Article

A Study on the Mechanism of University Talent Supply for Upgrading Foreign-Language Services for Inbound Tourists in Chengdu's International Consumption Center Empowered by Generative AI

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Abstract: The construction of international consumption center cities and the extension of visa-free entry policies have jointly raised the demand for high-quality inbound foreign-language services in Chinese cities, while generative artificial intelligence (GenAI) is fundamentally restructuring the knowledge and skill base of the language service workforce. This paper investigates the university talent supply mechanism through which GenAI empowers the upgrading of inbound foreign-language services in Chengdu, a representative city cultivating an international consumption center in western China. Synthesizing language service research, competency theory, and the triple-helix model, the paper argues that GenAI does not reduce but reconfigures talent demand: routine translation is being automated, while demand for culturally competent, AI-fluent, industry-aware language professionals is growing. It then constructs a two-wheels, four-links university talent supply mechanism driven by scenario-based demand identification and competency-based cultivation, and operating through four sequential links: demand perception, competency translation, scenario incubation, and evaluation feedback. Within this mechanism, a three-layer competency model of foreign language, AI, and industry is proposed, comprising AI literacy and tool proficiency at the base, discourse competence and cultural translation at the core, and industry knowledge and service innovation at the top, anchored by professional ethics and cultural confidence. Four realization pathways are derived: collaborative education governance, a competency-oriented curriculum system, scenario-embedded practice platforms built on Chengdu-oriented corpora and vertical large language models, and multi-agent outcome evaluation. The study advances a supply-chain perspective on foreign-language talent cultivation and offers actionable guidance for aligning university talent supply with urban service upgrading.

Keywords: artificial intelligence; language services; talent cultivation; inbound tourism; urban development; higher education

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1. Introduction

Two national policy initiatives are converging on the foreign-language service capacity of Chinese cities [1]. The first is the phased extension of visa-free entry: since December 2024, China's transit visa-free policy has permitted stays of up to 240 hours across 24 provinces, 60 ports, and 54 countries, and visa-free entries by foreign nationals increased from 1.988 million in the first quarter of 2024 to 6.57 million in the same period of 2025. Econometric evidence confirms that transit visa-free policies significantly increase inbound tourist arrivals at the city level, and that the policy's effects propagate through tourism supply chains. The second is the development of international consumption center cities, a national initiative that directs designated cities to expand high-quality consumption supply, attract global consumers, and integrate commerce, tourism, culture, and sports into cohesive consumption environments. For cities such as Chengdu, the

policy implication is direct: inbound visitors are not merely tourists but consumers, and the ease, quality, and cultural depth of their language-mediated experience determines whether policy-driven visitor volume translates into sustained consumption engagement.

Foreign-language services constitute foundational infrastructure for this translation [1]. Research on inbound tourism indicates that approximately 90 percent of foreign visitors obtain destination information online, that independent and small-group travel has become predominant, and that language barriers persist across planning, navigation, consumption, assistance services, and post-trip sharing. Policy research accordingly calls for a full-chain, multi-level language service system spanning the stages before arrival, during the stay, and after departure, with services differentiated by source market and context rather than limited to English-only signage. What has changed since this agenda was formulated is the technology: generative artificial intelligence (GenAI), large language models (LLMs), and retrieval-augmented generation (RAG) have substantially reduced the cost of multilingual content production and real-time cross-lingual interaction, and are being integrated into smart tourism services, intelligent recommendation, and service optimization at an accelerating pace.

The talent question, however, remains unresolved—indeed, it is intensified. GenAI automates routine translation, yet comparative experiments show that leading models remain inconsistent in fidelity and cultural sensitivity when handling culture-rich tourism texts, and that prompt engineering only partially mitigates these limitations. The essential human contribution to language service—cultural translation, discourse strategy, and quality governance—persists and even increases in value [2]. At the same time, studies of regional economies repeatedly find that demand for single-skill foreign-language graduates has declined sharply, while innovative composite talent combining language proficiency, technological fluency, and industry-specific knowledge is in acute shortage. Universities are thus caught in a double bind: their traditional cultivation model supplies what the market no longer requires, while the new demand—for 'foreign language + AI + industry' professionals who can build domain-specific corpora, operate intelligent service platforms, and translate culture for global consumers—remains unmet.

This double bind has both theoretical and practical dimensions. Existing discussions of language service upgrading are written largely from the demand side—what the city, the industry, or the visitor needs—while discussions of foreign-language education adaptation are written largely from the supply side—what universities teach. The two literatures rarely converge on a shared mechanism: an explicit, organized, and auditable arrangement by which demand signals are converted into cultivated competencies and then into verified service outcomes. Without such a mechanism, policy objectives on both sides remain aspirational, and cities default to temporary measures—volunteer coordination, short-term training courses, isolated platform pilots—that cannot accumulate into systemic capability.

