively less weight to the research component in their UII practices. In other words, altough they both are connected to each poles of the knowledge triangle, they position themselves at different places in this triangle (see *Figure 11*).

Figure 11.
The position of research universities and universities of applied science in the knowledge triangle



Positioning universities within the knowledge triangle can at times be challenging. A good example is Southwest Jiaotong University Hope College, established in 2001 as an independent college jointly founded by Southwest Jiaotong University and the Hope Education Group, a major private higher education provider. This private institution occupies an ambiguous space in China's higher education landscape, combining the brand affiliation of a research university with the operational model of an applied, teaching-oriented college.

Its UII practice is articulated through the so-called "Trinitarian Teaching–Research Model" or "Three-in-One Model," which integrates teaching, research, and industrial application into a single, mutually reinforcing process. This model establishes a continuous flow from classroom instruction to applied research and enterprise collaboration, feeding back into curriculum improvement. Rather than treating industry engagement as an extracurricular internship activity, the college institutionalizes the presence of industry within the curriculum, using regional private-sector partnerships – particularly in accounting, taxation, and software – to create a living applied-research environment where practical inquiry and professional skill development take precedence over traditional academic publication outputs.[25]

Another compelling example illustrating that skills-development-oriented UII practices can thrive not only within applied or vocational universities but also in comprehensive and research-intensive institutions is Chongqing University (CQU). Founded in 1929, CQU is a comprehensive university offering a broad spectrum of disciplines, including liberal arts, science, engineering, business, law, and medicine. It has been included in several major national initiatives—namely, *Project 211*, *Project 985*, and the *Double First-Class University* program, underscoring its strategic importance in China's higher education landscape. CQU is frequently described as a "world-class university with Chinese characteristics" reflecting both its academic excellence and its alignment with national development priorities".[26]

Skills-development UII is part of CQU's overall strategy as reflected in its "Collaborative Development Plan for the Integration of Industry and Education" (focusing mostly on engineering education), acknowledged by the Ministry of education.[27] This plan aims at "integrating the 'real problems' and 'real needs' in enterprise engineering practice into teaching and practice content, and guide enterprises to deeply participate in professional planning, textbook development, teaching design, curriculum setting, and internship training." The practice of teacher internships (sending teachers to companies) observed mostly in universities of applied sciences appears also in this comprehensive, research oriented university. As the ministry documents earlier quoted states: "experts and professors are selected to serve in enterprises, and outstanding engineering and technical personnel are selected to serve in the college, and the education, teaching and engineering practice capabilities of the teaching staff are continuously strengthened".[28]

The strength of UII at CQU can be illustrated, among others, by the way this university cooperates with Huawei. They have developed a comprehensive strategic partnership which

[25] Source: A presentation by dr. LU Weiji entitled „Report on Industry-Academia-Research Collaboration" (2025 October) at Southwest Jiaotong University Hope College.
[26] See the website of the university here: https://english.cqu.edu.cn/About1/An_overview.htm.
[27] See the MoE websites "Chongqing University takes the "head enterprise" project as the traction to deepen the integration of industry and education and serve high-quality development" (http://www.moe.gov.cn/jyb_sjzl/s3165/202410/t20241009_1156433.html) and „Chongqing University focuses on strengthening the training of outstanding engineers" (http://www.moe.gov.cn/jyb_sjzl/s3165/202312/t20231206_1093388.html).
[28] i.e.

covers not only scientific research but also talent training, Huawei technologies are embedded into the university's curriculum and campus infrastructure, so this partnership is going much beyond internship arrangements; it spans curriculum development and campus infrastructure ("smart campus") signalling a deeper integration of industry logic into the university. Their agreement includes also special student recruitment, scholarship mechanisms, and a "developer programme" managed jointly by them, its objective being to train students who can immediately enter or influence the industry ecosystem.[29]

3.1.9 Broadening the scope of industry

When people hear the word "industry," they often think of traditional manufacturing sectors and assume that UII is primarily relevant to universities and disciplines connected to those fields. However, we have identified compelling examples of UII activities that extend well beyond the classical industrial domain – demonstrating that UII is relevant across all academic disciplines and in diverse areas of life beyond the university.

One of these examples is the case of *Polus International College*: While walking in the campus of a university like CDTU, focusing on engineering one might feel like being in a factory where one can see real manufacturing production processes (see *Figure 9*.), walking in Polus' campus one feels like visiting a museum or making a tour at a touristic site, presenting traditional Chinese pieces of art and cultural artefacts (see *Figure 12*.). Here university education is integrated not only with classical industrial activities (e.g. fashion and textile industry) and services (such as hairdressing) but also with classical culture preserved and exhibited by the institutions of cultural industry.

Figure 12.
Polus International College

Source: photos taken by the authors.

The integration of education with cultural industry on the basis of liberal arts disciplines and humanistic pedagogy is particularly valuable form of UII, demonstrating that UII thinking and practices are relevant in every disciplinary area. This has been presented in this way in one of the publications of a teacher of the college: Polus "has built a museum community composed of Western Sichuan Classical Furniture Museum, Needlework Craft Museum, and Contemporary Terracotta Art Museum, turning the campus into National AAA-level tourist attraction. The school also uses the academy's cultural, museum and tourism resources to create

[29] See the websites „*Chongqing University and Huawei Technologies Co., Ltd. deepen comprehensive strategic cooperation*" (here: https://english.cqu.edu.cn/info/1100/3112.htm) and "*Chongqing University joins hands with Huawei to launch the Smart Major Action Plan*" (https://paper.sciencenet.cn/htmlnews/2023/9/507638.shtm).
"

an immersive education environment for students to learn humanities knowledge and experience excellent traditional culture and intangible cultural heritage" (Guo, 2021). This example shows that UII can be used not only to give labour market relevance to liberal arts studies but also to bring liberal education into skills development oriented vocational education. Visiting Polus and discovering is unique approach to arts and skills we had the impression that we were witnessing the birth of a new *Bauhaus* in a genuine Chinese environment.

Polus collaborates with local health/cosmetic/wellness firms co-designing course modules or teaching projects, using internships and applied labs, developed together with them. Similarly to many other schools it hosts student/faculty startups in various health/wellness/design/ technology areas. Its hairdresser shop, coffeeshop and other services operated by student clients receive clients from within and from outside the school, and the profit remains with the students who created these companies.

Another example is the UII activities of the School of International Studies of Chengdu Jincheng College (CDJC), presented in details earlier. Similarly to Polus, this institution brings UII into the disciplinarily areas of humanities. Its non-technical, language-centred faculty of this school is cooperating with organisations in those industrial sectors that need foreign language skills, such as foreign language training providers, tourism agencies, sight seeing guidance providers, companies providing translation services or companies involved in cross-border e-commerce activities (see *Box 6*).

Box 6.
Teaching project performed by the international studies staff of CDJC

1. Education Track (教育微专业) – In this track a 'closed-loop cooperation' model linking interview → training → assessment → employment is implemented. Partners include chain education institutions. Students receive enterprise mentorship, targeted training, and direct employment opportunities. This represents a classic skills pipeline integrating teaching simulation and certification.
2. Translation Track (翻译微专业) - Aligned with the CATTI certification system and supported by Grouphorse Translations and the Sichuan Translation Association. Simultaneous interpretation labs, CATTI preparation, and international cooperation ensure high professional relevance.
3. Tourism & Hospitality Track (旅游与酒店微专业) – This project integrates multi-scenario teaching, national guide certification, and practical tourism promotion projects. Students participate in real-world activities such as the 'Pandas Go Around the World' campaign and 'World Games' promotional media. Emphasizes intercultural communication and global service competence.
4. Cross-Border E-Commerce Track (跨境电商微专业) – This project combines business, finance, and language courses with live-streaming commerce projects. Partners include Sichuan Cross-border E-Commerce Association, Deyang Glassware Co., and Chengdu Huidu Industry Park. Students simulate platform operations (AliExpress, Alibaba.com) and participate in national innovation contests.

Source: Power Point presentation of the international studies staff of CDJC

In CDJC we can see the expanding of UII to the humanities and service industries, proving that skills-driven integration can work also beyond the classical STEM and business areas. UII-related teaching activities are realised through „micro-specialization" modules (offering 12 credits). This remarkable curriculum innovation makes teaching in humanities modular, stackable and more practice-oriented, connecting this disciplinary area to global markets, and transforming language education into a bridge between humanities and local industries.

This innovation also enhances teacher and student confidence and professional well-being. It overcomes the "marginalization" of language majors by connecting it to employability and industry demands. This is realised through work based skills development, internships and industry mentorship, leading to the recognition of acquired skills by credentials recognised by industry (e.g. tourist guide qualification).

The case of international studies at CDJC illustrates that UII in China has moved beyond the traditional boundaries of applied sciences. It also serves as a mechanism of pedagogical modernization and identity transformation in the disciplinary area of humanities. The school redefines foreign-language education as an employability ecosystem, embedding certification, practice, and cross-border engagement. It offers a particularly interesting complement to our knowledge about Chine's UII policies and practices, underscoring a broader conception of 'integration' as a holistic transformation of curriculum, teaching, and institutional culture.

3.1.10 UII as combining learning and service

To the combinations and synergies discussed in the previous sections (especially in "*UII and new pedagogy*" and "*UII and the knowledge triangle dynamics*") we can add another important one: the synergy between learning and service. When teachers and students engage in activities that directly support companies or communities – such as working on open, real-life problems in collaboration with enterprises – they participate not only in innovative forms of experiential learning but also in providing meaningful services to their partners in business and society.

