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Research on the Localization of "Municipal Conditions Education" for College Students in Wenzhou from the Perspective of New-Quality Productive Forces

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Abstract: An exploratory sequential mixed-methods design was employed. First, a qualitative multiple-case study was conducted, analyzing three typical industry-education integration models through interviews and documents. Second, a quantitative survey of 415 university students in Wenzhou was administered, with data analyzed using structural equation modeling to test hypotheses derived from the qualitative phase and our theoretical framework. The study reveals that localized education fosters talent for New Quality Productivity through two synergistic paths: enhancing students' cognition of emerging industries via curriculum-embeddedness, and strengthening practical skills and local occupational identity through deep university-enterprise coupling. These factors significantly increase graduates' willingness to work locally. Key systemic barriers, including policy misalignment and slow curricular response to technological change, were also identified. This research makes two primary contributions. Theoretically, it integrates Regional Innovation Systems and Triple Helix models to propose a novel "Dynamic Response" analytical framework for understanding education at the municipal level. Empirically, it provides one of the first systematic investigations into the operationalization of "New Quality Productivity" within local higher education, offering evidence-based insights for policy and practice.

Keywords: New-Quality Productive Forces; Municipal Conditions Education; Localization

1. Introduction

In an era characterized by rapid technological disruption and intensified regional competition, universities worldwide are increasingly compelled to transcend their traditional roles and actively engage in local socio-economic development—a concept widely theorized as the "third mission". This shift necessitates the localization of curricula and pedagogies to cultivate human capital that is directly relevant to regional innovation ecosystems. Concurrently, China's strategic push for "New Quality Productivity", which prioritizes innovation-driven, high-value, and green growth, has created an urgent and unprecedented demand for a new breed of talent equipped with digital literacy, interdisciplinary agility, and adaptive skills. This national imperative places particular pressure on higher education institutions (HEIs) in manufacturing and entrepreneurial hubs to realign their training paradigms with the dynamic needs of upgrading local industries.

However, a significant research gap persists between these macro-level policy discourses and micro-level educational practices, especially at the prefectural or municipal scale where industry-education interactions are most direct and critical. Existing literature on university regional engagement often focuses on national systems or prominent metropolitan areas, leaving the dynamics within characteristic regional economies—such as those driven by small and medium-sized enterprises (SMEs)—underexplored. Furthermore, while concepts of place-based education and industry-education integration are well-established, few studies have empirically examined how localized educational initiatives specifically operationalize and respond to a transformative, technology-driven productivity agenda like "New Quality Productivity". The mechanisms, effectiveness, and constraints of such responses remain unclear. To address this gap, this study adopts Wenzhou, Zhejiang Province—a renowned epicenter of China's grassroots private economy—as a critical case. Wenzhou's economy, traditionally strong in sectors like electrical appliances, automotive parts, and footwear, is now

vigorously transitioning towards smart manufacturing and digital commerce, epitomizing the "New Quality Productivity" challenge at the local level. Its HEIs have actively implemented various forms of "civic education" aimed at rooting students in local industry and culture. This context presents a unique opportunity to investigate the following research questions:

What specific models and practices constitute "localized civic education" in response to New Quality Productivity in Wenzhou's HEIs? Through what mechanisms do these educational experiences influence students' relevant competencies and their intentions to contribute to the local economy? What are the key enabling factors and systemic barriers that shape the effectiveness of this educational response?

By answering these questions, this paper aims to make a twofold contribution. Theoretically, it seeks to integrate the Regional Innovation Systems framework with the Triple Helix model to construct a novel "dynamic response" analytical lens for understanding education-industry linkages at the municipal level. Empirically, it provides one of the first systematic, mixed-methods investigations into the concrete translation of a national innovation policy into localized educational practices, offering evidence-based insights for policymakers, educators, and industrial stakeholders in Wenzhou and similar regional economies globally.

The remainder of this paper is structured as follows: Section 2 reviews relevant literature and develops the theoretical framework. Section 3 details the mixed-methods research design. Section 4 presents the findings, which are then discussed in Section 5 regarding their theoretical implications, practical applications, and limitations. Section 6 concludes the study.