This paper addresses the question: through what mechanism can universities supply the talent that enables GenAI-empowered upgrading of inbound foreign-language services, and how can this mechanism be institutionalized in the context of Chengdu's international consumption center development? The question decomposes into three sub-questions [3]. First, what does the GenAI turn imply for the structure of talent demand in inbound foreign-language services? Second, through what mechanism can universities convert demand signals into graduate competencies and service outcomes? Third, what institutional arrangements make the mechanism durable in a specific city context?

Chengdu is a revealing case. It is the largest city in western China, a national central city covered by the 240-hour transit visa-free policy, a city that has adopted international consumption center development as a strategic goal, and a place where AI-assisted international communication has already been piloted through the 'PandaGuide' multilingual service platform. Its rich cultural IP—the giant panda, Sanxingdui, Sichuan opera, and tea-house culture—gives its language services unusual cultural depth, and its large university system, with foreign-language programs spanning common and less commonly taught languages, gives it unusual talent reserves [4]. If the talent supply

mechanism can be made to work in Chengdu, it can plausibly work in the wider class of inland hub cities facing the same policy initiatives with thinner endowments.

The paper makes three contributions. First, it reconceptualizes foreign-language talent cultivation as a supply-chain problem, shifting analytic attention from curriculum inputs to the mechanism that connects demand signals, competency formation, and service outcomes [5]. Second, it constructs a 'two-wheels, four-links' university talent supply mechanism and a three-layer 'foreign language + AI + industry' competency model, specifying the causal chain from demand perception to service upgrading and deriving testable propositions. Third, it derives four institutionally actionable pathways tailored to Chengdu, contributing to both the theory of university–city co-development and the practice of international consumption center development. Section 2 reviews the literature; Section 3 analyzes the Chengdu context; Section 4 constructs the mechanism; Section 5 proposes pathways; Section 6 discusses implications; Section 7 concludes.

2. Literature Review and Theoretical Foundations

2.1. GenAI and the Upgrading of Inbound Foreign-Language Services

Language service for inbound tourism has evolved through three stages: instrumental assistance, such as bilingual signage and guide brochures; systematic construction, including multi-scenario multilingual service systems with hotlines, guide teams, and standardized protocols; and intelligent empowerment, featuring AI translation devices, multilingual digital platforms, and integrated public service solutions. Analysis of national and local policy documents indicates that language service provisions reached their highest frequency in 2024, with growing emphasis on multilingual precision, comprehensive scenario coverage, and seamless technology integration, while post-departure support and frontline personnel training remain comparatively underdeveloped. Generative artificial intelligence defines the current stage. Research on smart cultural tourism suggests that AI-generated content can shift tourism communication from standardized mass output toward adaptive, narrative-driven generation—provided that cultural frameworks and structured story models guide system behavior and human oversight ensures authenticity and aesthetic integrity. Systematic examinations of AI applications in tourism document uses in intelligent recommendation, real-time guidance, demand forecasting, and service optimization, while noting that scenario-specific adaptation and effective human–machine collaboration require further advancement [3]. Empirical studies on AI-assisted travel translation report measurable improvements in cross-lingual communication effectiveness and traveler satisfaction.

However, the same body of work identifies a persistent cultural gap: when translating Chinese tourism materials, general-purpose models frequently oversimplify cultural connotations and misrepresent culture-specific expressions, meaning unfiltered AI output may inadvertently dilute the cultural distinctiveness that attracts international visitors [6]. Consequently, advancing inbound foreign-language services necessitates a refined functional allocation—AI enhances scalability and accessibility, while domain specialists ensure cultural depth and quality assurance. This functional allocation fundamentally reflects evolving professional requirements: it clarifies the knowledge and competencies needed across an AI-enhanced service ecosystem. Emerging roles—including corpus engineer, machine translation post-editor, transcreator, RAG knowledge-base curator, and multilingual service operator—sit at the intersection of language, technology, and tourism, yet none is sufficiently addressed by conventional foreign-language education programs.

2.2. Talent Demand in International Consumption Center Construction

The international consumption center agenda reframes inbound visitors as global consumers whose spending decisions are shaped by consumption scenarios, emotional experience, and service quality. Scene-economy research shows that consumption upgrades when consumers become co-producers within well-designed scenes, so that

"scene empowerment–prosumption synergy–experience upgrading" becomes a principal driver of consumption transformation. Emotion-economy research similarly demonstrates that "heart-to-price" logic and a "stimulus–response–reinforcement" spiral convert emotional satisfaction into repeat visits and advocacy [7]. Both perspectives imply that language services in an international consumption center must go beyond information transfer to support experience co-creation and emotional resonance—tasks demanding far higher-order competencies than routine translation.