Among the many possible illustrations, the Business School of Sichuan University (SUBS) offers an especially telling example. In its MBA programme titled *Enterprise Diagnosis Practice*, students and teachers collaborate directly with real enterprises through intensive three- to four-month projects based on fieldwork. During these projects, student teams apply theoretical knowledge to diagnose business problems in authentic organisational contexts. Each cycle culminates in a *Final Presentation and Exchange Meeting* (结项汇报交流会), where students present their findings to an audience that includes representatives of the participating firms, who in turn provide feedback and evaluation..[30]

Participants of these projects report both highly positive experiences and constructive challenges.[31] Teachers not only guide student teams in data collection and analysis but also learn from the process themselves, subsequently integrating this new understanding into their classroom teaching. In this sense, the "learning + service" dynamic benefits both sides: enterprises receive practical insights, while teachers and students engage in reflective, practice-based learning.

[30] See the „Sichuan University Business School MBA2023 Enterprise Diagnosis Practice Project Completion Report Exchange Meeting" website of the school here:
https://mba.scu.edu.cn/article/268?utm_source=chatgpt.com
[31] Source: interviews with teacher and students at SUBS.

A second example comes from the rural revitalisation initiatives of Southwest University (SWU, Chongqing). These activities were highlighted several years ago in a Ministry of Education publication as exemplary cases of combining UII with social service to local communities, particularly in the agriculture and tourism sectors. As the Ministry's report noted, students involved in these initiatives "implement practical teaching projects such as supporting agriculture and education, making full use of practice bases such as experimental farms and modern agricultural demonstration sites". They also "carry out social practices such as homecoming surveys and hold thematic training sessions on employment and community development at the grassroots level."[32]

At SWU, teacher-education students regularly engage in field-based teaching practice across rural areas of Chongqing and Sichuan, jointly organised by the School of Education and local education bureaus. This model integrates learning, teaching practice, and community service, showing how UII can operate as social learning through service. SWU's UII activities are framed not merely as internships but as social-service missions aligned with the national Rural Revitalization Strategy. In these projects, students apply modern pedagogical and digital-education methods—developed through university–industry partnerships with smart-education companies—to enhance the quality of rural education.

The service orientation of UII activities is not always explicitly stated in formal descriptions of industry colleges or study programmes. However, a careful reading of institutional documents reveals that this dimension often forms an integral part of their activity portfolios. A good example is provided by the CRRC Times Microelectronics Industry College at Southwest Jiaotong University (SWJTU, Chengdu).[33] This college connects engineering students with real-world rail-safety projects such as on-site testing, maintenance, and data collection on urban rail systems in Chengdu and Chongqing, under the supervision of industry engineers. Even when not explicitly described as "service projects," these activities possess a clear public-service dimension—ensuring the safety and reliability of transport infrastructure used daily by millions of citizens.

3.2 New emerging perspectives of exploring the UII phenomenon

Our Chongqing-Chengdu fact-finding mission helped us to better understand also some broader aspects of the UII phenomenon, that might require further research in the future. One is related to the relationship between the spectacularly rapid development of institutional mechanisms of UII and the general dilemmas of economic and social modernisation in China. An other one is related to the sustainability dimension of the UII phenomenon.

3.2.1 UII as modernisation dilemma

One of the striking observations during our fieldwork in Chengdu and Chongqing was the large number of newly built university laboratories and practice rooms that appeared empty or only lightly used. While we found this surprising at first glance, this also incited us to reflect about the general developmental logic of building UII mechanisms in the region. One of the

[32] See the MoE website "Southwest University actively serves the national rural revitalization strategy [西南大学积极服务国家乡村振兴战略] (http://www.moe.gov.cn/jyb_xwfb/s6192/s133/s214/201808/t20180824_346042.html?utm_source=chatgpt.com).

[33] See the website „Southwest Jiaotong University-CRRC Times Microelectronics College Case Promotion" [西南交通大学-中车时代微电子学院案例推介] (https://kfc.jxut.edu.cn/info/1468/1875.htm?utm_source=chatgpt.com).

conclusions this reflection generated is that we should see this rather than signalling failure or underperformance, as part of a broader pattern in which infrastructure development, policy incentives, institutional transformation, and human-resource dynamics unfold at different speeds.

A first explanation might lie in China's "infrastructure-first" strategy. Universities in western China have received substantial investment to build high-quality teaching laboratories, modern industry colleges, and enterprise co-operated practice centres. This often follows a "build first, activate later" logic: physical capacity must exist before curricula, partnerships, and teaching teams can fully make use of it. Constructing visible labs demonstrates readiness for cooperation, strengthens institutional credibility, and aligns universities with national and provincial UII priorities. In this sense, empty laboratories might represent future-oriented capacity rather than present underutilization.

A second reason of temporary overcapacity might be created by rapid funding cycles. Chengdu and Chongqing universities have benefited from a series of central and provincial initiatives – such as the creation of Modern Industry Colleges, Industry or other kinds of education integration centres or vocational-undergraduate pathways—that encouraged institutions to expand practice-oriented infrastructure. Infrastructure might grew more quickly than student numbers, program structures, or partnerships, creating a natural time-lag in utilization. This stage is probably common in regions undergoing accelerated modernization, and mirrors earlier experiences in Shenzhen, Hunan, and parts of the Yangtze River Delta.

A third possible factor is that some of the laboratories we visited were not designed for daily classroom use, but for periodic project-based teaching, applied research, and enterprise cooperation. Smart logistics platforms, intelligent manufacturing lines, digital-twin studios, building-information-modelling labs, and maintenance simulation centres are typically activated during specific project weeks, enterprise-driven modules, innovation competitions, or cooperative applied research tasks. In this sense their function is episodic rather than continuous, so long periods of apparent inactivity are built into their operational logic.

In addition, enterprise partners who contribute to the construction of modern industry colleges often make only selective or strategic use of the laboratories. Their core activities take place in factories, logistics centres, or corporate R&D units, not on campus. As a result, enterprise involvement tends to be periodic-focused on demonstrations, mentorship sessions, recruitment events, or specific project collaborations. This makes laboratories appear empty for much of the year, even when cooperation functions effectively on its own terms.

A further constraint might relate to teacher readiness and gradual development of dual-professionalism. Many of the new laboratories contain advanced industrial equipment – robotics lines, high-precision CNC systems, smart construction controllers, or data-driven logistics platforms – which require specialised skills. Although we could see many teachers understanding well the principles of new pedagogies (see the sections "*UII and new pedagogy*" and "*Impact on teachers*"), probably still many of them have only limited industry experience and many of them need further technical training to use the new equipment confidently. Although universities are actively developing dual-professional teaching teams, this process takes years. Until teacher capability catches up with infrastructure, usage will naturally remain uneven.

Finally, there also might be cultural and managerial factors that influence laboratory usage. Universities in the region Chengdu–Chongqing region – influenced by the Ba–Shu cultural unity and dualism – might tend to protect expensive equipment by restricting open access and scheduling activities in a controlled manner. Laboratories are sometimes maintained in a state of readiness for inspections, accreditation processes, and project evaluations linked to UII policy performance indicators. Keeping labs clean, orderly, and damage-free is part of responsible equipment management in many Chinese institutions. This can give outsiders the impression that labs are unused, even though they are reserved for targeted pedagogical and cooperative activities.

Taken together, these factors seem to explain the apparent emptiness of laboratories in Chengdu and Chongqing. This is best understood not as a deficiency, but as a logical stage of developmental within the broader process of UII implementation. Physical infrastructure has been built rapidly to meet policy goals and attract industry partners, while programmatic and human-resource dimensions are still catching up. As the region's UII ecosystems mature – supported by teacher innovation teams, deepening industry partnerships, and the expansion of project-based learning – these laboratories are likely to become more fully integrated into everyday teaching, applied research, and talent development activities.

What appeared to us as the "empty laboratory puzzle" could be analysed in the broader framework of development or modernisation theories. What we saw can be interpreted in the context of what development scholars sometimes describe as an "infrastructure-first model of modernization". This means that often physical capacities are built in advance of social routines, human capabilities, and institutionalized practices. This logic is naturally not unique to China. Meyer and Rowan's (1977) classic argument on "myths and ceremony" highlights how organizations construct visible, formal structures – modern buildings, laboratories, technology platforms – to signal conformity with institutional expectations, even when everyday practices have not yet fully adapted. Pritchett, Woolcock, and Andrews (2010, 2013) similarly describe "isomorphic mimicry" and "capability traps," where states create outward signs of modernity faster than internal capabilities can grow. These insights could help us explain why laboratories in Chongqing and Chengdu are often impressive in appearance but sometimes not yet integrated into everyday teaching routines.

What we observed might also be shaped by further dynamics. In China's system of local government, universities are embedded in what some authors (e.g. Li and Zhou, 2005) described as promotion or tournament driven incentives, where visible achievements – new buildings, advanced equipment, modern industry colleges – carry significant political weight. In this context infrastructure becomes a form of performance signalling. Heilmann (2008) describes China's model of development a "experimentation under hierarchy": this model often requires institutions to build platforms for collaboration before mature practices emerge to use them. Laboratories thus may function initially as readiness conditions for future cooperation, rather than as fully operational teaching spaces. The result is a predictable time-lag: infrastructure expands rapidly, while curriculum redesign, enterprise partnerships, and dual-professional teacher development progress more slowly.