2. Literature Review and Theoretical Framework

2.1 Localized Education and Its Role in Regional Development

The discourse on the regional mission of universities has evolved significantly, moving beyond knowledge transfer to encompass a strategic role in fostering localized human capital. Theories of "place-based education" emphasize pedagogical approaches that connect learning to local communities, cultures, and economies, thereby enhancing student engagement and regional relevance [1]. Parallelly, the concept of "service-learning" integrates community service with academic instruction, aiming to achieve both student learning outcomes and civic development [2]. At an institutional level, the "third mission" framework posits that universities are key actors in regional innovation systems, responsible for contributing to social, cultural, and economic development through activities beyond teaching and research [3].

However, a critical gap exists in applying these concepts to the context of rapid, policy-driven industrial transformation in emerging economies. While extensive research exists on university engagement in Western contexts, fewer studies examine how these principles are operationalized in response to specific, state-led industrial policies—such as China's "New Quality Productivity"—at the sub-national level. Furthermore, much of the literature focuses on outcomes for the region or the institution, with less empirical attention paid to the micro-level impact on student competencies and career intentions, which are the ultimate conduits for regional development.

2.2 Industrial Upgrading, Skill Demands, and the Educational Response

The transformation of regional economies, particularly towards innovation-driven models, fundamentally alters labor market demands. The theory of Regional Innovation Systems (RIS) highlights the interplay between firms, knowledge institutions, and governance structures in driving innovation, wherein the flow of skilled labor is a critical component [4]. Technological change, especially the digital and green transitions central to "New Quality Productivity," is inherently "skill-biased," creating a growing demand for advanced cognitive and technical skills while rendering others obsolete [5].

This creates a persistent tension: the dynamism of industrial upgrading often outpaces the inherent inertia of formal education systems. Educational institutions struggle with curriculum lag, a mismatch between taught skills and industry needs, and a disconnect between academic knowledge and applied problem-solving [6]. While strategies like work-integrated learning and competency-based education are proposed as solutions, their

effectiveness in synchronizing with the pace of change in dynamic, SME-dominated regional economies like Wenzhou's remains under-researched.

2.3 Conceptualizing "New Quality Productivity" within the Scholarly Discourse

"New Quality Productivity" is a nascent and distinctly Chinese policy concept that has yet to be fully integrated into international academic literature. It can be analytically situated within broader discussions on innovation-driven growth, techno-economic paradigm shifts, and sustainable industrial policy. It shares affinities with concepts like "Industry 4.0" in its emphasis on digitalization and smart manufacturing, and with "green growth" in its focus on low-carbon development. Its uniqueness lies in its holistic, policy-driven framing within China's development strategy, emphasizing the synergistic advancement of high-tech, efficiency, and quality.

For this study, we operationalize "New Quality Productivity" not merely as a sectoral shift, but as a dynamic regional competency demand signal. It manifests locally in Wenzhou as the transformation of traditional clusters (e.g., electrical, footwear) through intelligent and green technologies, and the emergence of new sectors (e.g., new energy, digital economy). This operationalization allows us to examine how local education systems perceive and respond to this composite signal.

2.4 An Integrated Theoretical Framework: The Dynamic Response Model

To bridge the aforementioned literature gaps and analyze our case, we integrate three theoretical strands to construct a novel "Dynamic Response" analytical framework (see Fig. 1).

1. Regional Innovation Systems (RIS) Theory: Provides the macro-structural context, positioning Wenzhou's universities as core knowledge institutions within a regional system where firms (driving "New Quality Productivity") generate new skill demands [7].

2. Human Capital Theory (Extended): Forms the micro-foundation. We extend the theory by proposing the concept of "Localized New Quality Human Capital"—the bundle of knowledge, skills, and dispositions (e.g., digital fluency, adaptive problem-solving, local industrial literacy) that make individuals productive within the specific innovation context of their region. Education is the primary investment in this capital.

3. The Triple Helix Model: Provides the interactive governance lens, focusing on the non-linear, evolving relationships between university, industry, and government. It helps analyze the process of response, particularly how policies enable or constrain university-industry linkages and how institutional arrangements facilitate or hinder adaptation [8].