Studies of talent needs in international consumption center cities converge on a composite profile: digital skills, international vision, innovative mindsets, scenario-based service capability, and cross-cultural communication competence. Research on language service competence decomposes the construct into language competence, discourse competence, and technology competence, with the high-value elements—content curation, cultural load management, brand tonality, and creative rhetoric—concentrated in discourse competence. Regional studies add two further specifications: multilingual capacity must extend beyond English to the languages of key source markets, including less commonly taught languages; and demand for single-skill language graduates has fallen to nearly zero, while composite talent serving hub economies is in short supply [5].

The generative AI turn sharpens these conclusions at the level of tasks rather than occupations [8]. Task-by-task analysis suggests that the technology substitutes for low-judgment, high-frequency tasks—literal translation of standard texts, FAQ responses, itinerary formatting—while complementing tasks that require audience judgment, contextual knowledge, and accountability: deciding what to say to whom, in what register, under whose responsibility. For talent cultivation this asymmetry is decisive. If substitution tasks dominated, the policy response would be workforce reduction; because complementarity tasks dominate—and because AI output multiplies the volume of material requiring human review—the demand for talent shifts upward along the competency ladder rather than disappearing. The graduate who can post-edit machine output at scale, audit a knowledge base for cultural accuracy, and design the prompts and workflows that keep a service platform trustworthy is not a diminished translator but an augmented language service professional. Framing demand at this task level prevents two common errors: the pessimistic equation of generative AI with the end of language careers, and the optimistic assumption that existing curricula suffice because "the tools do the translation."

2.3. University Talent Supply: From Pipeline to Ecosystem

Traditional foreign-language education functions as a linear pipeline: standardized curricula yield graduates who enter the workforce with a time lag, often resulting in misalignment between competencies acquired and actual market needs. Current scholarship identifies three key directions for enhancement. First, competency-based education: learning objectives should be grounded in observable, integrated competency frameworks rather than course completion alone; a tripartite structure comprising language proficiency, discourse competence, and technological literacy offers a robust foundation. Second, scenario-embedded learning: project-oriented, service-integrated instruction within authentic contexts simultaneously strengthens practical application skills and professional readiness—particularly when learning is directly coupled with real-world service delivery, fostering both capability and professional identity. Third, collaborative governance: an adapted quadruple-helix model—integrating government, industry, higher education institutions, and community stakeholders—enables coordinated responses to inbound tourism demand by aligning information flows, talent development, and resource allocation. Further research highlights that universities in central and western cities often remain underintegrated with regional opening-up initiatives, underscoring the need for place-responsive university–city collaboration strategies rather than replication of coastal models [9]. Additionally, studies on generative artificial intelligence in language education indicate that such tools transform not only instructional content but also assessment design and pedagogical mediation, necessitating

concurrent teacher professional development and ethical safeguards alongside curriculum modernization.

2.4. Research Gap

Three gaps follow. First, existing work specifies the competencies required for language service talent but does not clarify how universities can systematically organize the supply of these competencies as an integrated mechanism—one that links demand signals to cultivation processes and to verifiable service outcomes. Second, while the impact of generative artificial intelligence has been examined separately in language education and in tourism services, the talent supply mechanism connecting these domains—particularly how AI transforms not only instructional content but also the institutional organization of talent development—remains unexplored. Third, city-level studies on international consumption center construction emphasize the need for composite talent without articulating the university-level institutional arrangements necessary to produce it [3]. This paper addresses these gaps by constructing and operationalizing a university-based talent supply mechanism for foreign-language service upgrading empowered by generative artificial intelligence, using Chengdu as the empirical context.

3. Context: Chengdu's Demand for AI-Empowered Inbound Foreign-Language Talent

3.1. Policy and Market Drivers

Chengdu's demand for inbound foreign-language talent is driven simultaneously by policy, market, and technological developments. From a policy perspective, Sichuan's inclusion in the 240-hour transit visa-free arrangement and Chengdu's strategic focus on building an international consumption center generate both increased visitor inflows and institutional imperatives for service enhancement; the city has implemented time-bound initiatives to accelerate the recovery of inbound tourism, reflecting a governance approach characterized by pilot implementation, agile adjustment, and cross-departmental coordination. Market forces further reinforce this demand: the city's distinctive cultural assets—including the giant panda, the Sanxingdui and Jinsha archaeological sites, Sichuan opera, traditional tea-house culture, and hot-pot cuisine—enjoy broad international recognition [10]. Meanwhile, consumption environments—from global business districts and vibrant night markets to rural leisure destinations and major sporting events—are undergoing systematic upgrading under the international consumption center agenda. Chengdu's status as an aviation hub, supported by two international airports and an expanding network of direct flight routes, positions it on the travel itineraries of increasingly diverse source markets.