We might use Geels' (2002) multi-level perspective on socio-technical transitions to clarify this sequencing. During early phases of systemic transition – such as the shift toward applied, practice-based higher education – material "niches" (labs, demonstration platforms) appear first. Only later do they become embedded in stable routines, organizational cultures, and learning ecosystems. China's modernization policies (such as dual-carbon strategy, new industrial

clusters, and mission-oriented innovation policies) my intensify this dynamic by encouraging rapid creation of specialized laboratories aligned with new industrial chains, even before sustained partnerships or teaching routines are in place (Mazzucato, 2018).

At the micro-level, further mechanisms my contribute to the phenomenon. Many laboratories might be designed for project-based cooperation with enterprises – for innovation weeks, joint experiments, demonstrations, and applied research –, that is not for daily classroom use. Enterprise partners use these spaces episodically, while teachers often require time to develop the technical competence to operate advanced industrial equipment. This creates a temporary state in which laboratories are present, impressive, but underutilized. Yet this does not necessarily indicate dysfunction. Hirschman's (1958) theory of "unbalanced growth" argues that building strategic capacity ahead of demand can trigger new linkages and capabilities. From this perspective, empty labs may not be wasteful, but part of a deliberate sequencing strategy aimed at stimulating future cooperation, talent pipelines, and institutional innovation.

Understanding the empty-laboratories phenomenon as a symptom of a broader modernization dilemma allows us to see it not as *failure*, but as a *transitional stage*. Universities in Chengdu and Chongqing are probably constructing the physical infrastructure for UII faster than human capabilities and institutional routines can adapt. This reflects deeper structural tensions between appearance and capability, infrastructure and usage, policy expectations and operational maturity. Over time – through teacher innovation teams, expanding enterprise partnerships, and the gradual normalization of project-based learning – these laboratories are likely to become more fully integrated into the region's educational and innovation ecosystems. In this sense, what we could see is not simply empty space but the early architecture of a future system, where capacity precedes capability, and where physical infrastructure is a starting point rather than an endpoint of modernization.

A key implication of the development and modernisation dilemmas discussed above is that we must also consider the sustainability of China's UII policies and practices. Are the institutional arrangements, coordination mechanisms, and behavioural patterns observed during our fact-finding missions viable in the long run? Put differently: will China succeed in bringing real activity into the many empty laboratories we encountered, and will the ongoing "pedagogical revolution" lead to a broad and lasting transformation of teaching and learning across the higher education system? These remain open questions, yet the cumulative evidence from our two fact-finding missions inclines us toward a cautiously positive conclusion. The systems we observed appear to possess both the structural momentum and the cultural–institutional foundations needed to turn initial infrastructure and policy ambitions into living, sustainable practice.

3.2.2 The sustainability dimension of UII

The sustainability question can be raised not only from the perspective of the specific, UII related institutional and behavioural mechanisms but also from a broader the perspective: what is the impact of UII on sustainability in general. One of the key outcomes of our Chongqing/Chengdu fact-finding mission has been a deeper recognition of the sustainability dimension of UII.

Sustainability is one of the most important – if not the most important – global social and economic concerns of our time. It is therefore both logical and necessary to examine how UII contributes to the sustainability agenda. Since UII opens education to the outside world and

brings real societal concerns into the teaching process, it inherently holds the capacity to foster sustainability in meaningful and transformative ways.

China's ambition to peak carbon emissions before 2030 and achieve carbon neutrality by 2060 ("dual-carbon goals") provides a powerful policy environment for UII. At the national level, the Ministry of Education, the National Development and Reform Commission, and sectoral ministries have linked talent development directly to dual-carbon strategies, calling for new low-carbon professions, updated training standards, and industrial-sector talent pipelines (MoE, 2022a; 2022b). In Sichuan and Chongqing, similarly to other provinces, these policies have been translated into regional industrial catalogues, [34] green-industry clusters, and talent development action plans. As we have seen, the Master Plan for the Construction of the Chengdu-Chongqing Economic Circle issued in 2021 (see the section "*The Chengdu/Chongqing context*") formulated sustainability goals under the label "Ecology-first green development" this way: „fully put into practice the concepts of ecological civilisation, optimise the spatial development pattern, improve the efficiency of land, water and energy use, and build green and low-carbon work and lifestyle, along with construction and operation models". [35]

Local governments explicitly encourage universities to align their programs with strategic sectors such as new-energy vehicles, green manufacturing, digital logistics, advanced materials, and smart energy systems. This means that universities and industry colleges are not simply responding to sustainability trends, they are also operating inside a policy ecosystem that systematically pushes education toward sustainability-relevant fields.

The relationship between UII and sustainability has already attracted attention from Chinese scholars. In a recent paper presented at an international conference, He et al. (2024) examined a newly established industry college as a case study to demonstrate how UII can support the development of a green and low-carbon economy within the logistics sector. This college integrates logistics management with the automotive industry through what the authors describe as "a new ecological integration of production and education." Within its Automotive Service Engineering program, the institution has deliberately advanced sustainability goals, particularly those related to green and low-carbon development. One notable example is its focus on "cold chain logistics," which involves the organization of transportation systems that maintain products at low temperatures throughout the delivery process.

Sustainability can be understood in a broader sense, not only as the protection of the natural environment and living ecosystems, but also as the transformation of human-made systems such as business practices, public institutions, and education itself to become more sustainable. UII has the potential to contribute meaningfully across all these domains. Co-founded and co-governed industry colleges, for instance, frequently offer programs that support the development of economically and financially sustainable business models. Their innovative approaches to co-governance foster new institutional mechanisms that enhance the financial sustainability of higher education. Moreover, the pedagogical innovations emerging from these collaborations can contribute to making teaching and learning processes themselves more sustainable through turning the content of teaching more relevant for real life, generating higher level student motivation and also strengthening the sense of self-efficacy of teachers.

[34] For industrial catalogues see NDRC (2024).
[35] See the website of the Hong Kong Trade Development Council „Chengdu-Chongqing Economic Circle: Objectives and Planning Rationales" here (https://research.hktdc.com/en/article/MTA2NDU4NjExNw?utm_source=chatgpt.com).

We could note several examples illustrating the promotion of sustainability goals in the universities visited in Chongqing and Chengdu. On example is the already mentioned SF Express Industry College of CCMC (see more about this in the section „*Regional and institutional commitment to UII*") which is built around a company whose corporate strategy includes a "Zero Carbon Future" program. Students learn here operational processes that integrate green-supply-chain management, waste-reduction protocols, and low-emission last-mile delivery; all tied to real industrial standards with measurable sustainability outcomes. In the Smart & Green Logistics Key Laboratory of the same university students work with automated guided vehicles, energy-efficient warehouse systems, and digital transport monitoring. These learning environments expose students to low-carbon logistics, including route optimization and energy-use reduction—directly reflecting dual-carbon priorities.

Another example is the School of Architecture & Civil Engineering of CDU which has intensive cooperation with a construction engineering management company called Mingyang (the company is the official industry-university-research base oh the school).[36] The course portfolios of this school include modules such as "High-Performance and Green Low-Carbon Civil Engineering Materials" and "Low-Carbon Energy Technologies," taught to undergraduate and graduate students. This school recruits students who want to learn about sustainable architecture and green design, smart buildings and smart cities, urban renewal planning and design, architectural landscape environment, smart buildings and smart cities.[37]

A further example is the Green Building Materials DEMO Factory" of the School of Civil Engineering of Southwest Jiaotong University in Chengdu. This is a construction project carried out by the "Green Intelligence Sunacing" team of the school. The project aims at the goal of "double carbon talent training", focusing „on dual carbon science, green building materials, intelligent construction and other sectors". The school carries out „student visits, internships, production training, and provide preliminary and pilot testing platforms for green building materials for scientific researchers in the school."[38]

4 Additional inputs from outside the Chengdu-Chongqing area

As mentioned in the introduction, our Chengdu-Chongqing fact-finding mission was supported by two additional short visits to Singapore and Suzhou, making it possible to enrich the case with further elements supporting the understanding of China's UII policies and practices beyond the specific target area of Chengdu and Chongqing. In this section we present these elements as specific additional inputs.

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[36] See the website „School-Enterprise Cooperation|Mingyang Management and Chengdu University Deepening School-Enterprise Cooperation Exchange Conference was successfully held" here: https://www.sohu.com/a/744230625_121852073?utm_source=chatgpt.com.

[37] See the recruitment website here: https://www.career.zju.edu.cn/jyxt/sczp/zpztgl/ckZpgwXq.zf?zpxxbh=3733734B13149CC1E0653A68DD0E9B18&utm_source=chatgpt.com.

[38] See the website of the Sichuan Provincial Department of Education: „*Southwest Jiaotong University: "Green Intelligence" education helps "double carbon" talent training*" [西南交通大学："绿智"育人助力"双碳"人才培养] (https://edu.sc.gov.cn/scedu/c100499/2022/11/11/5b3eb17778944edabac7ce8b334862ff.shtml?utm_source=chatgpt.com).

4.1 The Singapore input

Examining university-industry cooperation (UIC) in Singapore offers valuable insights for understanding and communicating China's UII policies within European and Hungarian contexts. Presenting the model through a Singaporean lens may make the message more readily accepted by certain European and Hungarian stakeholders than if it were presented directly from China. Indeed, the two nations exhibit remarkable parallels: both strongly encourage skills-development-oriented UIC/UII, demonstrating a similar depth and intensity in their approaches.

The differences between the two contexts can also help deeper understanding. While intensive university-industry cooperation is promoted by strong state policies in both cases, in Singapore this happens in an environment where

(1) a large section of industry is made of multinational companies that cannot be controlled or directly influenced by the national government;
(2) UIC/UII happens in the context of a highly advanced and sophisticated national skills strategy and lifelong learning policy environment where (2.1) a large part of incentives are targeted not to the supply-side (companies) but to the demand-side (individual learners) and (2.2.) there is a particularly strong focus on autonomous *adult* learners who are responsible for their own career management and skills improvement;
(3) Universities are more embedded into the global, international academic environment and enjoy larger autonomy that their Chinese counterparts.
(4) The integration of studying and work is conceived more at the level of the learning individuals (e.g. students involved in work-integrated learning) than at the level of the providers (e.g. the institutionalised cooperation of companies and universities)

The deep and intensive connection between the world of education and the world of work in Singapore can be illustrated, among others, by the practice of the *Singapore Institute of Technology* (SIT) which in the last decade developed new teaching model named "Integrated Work Study Programme" (IWSP).[39] A key element of this model is a 8–12-month work placement which – unlike most internship arrangements added as a supplementary part to degree programs – is embedded into a degree program. Curriculum, assessment and supervision in these programs are co-designed with employers. This is a form of deep integration of education and work although the integration is achieved not at the level of the university and the company as organisations but at the level of the study programs and individual learners and it appears as an innovative pedagogy (Lim et al., 2020). .

Another key feature of the SIT model is the strong focus on micro-credentials based on shorter programs elaborated in close cooperation with industry. This is in harmony of Singapore's national skills strategy which provides a general framework for connecting industry and academia (Lim et al., 2024).

4.2 The Suzhou input

As a complement of the Chengdu-Chongqing fact-finding mission the authors of this case study had the opportunity to spend two days at the two campuses of Xi'an Jiaotong-Liverpool University (XJTLU) in Suzhou. This provided substantial input to enrich our understanding of

[39] See the presentation of IWSP at the webpage „*Integrated Work Study Programme*" here: https://www.singaporetech.edu.sg/integrated-work-study-programme

China's UII policies and practices, especially their impact on pedagogy and teaching-learning innovations.

XJTLU was established in 2006 as a joint venture between Xi'an Jiaotong University in China and the University of Liverpool in the United Kingdom. It is widely regarded as one of the most innovative higher education institutions in China. The university operates across two campuses, one of which being situated in an industrial zone on the outskirts of the city (Taicang's High-Tech Development Zone), and being developed with significant financial support from the Suzhou municipal government. This campus is not only closely integrated with industry but also exemplifies a genuinely 21st-century learning environment, characterized also by its imaginative and forward-looking architectural design (see *Figure 13*). The first image (left side) depicts XJTLU's Entrepreneur College (Taicang) campus: a highly symbolic and pedagogically intentional structure that serves as an architectural embodiment of the university's UII-driven educational philosophy.

Figure 13.
Xi'an Jiaotong-Liverpool University

Source: photos taken by the authors.

XJTLU has gradually developed a complex pedagogical model using UII as one of the key engines of reforming teaching and learning. The evolution of this model is described evolving through as three successive phases: "model 1.0" aimed at "making the classroom excellent"; "model 2.0" fused the classroom with the factory; and "model 3.0" turned the university into a platform that binds learning, industry, and society (see *Box 7*). There is also an emerging further new model (it is already called 4.0) which will individualise learning through the creation of fully personal learning paths for each student.

Box 7.
The evolution of XJTLU's education model[40]

Education model 1.0 — Upgraded "professional-elite" education.
Student-centred, interest-driven, research-led learning within classical disciplines, with added industry awareness so graduates become strong *professional elites* in their field. Think: personalised learning, research projects, and exposure to sector trends.

Education model 2.0 — Syntegrative (融合式) education.
Moves beyond single-discipline training: curricula are organised around *industries*, integrating specialised knowledge with entrepreneurship and leadership, and co-designed/delivered with companies. Goal: produce *industry elites and future leaders*. This is embodied in the **Taicang Entrepreneur College** model and its year-long **Syntegrative Projects**.

[40] See XJTLU's "Vision and mission" website: https://www.xjtlu.edu.cn/zh/about/overview/vision-and-mission?utm_source=chatgpt.com

Education model 3.0 — Innovation ecosystem.
Builds a university–industry–society *innovation ecosystem*: education, research, tech transfer, entrepreneurship and lifelong learning are run as one platform (e.g., **Learning Mall**, park partnerships), aiming for "society-university-industry" symbiosis. In recent years this has been overlaid with an **Education + AI** strategy.

The key elements of XJTLU's pedagogy

1) Syntegrative Education (SE): industry-co-designed curricula, year-long Syntegrative Projects embedded in degrees.
2) Entrepreneur College (Taicang): industry-themed schools co-founded with firms; project-based delivery tied to local manufacturing ecosystems.
3) Learning Mall (Core & Premium): Core = degree LMS; Premium = non-degree/lifelong learning marketplace with external partners.
4) Co-assessment & QA: UK-style learning outcomes, workplace deliverables, external industry mentors in assessment panels where applicable.
5) Pathways & mobility: 2+1+1 routes with University of Liverpool; English-medium, international QA spine.
6) Education + AI: platform-first, data-informed T&L; pilots of AI-supported teaching/learning services.

As described in a publication by an XJTLU faculty member who actively contributed to shaping the university's pedagogical approach, industry "plays an important role within the 'industry-themed' schools, and is not just there to provide internships. Industry partners are involved in determining what degrees should be developed, are consulted with regard to the degree content to ensure that it is relevant and fit for purpose, help in the development of materials, and are involved in the delivery through the on-campus company. In addition, it is real-life, industry-based problems that students work with during the second stage of the professional development program" (Perrin, 2022).

XJTLU's pedagogical model exemplifies what Chinese policymakers and educators increasingly refer to as "classroom revolution" (课堂革命) or "pedagogical revolution" (教学革命). In this transformative process, students become co-producers of knowledge, learning shifts from passive absorption to active creation, and classrooms evolve into industry-linked laboratories of innovation. In developing this model, "several different vocational education models around the world were analysed to establish what was best for the Chinese education market" (Perrin, 2022). This represents a striking example of China's capacity to absorb international experiences and reconfigure them into a new educational construct: one that arguably surpasses the original models in both ambition and coherence.

XJTLU's pedagogical model may represents one of the most sophisticated and forward-looking examples of university–industry interaction in Chinese higher education. It seems to transcend most of the existing, conventional forms of cooperation between universities and enterprises by embedding education, research, innovation, and entrepreneurship within an interconnected ecosystem of mutually reinforcing components. This integrated approach is visually captured in the schematic displays that line the corridors of XJTLU's campus buildings, offering visitors a tangible representation of the institution's educational philosophy and strategic vision (see *Figure 14*).

Figure 14.
Figures presenting XJTLU's pedagogical model

Source: photos taken by the authors.

The first displayed board (left side of *Figure 14*) illustrates XJTLU's concept of an "Innovative Ecosystem" centred on the College of Industry-Entrepreneurs (CIE). This college functions as the nucleus of a system that links government, industry, universities, science, and talent in a circular and mutually generative relationship. The model operates along two interdependent chains: the "Innovation Chain" (创新链) and the "Capital Chain" (资金链). These represent the flow of intellectual and financial capital, binding education and industry together. The key concepts are co-construction (共建), co-sharing (共享), symbiotic innovation (共生共创), and creating ecological dividends (共创生态红利): they articulate a pedagogical philosophy that treats learning and innovation as mutually generative social processes. Some affiliated agencies/institutions (e.g. the Suzhou XIPU Education Development Foundation, the HeXie Research Fund for Ecological Management, and the Industry and Strategic Resource Alliance) provide the institutional scaffolding for this innovation ecosystem, ensuring continuity between research, teaching, enterprise incubation, and social contribution.

The middle part of *Figure 14* showing "XJTLU X-Eco Mall", visualises how this ecosystem is operationalised and developed into an education model that is fully open to the external world. The X-Eco Mall – described also in *Box 7* – is a meta-platform for learning, innovation, and entrepreneurship, integrating resources from academia, industry, government, and society. At its core lies the integration of industry, academia, research, government, and society,supported by world-class campus infrastructure, digital and AI platforms, and global networks of partners. Within this environment, students, faculty, and enterprises share the same space of production and experimentation. The Ambassador and Membership programmes mirror industrial ecosystems, where stakeholders participate through multi-level cooperation and differentiated services. The X-Eco Mall blurs the boundary between learning environment and innovation economy: it embodies the principle that education should be both productive and entrepreneurial, enabling students to acquire competencies by engaging in real innovation cycles – prototype design, startup incubation, and collaborative research – rather than through classroom simulation.

Finally the image at the right hand of *Figure 14* provides a broader educational blueprint that situates the previous two models within the university's institutional evolution. XJTLU identifies four major developmental stages described in *Box 7*. This scheme also displays the fourth development stage (XJTLU 4.0), the creation of "ecological university" which is symbolised mostly by the X-Eco Mall, where learning, innovation, and production form a continuous, self-reinforcing cycle. Around this framework stand the academies that enact the ecosystemic vision – such as the Academy of Industrial Technology (JITRI), Academy of Future Education, Academy of Film and Creative Technology, and the College of Industry–

Entrepreneurs – each functioning as a node that connects teaching with industry and social innovation.

Taken together, these three diagrams visualise a university that has redefined the meaning of UII. Through the CIE and the X-Eco Mall, XJTLU acts simultaneously as an educator, innovator, and platform operator. Its unique pedagogical philosophy (syntegrative education) positions learning as a dynamic, ecosystemic process embedded in networks of innovation and entrepreneurship.