Technologically, AI-supported international communication is already operational at the provincial level: the 'PandaGuide' platform delivers multilingual services through a '1+N' architecture, employs retrieval-augmented generation (RAG) techniques to power intelligent question-answering grounded in authoritative local knowledge bases, and has produced over 200 practical multilingual guide videos. Complementing these digital offerings are offline salons and community-based activities designed to support foreign residents and visitors [7]. Collectively, these drivers elevate expectations for human capital. Chengdu requires professionals capable of developing and curating domain-specific linguistic corpora that underpin AI systems; operating and evaluating intelligent platforms across high-frequency touchpoints—including transportation hubs, scenic attractions, payment interfaces, and assistance services; and adapting cultural content for global audiences throughout the entire visitor journey.

This demand can be further clarified by mapping it onto discrete stages of the visitor journey, each with distinct language requirements and potential points of breakdown. Prior to arrival, travelers require reliable multilingual information on visa procedures, itinerary planning, and payment methods. Upon arrival and transit, they need clear wayfinding, seamless payment setup, and immediate assistance at airports and railway stations. During the destination experience, accurate interpretation, culturally informed

explanations, and context-sensitive consumption guidance are essential in scenic areas, historic neighborhoods, and commercial districts [11]. In situations requiring urgent assistance or formal inquiry, accessible complaint mechanisms, medical support information, and legal guidance must be available. After departure, channels for feedback, social sharing, and future engagement help sustain long-term relationships. Independent travelers—who represent the majority of visa-free arrivals—rely more intensively on these services than group tourists, and predominantly access them via digital platforms. Consequently, each stage translates into a specific set of responsibilities—content creation, platform management, on-site support, and quality assurance—requiring integrated competencies in linguistics, technology, and sector-specific knowledge that current educational programs do not comprehensively address.

Moreover, Chengdu requires such talent in sufficient volume and with long-term professional sustainability: short-term volunteer engagement, while beneficial, cannot replace a robust, career-oriented talent pipeline. As inbound visitor numbers rise and international consumption scenarios expand, the reputational cost of service shortcomings—such as ambiguous signage, inaccurate menu translations, or unresponsive assistance—accumulates, potentially undermining the city's standing as a welcoming international destination. Conversely, each well-executed cultural interaction contributes cumulatively to positive word-of-mouth and digital advocacy.

3.2. Structural Contradictions in Talent Supply

Against these drivers, Chengdu's talent supply exhibits three structural contradictions. The first is a specification mismatch: university foreign-language programs continue to emphasize general proficiency and traditional career paths in teaching and general translation, whereas emerging demand centers on scenario-based, technology-mediated service competence in tourism and consumption contexts—precisely the profile identified as underrepresented in regional analyses. Graduates possess strong examination-driven language skills but limited exposure to AI workflows, corpus-based methodologies, or service delivery in consumption-oriented settings.

The second is a technology gap: most language graduates lack competencies in corpus construction, prompt engineering, and AI output evaluation, while most AI-literate students lack the cross-cultural depth required for culture-loaded communication; consequently, the city's AI service pilots rely on imported technical capacity while exporting linguistic training, and AI outputs deployed without cultural review risk reproducing interpretive flattening. The third is an institutional lag: university programs respond slowly to evolving demand signals, industry participation in talent cultivation remains sporadic and project-based, and no sustained mechanism translates the consumption center construction agenda—including its operational scenarios, source-market composition, and service standards—into concrete cultivation targets, enrollment strategies, and evaluation frameworks. These contradictions are characteristic of inland hub cities broadly. However, Chengdu's distinctive endowments—its university system, cultural intellectual property assets, and pilot platforms—position it as an optimal site to address them through deliberate mechanism design rather than incremental adjustments.

4. The University Talent Supply Mechanism: A "Two-Wheels, Four-Links" Framework

4.1. Framework Overview

Figure 1 presents the proposed mechanism. The supply side—the university, in collaboration with its partners—is organized around four sequential links: demand perception, competency translation, scenario incubation, and evaluation feedback—through which external demand signals are converted into graduate competencies and, ultimately, into service quality. Two wheels drive the loop: demand-driven governance aligns all four links with real service scenarios, and competency-based cultivation ensures that every learning activity builds specified competencies rather than merely covering courses. The mechanism yields dual upgrading: enhancement of inbound foreign-

language services—from information accessibility through experience co-creation to cultural-emotional resonance—and advancement of talent profiles—from single-skill language workers to composite "foreign language + AI + industry" professionals. A data feedback loop connects service outcomes back to demand perception, closing the circuit and enabling self-correcting dynamics.