From a comparative perspective, XJTLU's ecosystemic pedagogical model could be seen as parallelling Chengdu Jincheng College's Industry–Education Integration Ecosystem model, yet it extends the concept in scale and sophistication. Whereas Jincheng focuses on applied teaching and industry-linked curricula at the institutional level, XJTLU transforms the entire university into a living ecosystem where research, education, enterprise creation, and social development coexist. Both models exemplify China's ongoing pedagogical revolution in higher education: a transformation from a knowledge-transmission paradigm to one of knowledge co-creation and ecological learning, where education functions as the generative core of innovation ecosystems.

5 Conclusions

Our second fact-finding mission to China has significantly enriched our prior knowledge about China's UII policies and practices. It has confirmed that UII policies have reached the micro levels of higher education, significantly transforming the way universities and their academic staff work, teaching and learning is organised and people think about effective teaching in higher education. We could identify a high number of concrete examples supporting our preliminary assumptions about the transformative impact of university-industry integration.

While our first case study in Shenzhen and the Greater Bay Area highlighted the front-runner role of a globally connected, export-driven economic hub, this second case shows how UII can take root in a markedly different regional ecosystem, shaped by inland industrial restructuring, strong municipal leadership, intense competition for talent, and distinct cultural-historical legacies. We could observe, across the universities and industry colleges we visited, a shared conviction that UII is not an appendage to higher education but it has evolved into an essential mechanism for transforming the quality, relevance, and organisation of teaching and learning.

One of the key findings of this mission is that the emergence of an ecosystemic approach to UII across China can produce a major impact on education, skills-development, industrial production, and innovation. These are increasingly understood as interconnected components of a single system. This conceptual shift manifests itself in policy language, institutional strategies, and tangible educational practices. The changes are reinforced by China's concurrent national agenda of curriculum reform, disciplinary integration, and pedagogical modernization, all of these interacting with UII in a mutually reinforcing way. As demonstrated across several institutions, innovative pedagogies – such as project-based learning, scenario-based learning, dual-mentor systems, real-world simulation, and AI-supported teaching – are not only made possible by UII but are often driven by it. UII has thus become a catalyst for what we can legitimately call pedagogical revolution.

The Chengdu–Chongqing region also demonstrates strong regional/local ownership of UII. Despite differences in institutional types and missions, we found a consistently high level of

commitment to the UII idea across research universities, universities of applied science, vocational colleges, as well as public and independent/private institutions. This commitment is underpinned by a combination of enabling local/regional policies, such as the 2021 Outline Plan for the Construction of the Chengdu-Chongqing Twin-City Economic Circle or the Sichuan's 2018 Implementation Opinions on Deepening Industry-Education Integration. This localisation process and related governance models encourage local experimentation, cross-sector alliances, and differentiated pathways. The high number of new and diverse industry colleges, in particular, reflect a new institutional form tailored to local economic clusters and talent needs.

Another new key insight gained during our fact-finding mission concerns the sustainability dimension of UII. The region is strongly aligned with national dual-carbon targets, green-industry catalogues, and ecological-civilization goals. In this context, UII does not merely produce better employment outcomes; it also channels higher education into strategic sectors such as green logistics, green building materials, low-carbon construction, and digital energy systems. The cases observed at CCMC's SF Express Industry College, Chengdu Technological University, Southwest Jiaotong University or Sichuan University illustrate how sustainability considerations can shape both curricular content and the design of learning environments. UII thus connects pedagogical innovation with broader societal transformation and supports China's transition toward a green and high-quality development model. Additionally, the transformation of educational practices driven by UII also contributes to the sustainability of higher education as a system playing a key role in improving the economic performance and quality of life.

The case study also highlights important developmental tensions, such as the visible mismatch between rapidly expanding infrastructure and still-emerging activity in some laboratory spaces. However, when seen through the broader theoretical lens of China's modernization dilemmas, these phenomena appear less as signs of inefficiency than as characteristic features of a system that builds capacity ahead of capability and relies on experimentation, redundancy, and local initiative. The region's policy environment, institutional culture, and strong administrative steering suggest that these empty spaces are likely to be filled over time as new partnerships, project pipelines, and pedagogical capacities mature.

From a Hungarian and European perspective, this case study offers several lessons. It underscores the importance of viewing UII not as a narrow employability tool but as a systemic modernization strategy capable of reshaping curricula, pedagogy, governance, and institutional identity. It demonstrates that effective UII requires conceptual clarity, stable governance mechanisms, and long-term investment. These are elements that Chinese institutions have begun to articulate with increasing sophistication. One possible message to Hungarian and European stakeholders, possibly interested in applying UII-related Chinese ideas and practices in the European context, is that that national policies should enable local experimentation in the framework of strong regional-industrial ecosystems, which can produce differentiated yet coherent implementation pathways.

For European universities, often navigating a landscape of rigid disciplinary boundaries, high autonomy but fragmented funding, and less direct state steering, the Chengdu-Chongqing model might present a provocative contrast. Its lessons may lie less in direct replication of its institutional mechanisms (such as the creation of industry colleges), and more in its demonstration of how a powerful, shared strategic narrative – backed by aligned policy and funding – can unlock institutional agility and foster a culture of pedagogical co-creation with the economy and society.

Studying the Chengdu-Chongqing case might challenge the European policy paradigm of university autonomy as purely a safeguard against state interference. Autonomy here is exercised within a clear, long-term national strategic framework that actively creates the conditions for integration. For European policymakers, the key message of the Chengdu-Chongqing case might be not to replicate China's state-directed model, but to recognize that focusing on competitive, project-based university-industry cooperation may be insufficient. The question is how to support the emergence of sustainable, highly institutionalised ecosystems**,** using tools such as strategic funding, innovation incentives, and regulatory measures to incentivize universities and industry to build deep, co-governed institutional partnerships, similar to what we have seen in the Chengdu and Chongqing area.

The Chengdu-Chongqing case might inspire not only education sector policy makers in Europe but also those who design and implement labour and skills policies. The Chengdu-Chongqing model seems to confirm that resilient skills supply chains requires more than forecasting and funding training places, but it also necessitates a certain level of physical and institutional fusion of learning and production. While Europe excels at creating sectoral skills councils and frameworks of skills oriented social dialogue, the Chinese approach seem to go one step further by embedding entire production lines and corporate R&D teams within university campuses, turning the "skills pipeline" into a real-time "skills loop". The imperative for European skills policies is to move beyond work placements towards co-investing with industry in what we could perhaps call "skills foundries", that is, shared, high-tech facilities on campus where curricula are dynamically built around live manufacturing processes and innovation challenges. This might close the time-lag between emerging industry needs and the curriculum's responses, making the skills ecosystem more anticipatory and adaptive.

Overall, the Chengdu-Chongqing case confirms that China's UII reforms are not isolated initiatives but components of a broad and ambitious transformation of higher education. The evidence collected during our mission supports a cautiously optimistic view: although challenges remain, the structures, incentives, and cultural conditions necessary for sustained UII implementation are firmly in place. The Chengdu-Chongqing region, with its distinctive blend of industrial dynamism, regional governance, and cultural heritage, exemplifies how UII can serve as a powerful engine of educational modernization, regional development, and sustainable transformation.

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7 Annexes

7.1 Annex 1: List of figures

7.2 Annex 2: Report on the fact-finding mission

Background and goals

Between October 2 and October 25, 2025, a fact-finding mission was conducted in China to support the development of a case study, as outlined in the work plan of the project titled *"University–Industry Integration Policies and Practices in China – Potential Applications in Hungary."* The project is funded by the Hungarian government and is hosted and implemented by Wekerle International University (WIU) in cooperation with Mathias Corvinus College (MCC). The mission was carried out by the project's professional lead, Prof. Dr. Gábor Halász, and research assistant Mrs. Min Huang, who are also the authors of this report.

The primary target cities for the mission were Chengdu and Chongqing. However, thanks to the integration of multiple missions, additional visits were made to other locations. Specifically, the case study mission was combined with two other initiatives:

- The first was the third Asia fact-finding mission organized and funded by MCC's Learning Institute as part of its *"Learning from Asia in Education" (LfA)* project. This allowed one of the authors to spend several days in Singapore to explore university–industry cooperation, and enabled both authors to visit Suzhou for the same purpose. As a result of this combination, the travel costs for Prof. Halász were almost entirely covered by the LfA project budget.

- The second overlapping mission was undertaken by the president and vice-rector of WIU, contributing to the university's network-building strategy.

The itinerary of the case study mission is detailed in Annex 1, which also illustrates how the three missions were coordinated and how the composition of the visiting delegation evolved accordingly. The institutions visited and individuals met are listed in Annexes 2 and 3.

The primary objective of the case study mission was to collect data on university–industry interaction (UII) policies and practices in the Chengdu–Chongqing economic region. This area was selected for its distinctive context, which differs significantly from that of the first case study conducted in Shenzhen and the Greater Bay Area. The UII-related specificities of the Chengdu–Chongqing economic region will be presented in the case study.

Organisation of the mission

As with our previous mission, this visit was preceded by an extensive and intensive exploration of the development and current state of higher education in the Chengdu-Chongqing region. A substantial body of relevant policy documents and academic publications was collected and reviewed prior to the fieldwork. Numerous universities and experts were contacted, and the program of visits was carefully negotiated in advance through sustained online communication.