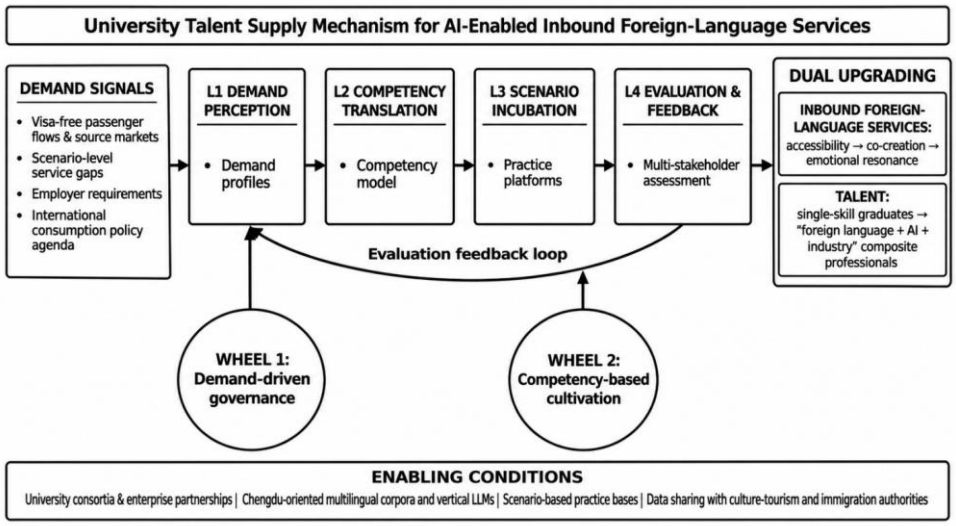


Figure 1. The "Two-Wheels, Four-Links" University Talent Supply Mechanism for GenAI-empowered Upgrading of Inbound Foreign-Language Services.

The framework rests on three foundational premises. First, demand is specific and knowable: the scenarios, languages, and competency requirements of inbound services can be observed, measured, and translated into cultivation targets through structured demand perception. Second, competencies are formable through designed experience: scenario-embedded, project-based learning reliably builds application capability that classroom instruction alone does not. Third, alignment is a mechanism, not a hope: sustained alignment requires standing institutions for governance, platforms, and evaluation; without them, adjustments remain episodic and deteriorate over time.

4.2. The Four Links

Link 1: demand perception. Universities must institutionalize the observation of demand signals—including visa-free passenger flows and source-market composition, scenario-level service gaps (such as signage, interpretation, emergency response support, and consumer safeguards), employer requirements from tourism, retail, and digital platform enterprises, and policy documents related to the consumption center initiative—and convert them into periodically updated "talent demand profiles" specifying target competencies by service context and language. Practical instruments include annual service-gap surveys at key locations, analysis of multilingual online reviews and social media feedback, employer consultation forums, and data-sharing arrangements with immigration and culture-tourism authorities. Demand perception fails when it relies on anecdotal evidence or a single-year snapshot; it succeeds when it is data-informed, recurring, and overseen by a dedicated, standing unit.

Link 2: competency translation. Demand profiles must be translated into a structured competency model and subsequently into curriculum design. A three-layer competency model is proposed (detailed in Section 4.3; Figure 2): a foundational layer encompassing AI literacy and proficient tool use; a core layer focused on discourse competence and cultural adaptation; and an advanced layer integrating industry-specific knowledge and service innovation, grounded in professional ethics and cultural awareness. Competency translation converts each demand profile into module-level learning outcomes and specifies the observable evidence required to demonstrate each competency, ensuring full

traceability from every course to a defined service competency and preventing the inclusion of fashionable but pedagogically irrelevant content. The central requirement in this link is traceability: every syllabus item must clearly indicate "which service context and which competency does this develop?", and every competency must be verifiable through student work—not merely stated in course descriptions [9].

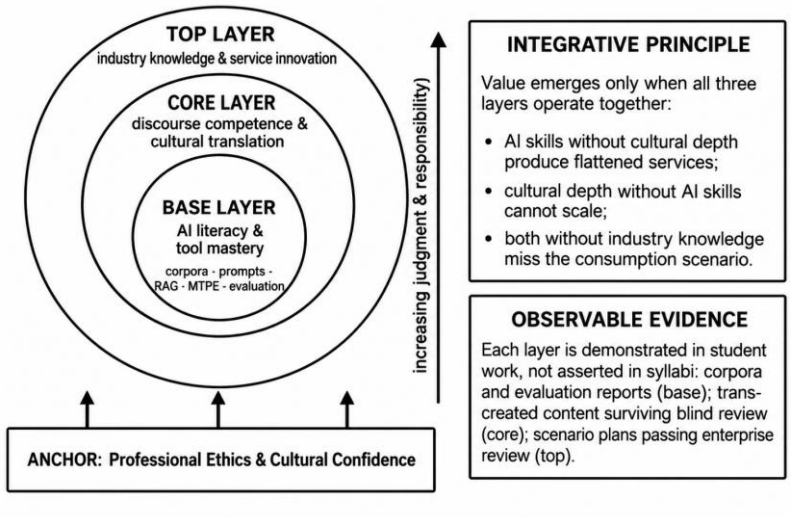


Figure 2. The Three-Layer "Foreign Language + AI + Industry" Competency Model Anchored by Professional Ethics and Cultural Confidence.