This preparatory phase proved significantly more challenging than for our first case study. We encountered a noticeably lower level of openness from institutions and individuals: approximately half of our outreach emails went unanswered, and one previously confirmed visit was cancelled. Nevertheless, all elements of our finalized program were successfully implemented. At each institution we visited, we were warmly received and able to gather valuable insights and information.

In Singapore, Suzhou, Chongqing, and Chengdu, we visited a total of 20 universities, schools, and research institutes, along with 3 companies (see Annex 2). Our local partners were highly receptive, generously sharing relevant information and helping us navigate both the general landscape of UII policy and its specific manifestations in the Chongqing–Chengdu economic area.

We received substantial coordination and organizational support from Hungarian foreign services in Singapore and Chongqing. Several visits, particularly those in Chengdu, were directly facilitated by WIU.

The insights gained through face-to-face meetings – combined with the documents reviewed beforehand and those collected during the visits – provided a robust foundation for the development of our second case study. Many host universities organized workshops and seminars where staff members presented their institution's UII practices. In most cases,

presentation materials (PPTs) were shared with us, becoming a valuable source of information for our case study.

Additionally, the visits provided an opportunity to share a link to an international comparative survey of business students, conducted as part of the doctoral research of one of the authors. This survey enables us to compare how students in China and Hungary perceive the impact of industry-related experiences on their instructors.

Outcomes

General outcomes

The primary outcome of the mission is the extensive data collected for our second case study, focusing on Chongqing and Chengdu. The volume and quality of this data will enable us to produce a case study that significantly deepens our understanding of China's university–industry interaction policies and practices. It already allows us to formulate preliminary conclusions ahead of the full case study (see next section).

Beyond this, the fact-finding mission yielded several additional outcomes:

Enhanced conceptual insight: We gained a deeper understanding of China's UII landscape, which will inform the further development of our project's conceptual and theoretical frameworks.

Expanded professional network: We established a particularly rich network of professional contacts, connecting us with nearly one hundred individuals across China and Singapore (see Annex 3). This network can support future activities such as hypothesis testing (by inviting partners to validate them) and initiating institutional partnerships with Hungarian universities—one of the key goals of our project.

As with our first data-collection mission, this visit also produced valuable institutional outcomes for both WIU and MCC. Several partners expressed interest in collaborating with WIU, recognizing its unique position as a university owned by a Chinese education provider in a country where China is investing heavily in industry and maintains a strong corporate presence.

Through our presentations and lectures, MCC gained increased visibility in China, particularly in the Chongqing/Chengdu region. The mission's outcomes align well with MCC's "Learning from Asia" initiative. The project was introduced to several partners, and multiple copies of the book "Learning from Asia in Education" were distributed. Many partners expressed interest in the initiative, and several PhD candidates indicated their desire to join MCC's Asian PhD Students Hub. We received strong encouragement to continue developing the Learning from Asia in Education project.

Preliminary conclusions

Although the writing of the second case study is still in its early stages, several preliminary conclusions can already be drawn from our recent data collection mission:

- *UII as a core component of modernization:* It has once again been confirmed that China's university–industry interaction policy is in an intensive phase of implementation. UII has become a firmly embedded and unquestioned element of both national and local economic modernization strategies. Institutional leaders in the

Chongqing/Chengdu region demonstrated a high level of awareness and commitment to this policy, actively shaping innovative environments where university education and industrial production are deeply and effectively integrated.

- *Emergence of a new conceptual framework:* We observed the development of an advanced conceptual and theoretical framework for UII, characterized by a form of "ecosystem thinking." In this model, education, skills development, industrial production, and innovation are not only institutionally but also conceptually interconnected. The skills-oriented quadruple and quintuple helix models are fully operational and will be featured in our second case study.
- *Pedagogical innovation driven by UII:* A notable new finding is that UII policies and practices are catalyzing disruptive innovations in higher education, resulting in what can be described as a "pedagogical revolution." We encountered numerous examples of highly innovative teaching practices that are both supported by and supportive of UII, indicating a mutually reinforcing relationship between pedagogical transformation and industry collaboration.
- *Regional and institutional diversity:* Our mission confirmed significant local and regional variation in the implementation of UII across China. This diversity is not incidental: it is actively encouraged by the national government. Local actors (provincial, municipal, institutional) initiate context-specific, bottom-up solutions that contribute to a highly differentiated UII landscape and foster innovative policy and coordination mechanisms. Institutional diversity is also pronounced, ranging from minimal to deep integration of university teaching and industrial production—even within the same university across different programs and projects.
- *Regional specificities in Chongqing/Chengdu:* The Chongqing/Chengdu economic area exhibits unique developments shaped by the specific nature of its industrial base. A shared feature with the Greater Bay Area (GBA) is the strong recognition – by both political and corporate leaders – of the strategic importance of human resources for economic development, social progress, and global competitiveness.
- *UII across university types:* In Chongqing and Chengdu, UII-related activities are robust not only in universities of applied sciences but also in research universities. The distinction between these two types of institutions appears less pronounced than in Shenzhen. We observed applied science universities with exceptionally advanced pedagogical practices, while research universities often integrate skills development as a core component of their research activities. UII seems to foster a more organic connection between research and teaching.
- *Implications for Hungary:* Based on the insights emerging from our second case study – currently in the data analysis phase – we can once again formulate relevant conclusions for Hungary. Elements of Hungary's higher education development strategy that promote university–industry cooperation (e.g. dual training programs and the establishment of dedicated UIC units within institutions) could be further developed into a more coherent and advanced model, drawing on Chinese experiences. Our earlier conclusion regarding the need for strong conceptual and theoretical foundations for designing more integrated and effective UIC policies has been reaffirmed. The practices observed in Chongqing and Chengdu offer valuable input for this effort.

Budapest, 2025.10.26

Annexes to the travel report

Travel report annex 1: The program of the mission

DATE	DAY	LOCATION	ACTIVITY	PARTICIPANTS/ MISSONS
October 3	Friday	Budapest	Departure	JS, GH, FM
October 4	Saturday	Singapore	Arrival to Singapore	JS, GH, FM
October 5	Sunday	Singapore	Visiting cultural institutions	JS, GH, FM
October 6	Monday	Singapore	LfA Book presentation, consulting persons attending the event	JS, GH, FM
October 7	Tuesday	Singapore	Visit to Yusof Ishak Institute (ISEAS) and Singapore Institute of Technology	JS, GH, FM; JM, FB
October 8	Wednesday	Singapore	Visit to Institute of Adult Learning, Singapore, travel to China	JS, GH, FM, JM, FB
October 9	Thursday	Suzhou	Visit to Xi'an Jiaotong-Liverpool University (XJTLU), meeting with the deans of several schools of XJTLU	JS, GH, FM; JM, FB, HM
October 10	Friday	Suzhou	Visit to Xi'an Jiaotong-Liverpool University (XJTLU), meeting with the deans of industry schools of XJTLU at Taicang Campus	JS, GH, FM; JM, FB, HM
October 11	Saturday	Chongqing	Attending the conference opening event at Southwest University	GH, HM
October 12	Sunday	Chongqing	Rest and preparing visits	GH, HM
October 13	Monday	Chongqing	Visiting Chongqing University and Chongqing City Management College	JS, GH, FM; JM, FB, HM
October 14	Tuesday	Chongqing	Visiting Southwest University	JS, GH, FM; JM, FB, HM
October 15	Wednesday	Chengdu	Travelling from Chongqing to Chengdu, visiting Southwest Jiaotong University	GH, HM, JM,
October 16	Thursday	Chengdu	Visiting Sichuan Top Information Technology Vocational College and Southwest Jiaotong University Hope College	JS, GH, FM; JM, FB, HM
October 17	Friday	Chengdu	Visiting Leduo Chain Store and Southwestern University of Finance and Economics	JS, GH, FM; JM, FB, HM
October 18	Saturday	Chengdu	Rest, preparing visits, writing the case study	GH, HM
October 19	Sunday	Chengdu	Rest, preparing visits, writing the case study, visiting museums	GH, HM
October 20	Monday	Chengdu	Visiting Sichuan University	GH, HM
October 21	Tuesday	Chengdu	Visiting Chengdu Technological University (CDTU)	GH, HM
October 22	Wednesday	Chengdu	Preparing next visits and writing the case study	GH, HM

October 23	Thursday	Chengdu	Visiting Polus International College	GH, HM
October 24	Friday	Chengdu	Visting Chengdu Jincheng College	GH, HM
October 25	Saturday	Chengdu	Travelling back to Europe	GH, HM

Legend:

GH – Gábor HALÁSZ (Case study mission + MCC LfA mission)
MH – Min HUANG (Case study mission)
JS – János SETÉNYI (MCC LfA mission)
MF – Mizi FAN (MCC LfA mission)
JM – Junkai MA (WIU mission)
FB – Ferenc BOGNÁR (WIU mission)

Travel report annex 2: List of institutions visited

Universities/schools/research institutes	
Temasek Polytechnic	Singapore
Singapore Institute of Technology	Singapore
Yusof Ishak Institute (ISEAS)	Singapore
Lifelong Learning Institute	Singapore
Institute of Adult Learning	Singapore
Raffles Music College	Singapore
Xi'an Jiaotong-Loverpool University (XJTLU)	Suzhou
Southwest University	Chongqing
Chongqing University	Chongqing
Chongqing City Management College	Chongqing
Southwest University	Chongqing
Southwest University Secondary School	Chongqing
Southwest Jiaotong University	Chengdu
Sichuan Top Information Technology Vocational College (STITVC)	Chengdu
Southwest Jiaotong University Hope College (SWJUHC)	Chengdu
Southwestern University of Finance and Economics (SWUFE)	Chengdu
Sichuan University	Chengdu
Chengdu Technological University (CDTU)	Chengdu
Polus International College	Chengdu
Chengdu Jincheng College	Chengdu
Companies	
Leduo Chain Store	Chengdu
Chengdu Tangyuan Electric Co., Ltd	Chengdu
Sichuan Wuzhou Tendering & Bidding Agency Co., Ltd.	Chengdu

Note: The institutions in coloured rows were not physically visited but we met people (leaders) representing them

Travel report annex 2: List of persons met

Name	**City**	**University/position**
1) Kharen PHUAH	Singapore	Temasek Polytechnic
2) Lim Lin DA	Singapore	Temasek Polytechnic
3) Lim Sok Mui MAY	Singapore	Singapore Institute of Technology

4)	Hee Jhee JIOW	Singapore	Singapore Institute of Technology
5)	Siwage Dharma NEGARA	Singapore	Yusof Ishak Institute (ISEAS)
6)	Soon Joo GOG	Singapore	Lifelong Learning Institute
7)	Yang SILIN	Singapore	Institute of Adult Learning
8)	Jeremy KOH	Singapore	Singapore Raffles Music College
9)	Xiaobo XU	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
10)	Lei LIANG	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
11)	Qian LIU	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
12)	Xianchang YU	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
13)	Xinning WANG	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
14)	Ruisi FAN	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
15)	Junsong Chen	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
16)	Yuan Virtanen	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
17)	Andrew King	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
18)	BO Fang	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
19)	Furong Jia	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
20)	Huiyang Li	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
21)	Han Li	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
22)	Hanqi Qian	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
23)	Peilin Zuo	Suzhou	Xi'an Jiaotong-Liverpool University (XJTLU)
24)	Muying DU	Chongqing	Southwest University
25)	Dan YANG	Chongqing	Southwest University
26)	Chang TAN	Chongqing	Southwest University
27)	Baoling ZOU	Chongqing	Southwest University
28)	FAN Kexing	Chongqing	Southwest University Secomdary School
29)	YOU Wei	Chongqing	Southwest University Secomdary School
30)	TAN Juan	Chongqing	Southwest University Secomdary School
31)	Xiang GAO	Chongqing	Chongqing University
32)	Ling OU	Chongqing	Chongqing University
33)	Jing PENG	Chongqing	Chongqing University
34)	Liang ZHANG	Chongqing	Chongqing University
35)	Yun QIU	Chongqing	Chongqing City Management College
36)	Yuzhong SUN	Chongqing	Chongqing City Management College
37)	Yiji YUE	Chongqing	Chongqing City Management College
38)	JIANG Chaozhe	Chengdu	Southwest Jiatong University
39)	ZHANG Guoguo (张国国)	Chengdu	Chengdu Tangyuan Electric Co., Ltd
40)	Wu Jianwei	Chengdu	Sichuan Top Information Technology Vocational College
41)	Luo Junqiang	Chengdu	Sichuan Top Information Technology Vocational College
42)	Ma Wenjing	Chengdu	Sichuan Top Information Technology Vocational College
43)	Bai Junfeng	Chengdu	Sichuan Top Information Technology Vocational College
44)	GUAN Peicai	Chengdu	Sichuan Top Information Technology Vocational College
45)	Zhang Sisi	Chengdu	Sichuan Top Information Technology Vocational College
46)	Qing Xun	Chengdu	Sichuan Top Information Technology Vocational College
47)	Feng Yu	Chengdu	Sichuan Top Information Technology Vocational College
48)	Chen Yemei	Chengdu	Southwest Jiaotong University Hope College
49)	Tan Qian	Chengdu	Southwest Jiaotong University Hope College
50)	Yang Qing	Chengdu	Southwest Jiaotong University Hope College
51)	Liu Xi	Chengdu	Southwest Jiaotong University Hope College
52)	Wang Lipeng	Chengdu	Southwest Jiaotong University Hope College
53)	Chen Shi	Chengdu	Southwest Jiaotong University Hope College

54) Fu Tianjie	Chengdu	Southwest Jiaotong University Hope College
55) Zhong Chaolan	Chengdu	Southwest Jiaotong University Hope College
56) Lu Weiji	Chengdu	Southwest Jiaotong University Hope College
57) ZHU Nan,	Chengdu	Southwestern University of Finance and Economics
58) ZHANG Yun	Chengdu	Southwestern University of Finance and Economics
59) Suwal Sunil	Chengdu	Southwestern University of Finance and Economics
60) WU Zikang	Chengdu	Southwestern University of Finance and Economics
61) ZHOU Liyun	Chengdu	Southwestern University of Finance and Economics
62) MENG Gangwen	Chengdu	Leduo Chain Store
63) GU Juan	Chengdu	Sichuan Wuzhou Tendering & Bidding Agency Co., Ltd.
64) CAO Qilin	Chengdu	Business School of Sichuan University
65) LIAO Yi	Chengdu	Business School of Sichuan University
66) LI Linheng	Chengdu	Business School of Sichuan University
67) LI Boyi	Chengdu	Business School of Sichuan University
68) LUO Qiang	Chengdu	Chengdu Technological University (CDTU)
69) TANG Xin Zhi	Chengdu	Chengdu Technological University (CDTU)
70) XU Mei	Chengdu	Chengdu Technological University (CDTU)
71) YE Rongfang	Chengdu	Chengdu Technological University (CDTU)
72) HONG Bo	Chengdu	Polus International College
73) MA Ya	Chengdu	Polus International College
74) ZHUANG Hong	Chengdu	Polus International College
75) DENG Lü	Chengdu	Polus International College
76) DING Nanjuan	Chengdu	Polus International College
77) JIANG Ke	Chengdu	Polus International College
78) SHUI Mingli	Chengdu	Polus International College
79) GUO Yingyan	Chengdu	Polus International College
80) KANG Yan	Chengdu	Polus International College
81) WANG Peili	Chengdu	Polus International College
82) LI Guangrong	Chengdu	Chengdu Jincheng College
83) WANG Weicheng	Chengdu	Chengdu Jincheng College
84) LUO Yan	Chengdu	Chengdu Jincheng College
85) YANG Hong	Chengdu	Chengdu Jincheng College
86) YANG Zeming	Chengdu	Chengdu Jincheng College
87) WANG Wenxian	Chengdu	Chengdu Jincheng College
88) ZHAN Lian	Chengdu	Chengdu Jincheng College
89) HUANG Ying	Chengdu	Chengdu Jincheng College
90) PENG Chaohua	Chengdu	Chengdu Jincheng College
91) YI Lan	Chengdu	Chengdu Jincheng College
92) HONG Yijiang	Chengdu	Chengdu Jincheng College
93) QIU Xiaofang	Chengdu	Chengdu Jincheng College
94) ZHANG Hongyu	Chengdu	Chengdu Jincheng College
95) WEI Sijia	Chengdu	Chengdu Jincheng College
96) DUAN Wei	Chengdu	Chengdu Jincheng College
97) XIN Sijing	Chengdu	Chengdu Jincheng College
98) LI Yayuan	Chengdu	Chengdu Jincheng College

7.3 Annex 3: Two narratives and two modernities

Two Modernities in Chinese Higher Education: SCMP's Crisis Narrative vs. UII as Pedagogical Modernization

This reflection produced by AI contrasts the pessimistic portrayal of Chinese STEM education in *The South China Morning Post* (SCMP, 25 Oct 2025) with our direct field observations from Chengdu and Chongqing, where university–industry integration reforms appear dynamic, modern and pedagogically transformative.

1. A Tale of Two Modernities

In late 2025, *The South China Morning Post* published a long investigative piece entitled *"The STEM crisis in China's universities: how outdated courses are wasting talent."* Its narrative was familiar: Chinese higher education—rigid, bureaucratic, obsessed with theory—allegedly fails to produce innovative, employable graduates. Professors lamented curricula "twenty years out of date," while university leaders warned that China might miss the window of technological revolution.

Yet the reality encountered during fieldwork in western China offers a strikingly different picture. In Chengdu, Chongqing and other inland innovation corridors, universities such as Southwest Jiaotong University, Southwest University of Finance and Economics, Chengdu Technological University, and numerous applied colleges have built **production-type training bases**, **enterprise-run industry colleges**, and **dual-mentor apprenticeship programmes**. Teachers and students jointly design projects with enterprises such as CRRC, SF Express and BOE. Far from being "locked in classrooms," these campuses are alive with cross-sector collaboration, simulation labs, and living-lab ecosystems.

How can the same country appear both "obsolete" and "avant-garde"?

2. Structural Biases in the Crisis Narrative

The SCMP article's tone reflects three structural biases typical of international English-language reporting on Chinese education:

1. **Elite bias.**
   Journalists and quoted experts come almost exclusively from first-tier universities—Peking, Tongji, Shanghai Jiao Tong—whose mission remains research prestige rather than applied innovation. Their "crisis" is genuine within that niche: slow curricular reform, administrative overload, and evaluation systems privileging papers over teaching. But this tells us little about the rapidly modernizing *applied* tier of Chinese higher education.
2. **Temporal lag.**
   The critique captures the legacy of pre-2017 higher education, before the State Council's landmark *Opinion on Deepening Industry–Education Integration*. Since then, a new generation of institutions—应用型本科院校 and 高职院校—has been re-engineered as **learning factories** and **regional innovation nodes**. The SCMP's narrative simply has not caught up.
3. **Western benchmarking.**
   The article equates educational success with frontier research and global rankings. In contrast, China's current reform logic measures modernity through **systemic**

contribution—the capacity of universities to serve industrial upgrading, regional development and national strategies. From this perspective, "modern" does not mean mimicking MIT; it means embedding the university inside the nation's productive ecosystem.