Link 3: scenario incubation. Competencies are developed through practice embedded in authentic service contexts: students build linguistic corpora and assess AI-generated outputs for real-world platforms, staff multilingual service points at transportation hubs and tourist sites, produce culturally adapted content for international audiences, and operate retrieval-augmented generation (RAG)-based guide agents under expert supervision. Scenario incubation simultaneously delivers practical service value and advances talent development, aligning individual learning pathways with urban development priorities; it functions as the operational core of the mechanism. Its effectiveness depends on four design parameters—task authenticity, quality of professional guidance, realism of workload expectations, and structured reflection practices—which determine whether students engage superficially or achieve deep, transferable learning [12]. Incubation should follow a progressive sequence: observation and supportive roles in the first year, guided task execution in the second, and increasing responsibility for independent projects in the third and fourth years, ensuring that cognitive and operational complexity grows in tandem with capability. When well implemented, the city gains immediate service contributions—such as signage assessments, multilingual content production, and platform performance evaluations—while students compile demonstrable, employer-validated portfolios.

Link 4: evaluation feedback. Learning outcomes must be assessed by multiple stakeholders—including universities, industry partners, government agencies, and end users—using competency-based rubrics and service-oriented metrics (e.g., user satisfaction, accuracy verification, engagement levels, and issue resolution efficiency), with results systematically informing updates to demand profiles and curriculum design. Multi-stakeholder evaluation strengthens accountability for both learners and the system itself: it mitigates subjective self-assessment bias, reveals service shortcomings that conventional academic grading may overlook, and sustains institutional commitment through transparent performance tracking. Evaluation closes the continuous improvement loop; without it, the mechanism lacks corrective signals, and misalignment between educational offerings and societal needs accumulates imperceptibly until graduate readiness is significantly compromised.

4.3. The Competency Model

Figure 2 depicts the three-layer competency model. The base layer—AI literacy and tool proficiency—comprises corpus construction and annotation, prompt design, RAG knowledge-base maintenance, machine-translation post-editing, and AI output evaluation. This layer reflects emerging requirements of the generative AI era and represents a critical gap in many traditional programs; it equips graduates to operate and oversee AI services rather than compete with machines. Operationally, it is demonstrated through student-built annotated corpora, evaluation reports comparing model outputs against human reference translations, and documented prompt libraries for recurring service tasks.

The core layer—discourse competence and cultural translation—includes audience-oriented content curation, cultural load management, transcreation, brand tonality, and multimodal rhetoric; it constitutes the primary domain of sustained human comparative advantage, as current AI systems remain comparatively limited in these areas [13]. Its application is evidenced by transcreated content that passes blind review by source-market users, cultural annotation of heritage texts, and crisis-communication products that handle contextually sensitive material appropriately. The top layer—industry knowledge and service innovation—encompasses scenario understanding of tourism and consumption (including visa-free procedures, payment processes, and consumer rights safeguards), service design, and data-informed innovation capability. Its outcomes include scenario service plans approved by industry partners, measurable improvements in service metrics achieved by students, and innovation proposals adopted by collaborating platforms.

Across all three layers runs an anchor of professional ethics and cultural confidence: responsibility for accurate, secure, and culturally respectful communication, without which technical capability may introduce risk. The model is integrative by design: value emerges only when all three layers function synergistically—AI skills without cultural depth yield homogenized services, cultural depth without AI skills lacks scalability, and both without industry knowledge fail to address real-world consumption contexts. Cultivation should therefore avoid treating the layers as separate academic disciplines; they represent interdependent dimensions of every graduate's profile, developed jointly through integrative projects rather than in isolation through siloed courses.

4.4. Mechanism Propositions

The mechanism yields three propositions for empirical testing. Proposition 1: greater alignment between talent demand profiles and cultivation targets is associated with higher graduate scenario-competence and a shorter service-readiness gap. Proposition 2: scenario-embedded incubation, compared with classroom-only instruction, leads to superior performance in AI-service operation and cultural translation, with the authenticity of the service task serving as a mediating factor. Proposition 3: institutionalized multi-agent evaluation feedback enhances both service quality and curriculum responsiveness over time, particularly when feedback from tourists and employers is explicitly weighted [8, 9].

4.5. Realization Pathways

4.5.1. Institutional Pathway: Collaborative Education Governance

The first pathway establishes a governance framework [9]. A standing coordination body for inbound foreign-language talent—comprising education authorities, culture and tourism departments, commerce authorities, key enterprises, platform operators, and university consortia—should assume responsibility for demand sensing, issuing annual talent demand profiles aligned with the consumption center development agenda and visa-free passenger statistics. Universities should be incentivized to respond through program evaluation, funding allocation, and enrollment planning that prioritize alignment with these demand profiles and graduate service outcomes, rather than academic output alone. Enterprises must assume clearly defined responsibilities—

including provision of real-world application scenarios, mentorship, and performance evaluation—to ensure collaboration is structurally embedded rather than ad hoc or voluntary.

Governance design is as critical as its establishment. The coordination body requires a small permanent secretariat jointly hosted by the education authority and a lead university consortium, an explicit mandate to collect and share data on passenger flows and service metrics, and a publicly issued annual report that transparently documents institutional alignment and enables cross-institutional comparison. Local experience with time-bound policy implementation supports phased governance innovation: a two-year pilot across three to five signature scenarios, followed by independent evaluation and subsequent integration into routine funding and assessment mechanisms. This staged approach transforms governance from formal declaration into sustained practice.

4.5.2. Curricular Pathway: A Competency-Oriented Curriculum System

The second pathway rebuilds curricula around the competency model. Foreign-language programs should restructure from course collections into competency modules: a "language + AI" module covering corpus work, prompt engineering, machine translation post-editing, and AI output evaluation; a "cultural translation" studio focusing on transcreation of Chengdu's cultural intellectual property for priority source markets; and an "industry service" module co-taught with tourism and commerce faculties, addressing consumption scenarios, service design, and communication related to consumer rights [8, 13].

Micro-credentials can certify layer-specific competencies, enabling flexible pathways for working professionals and students from other disciplines. This flexibility is strategically important: the technology and industry layers can be credentialed to non-language majors—such as tourism management or computer science students—supporting interdisciplinary collaboration while comprehensive curriculum updates are implemented. Faculty development is the rate-limiting step: instructors must acquire AI and scenario-based competencies through enterprise engagement and joint training before delivering such content. Curriculum updates without corresponding faculty capacity building risk replicating traditional pedagogical patterns under new terminology; therefore, incentive structures—including workload recognition for scenario-based supervision and valuation of practice-oriented scholarship—must evolve in tandem with syllabus revisions.

4.5.3. Platform Pathway: Scenario-Embedded Practice and AI Infrastructure

The third pathway constructs the physical and digital conditions for scenario incubation. On the digital side, universities should lead the construction of Chengdu-oriented multilingual corpora and vertical large language models—cultural gene maps and story graphs representing panda conservation, Sanxingdui archaeology, Sichuan opera, and teahouse traditions, annotated to museum-grade standards—and integrate them into practice platforms where students undertake authentic tasks in annotation, evaluation, and system operation. The "PandaGuide" initiative demonstrates the feasibility of retrieval-augmented generation–based authoritative service assistants and offers a ready-made practice environment. University-developed corpora address two objectives simultaneously: they anchor the city's AI services in accurate, culturally grounded knowledge, and they provide students with technically rigorous work whose outcomes directly impact service quality.

On the physical side, scenario practice bases should be established at key urban touchpoints—including airport arrival areas, panda research and conservation facilities, the Sanxingdui Museum, historic districts, and international business zones—where supervised students deliver multilingual support services, ranging from signage review and interpretive assistance to urgent response coordination and multilingual content creation. These bases operate under a dual teaching-service mandate: performance is assessed both by service delivery metrics and by demonstrable student competency development, and supervision is provided by professionals jointly qualified in academic

instruction and industry practice. Volunteer service contributions are formally certified and integrated into students' official competency portfolios.

4.5.4. Evaluative Pathway: Multi-Agent Outcome Evaluation and Feedback

The fourth pathway institutionalizes evaluation feedback. A multi-agent evaluation system should integrate competency rubrics—such as portfolio assessment of AI operation and cultural translation work—service metrics—including user satisfaction, accuracy audits, and engagement—and outcomes related to professional integration—such as employment in target scenarios and employer assessments. Tourists and service users should serve as primary evaluators, since service quality is ultimately experienced rather than inspected. Their feedback should be captured in structured, multilingual formats at the point of service, ensuring that evaluation data include scenario and language metadata to support actionable curriculum revision.

Evaluation results should inform annual updates to demand profiles and curricula, with transparent public reporting to ensure accountability [8]. Over time, the evaluation data themselves become a strategic asset: they support model refinement, enhance scenario design, and demonstrate to stakeholders the value of language-infrastructure investment. A practical safeguard is essential: evaluation must prioritize service quality and competency development over activity volume, to prevent superficial engagement that satisfies quantitative metrics without advancing actual competencies or improving user experience.