3. UII as Pedagogical Modernization

The reality in Chengdu and Chongqing suggests a deeper transformation than merely adding AI courses or renaming majors. UII functions as a **pedagogical modernization project**, reshaping how teaching, learning and professional identity are organized.

- **Governance.** Universities no longer act as isolated ivory towers but as *platform institutions* co-governed with enterprises and local governments. The rise of *产教融合中心* (Industry–Education Integration Centres) institutionalizes this mediation.
- **Curriculum.** Teaching now blends classroom theory with production-line simulation, joint project studios, and apprenticeship rotations. Knowledge is acquired through *doing*, not recitation.
- **Faculty identity.** Teachers increasingly identify as *dual professionals*—both educators and practitioners. Their self-efficacy grows through contact with industry, not through publication counts.
- **Student formation.** Learning environments cultivate professional confidence and teamwork, aligning education with emergent regional industries such as smart logistics, new materials, or urban rail transit.

This model represents a new kind of modernity—**"practice-driven modernity"**—grounded in the fusion of education, science and production (*科教融汇*).

4. Cultural and Regional Factors

The Ba-Shu cultural region (Sichuan-Chongqing) historically values craftsmanship, pragmatism and adaptive innovation. Local governments leverage these traditions to champion *校企共建* (co-building of schools and enterprises). Hence, while eastern universities dominate global rankings, the western region has become a laboratory for China's pedagogical experimentation.

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5. Reconciling the Contradiction

The apparent contradiction between the SCMP's "crisis" and the field's "vitality" is thus not a contradiction at all but a **dual modernization process**:

Dimension	Elite Research Universities	Applied / UII Universities
Reform Driver	International scientific competition	National industrial modernization
Modernity Model	Knowledge-centred	Practice-centred
Main Challenge	Bureaucratic inertia	Sustainable industry partnership
Narrative Tone	Crisis of relevance	Experiment of renewal

Both modernities coexist. The SCMP captures the frustrations of the former; field observation captures the momentum of the latter.

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6. Concluding View

From a Western media vantage point, China's higher education still fights the ghosts of rote learning and central control. From within the institutions implementing *产教融合*, one sees a different historical arc: education being re-engineered as a **co-productive system**, blending pedagogy, technology and enterprise.

Rather than a "STEM crisis," China may be experiencing a **pedagogical revolution**—one that Western commentary struggles to see because it happens not in lecture halls of Beijing but in the learning factories of Chengdu, the logistics bases of Chongqing, and the silent laboratories where teachers and engineers co-teach future technicians.

In short: *The SCMP reports an ending; fieldwork reveals a beginning.*

Reference: Peng, Dannie (2025). The STEM crisis in China's universities: how outdated courses are wasting talent. Many Chinese degrees prioritise theory over practical experience and fail to prepare students for real-world employment, critics say. South China Morning Post (25 Oct 2025) (https://www.scmp.com/news/china/science/article/3329310/stem-crisis-chinas-universities-how-outdated-courses-are-wasting-talent?module=perpetual_scroll_0&pgtype=article)

7.4 Annex 4: Industry colleges at Chengdu Jincheng College

Category	Chinese Name (中文名称)	English Name / Translation	Corporate / Institutional Partner (合作单位)	Focus Area
High-Tech & Digital Industry Colleges	锦城·华为新一代信息技术产业学院	*Jincheng–Huawei Next-Generation Information Technology Industry College*	Huawei (华为)	ICT, cloud computing, data networking
	锦城·百度人工智能与大模型产业学院	*Jincheng–Baidu Artificial Intelligence and Large-Model Industry College*	Baidu (百度)	AI, big data, generative models
	锦城·浪潮工业互联网产业学院	*Jincheng–Inspur Industrial Internet Industry College*	Inspur (浪潮)	Industrial IoT, smart manufacturing platforms
Media & Digital Commerce	锦城·汉沙传媒新媒体产业学院	*Jincheng–Hansha Media New Media Industry College*	Hansha Media (汉沙传媒)	Digital media production and communication
	锦城·OST传媒直播电商产业学院	*Jincheng–OST Media Live-Streaming E-Commerce Industry College*	OST 传媒	Live e-commerce and social marketing

Category	Chinese Name (中文名称)	English Name / Translation	Corporate / Institutional Partner (合作单位)	Focus Area
	锦城·新道数智商科产业学院	*Jincheng–Xindao Digital Business Industry College*	Xindao Tech (新道科技, UFIDA Group)	Digital business education, ERP simulation
Smart Manufacturing & Engineering	锦城·中控智造现代产业学院	*Jincheng–Zhongkong Smart Manufacturing Modern Industry College*	SUPCON (浙江中控)	Automation, industrial control systems
	喜马拉雅3D打印产教融合学院	*Himalaya 3D Printing Industry–Education Integration College*	Himalaya 3D (喜马拉雅)	Additive manufacturing, 3D printing
	锦城·欧彭智能机器人产教融合学院	*Jincheng–Oupeng Smart Robotics Integration College*	Oupeng Robot (欧彭机器人)	Intelligent robotics, AI hardware
Finance, Accounting & Tourism	锦城·香税物税务师现代产业学院	*Jincheng–Xiangshuiwu Tax Accountancy Modern Industry College*	Xiangshuiwu (香税物)	Applied tax and accounting training
	锦城·西部税谷现代产业学院	*Jincheng–Western Tax Valley Modern Industry College*	Western Tax Valley (西部税谷)	Tax services and fiscal digitalization
	锦城·正睿艺文旅演艺产业学院	*Jincheng–Zhengrui Cultural Tourism Performing Arts Industry College*	Zhengrui Arts (正睿艺)	Culture and tourism management, performing arts
Public Service & Emergency Response	锦城·四川省专家工作站	*Sichuan Provincial Expert Workstation at Jincheng College*	Sichuan Provincial Authorities	Expert consulting and technology transfer
	锦城·四川红十字应急救援救护培训示范中心	*Jincheng–Sichuan Red Cross Emergency Rescue and First Aid Training Demonstration Center*	Sichuan Red Cross (四川红十字会)	Public health and emergency training

Category	Chinese Name (中文名称)	English Name / Translation	Corporate / Institutional Partner (合作单位)	Focus Area
Digital Economy & Applied Innovation Labs	锦城·元智盈创数字经济（产业互联）联合实验室	*Jincheng–Yuanzhi Yingchuang Digital Economy (Industry Internet) Joint Laboratory*	Yuanzhi Yingchuang (元智盈创)	Digital economy and industry internet experimentation

Source: This table was created with AI assistance.

7.5 Annex 5: The university-industry control continuum

Stage	Control Orientation	Typical Features	Representative Case	Type of Integration	Notes
1 **University-only control**	Academic leadership; industry only as reference	• Pedagogical reform within university • Scenario-based, cross-disciplinary design • Industry serves mainly as context or inspiration	**SWUFE (Zhou Fanyin et al., 2025)** – "跨界融合视域下财经教育场景化教学探索与实践"	**UII as pedagogical modernization**	Teachers simulate real-world conditions using data and cases; industry not directly involved in course design or delivery.
2 **University-led with industry input**	University designs; industry participates episodically	• Enterprise experts invited for co-teaching or evaluation • Real enterprise data or cases integrated • No shared governance	**SWUFE × Ping An P&C Sichuan Branch (2025)** – Co-built *Risk Mitigation and Insurance Innovation* course	**UII as co-delivery**	Industry mentors design segments and teach modules, but curriculum remains under university accreditation and control.

Stage	Control Orientation	Typical Features	Representative Case	Type of Integration	Notes
3 **Joint design & delivery**	Shared curriculum planning and delivery	• Formal joint program / co-named courses • Enterprise mentors supervise projects • Curriculum co-authored, still university-governed	**SWUFE Accounting School – "Enterprise Mobile Classroom"**	**UII as joint implementation**	Executives and engineers help design courses, cases, and supervise student theses within formal partnership framework.
4 **Joint governance & branding**	University and enterprise share management structures	• Co-named "Industrial College" or "Joint Lab" • Curriculum and teaching jointly governed • National or provincial UII platform affiliation	**SWJTU × CRRC Times Microelectronics College**	**UII as institutional partnership**	Co-governed unit inside university; CRRC defines practice projects and provides assessment; university handles academic credit.
5 **Equity co-ownership (on-campus company)**	Industry holds structural and operational control	• Joint legal entity on campus • Enterprise equipment, staff, and production lines integrated into teaching • Shared profit/risk system	**Chengdu Technological University × Foxconn – "Chenggong Fuchuang Intelligent Manufacturing Industrial College"**	**UII as enterprise-driven co-ownership**	Enterprise co-owns facilities and curriculum; teaching follows industrial production logic; university acts as partner and credentialing body.
6 **Enterprise-run program**	Industry dominant	• Enterprise entirely or dominantly designs content	**Chengdu Vocational and Technical College × BOE**	**UII as delegated education**	Ultimate industry control; still limited by Chinese

Stage	Control Orientation	Typical Features	Representative Case	Type of Integration	Notes
on campus *(future or rare)*		• University mainly supplies students + degrees	**Technology Group**		higher-education regulation.

Source: This table was created with AI assistance.