5. Discussion

This study contributes to three scholarly domains. For language service research, it positions talent development as a central factor shaping service advancement and clarifies the supply-side mechanisms that influence it, complementing prior work focused on demand mapping. For higher-education research, it introduces a supply-chain perspective to foreign-language education—encompassing demand sensing, competency articulation, scenario-based practice, and evaluation-informed refinement—offering a more actionable approach than broad calls for systemic adjustment. For urban and tourism studies, it links the international consumption center initiative to university systems through a defined operational pathway, specifying roles, required competencies, and governance arrangements.

The framework also extends the triple-helix model toward service-oriented outcomes. Traditional interpretations emphasize innovation outputs—such as patents, spin-offs, and technologies—as the joint product of university, industry, and government collaboration [2]. In contrast, the 'two-wheels, four-links' mechanism identifies service capability as the shared outcome and demonstrates that its development requires sequential, interdependent processes: demand signals must first be sensed, then translated into targeted competencies, further developed through realistic scenarios, and finally refined via rigorous, multi-stakeholder evaluation. Universities in inland cities are sometimes perceived as disconnected from regional openness efforts; this analysis details how they can become integral to such efforts, and outlines the governance conditions necessary to sustain that role.

The framework carries practical implications for three groups of stakeholders. For university administrators, it suggests that effective intervention occurs not at the level of individual courses but across interconnected functional linkages: investments in demand-sensing tools, competency-articulation protocols, scenario-based practice platforms, and collaborative evaluation systems yield impact only when implemented as an integrated system. Partial implementation—such as introducing new curricula without supporting practice environments, or launching platforms without robust evaluation—merely reproduces existing bottlenecks in updated form. For city governments, it implies that funding for language services should be viewed as strategic investment in human capital infrastructure rather than short-term event support; benefits accrue over longer timeframes through enhanced consumption experiences and strengthened regional

reputation. For enterprises and digital platforms, participation in talent development is not auxiliary civic engagement but a core component of workforce planning: the practice settings, mentorship, and assessment standards they help shape today directly inform the quality and readiness of future hires.

A comparative perspective further sharpens the argument. Coastal international consumption centers such as Shanghai have built substantial foreign-language service capacity over decades through trade-driven openness, and their universities serve large, internationally engaged professional markets; their primary challenge lies in deepening existing capabilities. Chengdu and other inland cities face accelerated transformation: policy-enabled increases in international visitor flows precede the maturation of corresponding service capacity, requiring rapid capability development aligned with policy timelines. This compressed timeline heightens the importance of deliberate mechanism design—in contexts where demand evolved gradually, alignment emerged organically through iterative adaptation, whereas policy-driven demand surges require intentional coordination. The 'two-wheels, four-links' framework is therefore not only relevant to Chengdu but especially critical for cities facing similar acceleration, where absence of structured mechanisms risks persistent capability gaps.

Two boundary conditions qualify the argument. First, the mechanism assumes a sufficient volume of inbound demand to justify sustained platform investment—a condition now met in Chengdu due to policy adjustments enabling broader international access, though it may not apply in smaller cities with lower demand volumes. Second, effectiveness depends on governance strength; where coordinating bodies lack decision-making authority or evaluation lacks consequential impact, the four functional linkages risk becoming procedural formalities. Empirically, the propositions outlined earlier invite validation through graduate career tracking, performance assessments grounded in authentic scenarios, and quasi-experimental comparisons of different practice formats; planned pilot initiatives in Chengdu provide suitable testbeds [4]. Future research should also explore the framework's longitudinal behavior—how feedback dynamics evolve after initial implementation momentum subsides, and how evolving artificial intelligence capabilities necessitate updates to competency frameworks.

6. Conclusion

This paper has analyzed the university talent supply mechanism for GenAI-empowered upgrading of inbound foreign-language services in Chengdu's international consumption center construction. It argues that GenAI reconfigures rather than eliminates talent demand, specifies a "two-wheels, four-links" supply mechanism driven by demand identification and competency cultivation, and proposes a three-layer "foreign language + AI + industry" competency model anchored by ethics and cultural confidence. Four pathways—collaborative governance, competency-oriented curricula, scenario-embedded platforms on Chengdu-oriented AI infrastructure, and multi-agent evaluation—translate the mechanism into institutional practice. The broader implication is that, in the GenAI era, a city's language service competitiveness is determined not by speaker quantity but by how effectively its universities organize demand perception, competency formation, scenario capability incubation, and feedback discipline. For Chengdu, investing in this talent supply mechanism constitutes a direct investment in converting policy momentum into sustained consumption retention—and in advancing the city's standing as a genuinely international consumption center.

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