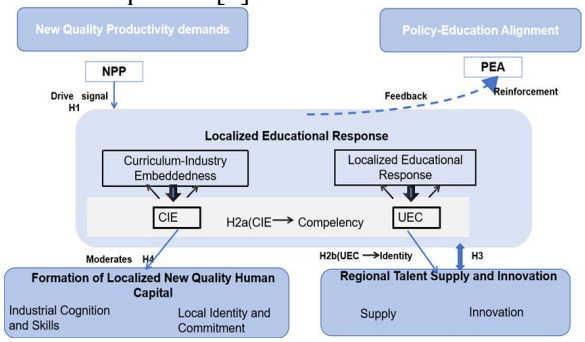


Figure 1. The Dynamic Response Model for Localized Education

Note: NPP = New Quality Productivity; CIE = Curriculum-Industry Embeddedness; UEC = University-Enterprise Coupling; PEA = Policy-Education Alignment. Solid arrows represent hypothesized direct effect paths, while dashed arrows indicate moderating effects or feedback loops. This model illustrates the dynamic process through which local higher education responds to the development needs of regional New Quality Productivity via two core dimensions—curriculum embeddedness (CIE) and university-enterprise coupling (UEC)—thereby fostering localized new quality human capital and influencing the supply of regional talent. Policy-Education Alignment (PEA) plays a critical moderating role in this process.

This framework yields three central research propositions guiding our empirical inquiry: The degree of Curriculum-Industry Embeddedness (CIE) is positively associated with the development of students' "New Quality Productivity" competencies; The intensity of University-Enterprise Coupling (UEC) positively influences students' local occupational identity and their intention to pursue careers within the Wenzhou region; The level of Policy-Education Alignment (PEA) acts as a critical moderating variable, amplifying or attenuating the effectiveness of both CIE and UEC in generating the desired human capital outcomes.

3. Methodology

3.1 Overall Research Design: An Explanatory Sequential Mixed-Methods Approach

To comprehensively address the research questions, this study employed an explanatory sequential mixed-methods design [9]. This two-phase approach begins with an initial qualitative phase aimed at exploring the complex landscape of localized civic education in Wenzhou, identifying key constructs, practices, and contextual factors. The findings from this phase were then used to inform the design of a subsequent quantitative phase, which aimed to test and generalize the relationships between the identified constructs across a broader population. This design capitalizes on the strengths of both approaches: the depth and contextual richness of qualitative inquiry, followed by the breadth and generalizability of quantitative analysis.

3.2 Phase 1: Qualitative Multiple-Case Study

3.2.1 Case selection and description

A multiple-case study design [10] was adopted to capture the diversity of "localized civic education" practices. Three distinct, information-rich cases within Wenzhou were purposively selected based on their theoretical relevance to the "Dynamic Response" framework's dimensions:

Case A (Deep Industry-Academy Integration): "Zhejiang Digital and Intelligent Finance Industry-Education Integration Consortium." Selected for its high University-Enterprise Coupling (UEC) intensity and integrated governance model.

Case B (Government-Platform Mediated Model): The "Wenzhou Digital Economy Industrial Park" as a municipal-level practice base. Selected for its role in facilitating Policy-Education Alignment (PEA) and serving multiple HEIs and firms.

Case C (Curricular Agility Model): A "Digital Economy Micro-credential" program at a local university. Selected for its focus on rapid Curriculum-Industry Embeddedness (CIE) in response to emerging skill demands.

This selection ensures coverage of the primary models outlined in the project proposal and allows for cross-case comparison.

3.2.2 Data collection

Qualitative data were collected from September 2025 to November 2025 through triangulated sources:

Semi-structured Interviews: 36 interviews were conducted (approx. 45-90 minutes each) with key stakeholders across the three cases: university deans/program directors (n=6), faculty members (n=9), enterprise mentors/manager (n=9), and students who had participated in the programs (n=12). Interview protocols were tailored to each group but centered on the three core dimensions of the theoretical framework.

Document Analysis: Internal documents were collected, including curriculum syllabi, industry-college cooperation agreements, policy directives from the Wenzhou Municipal Education Bureau, and program evaluation reports.

Field Observations: Non-participant observations were conducted in 8 settings, including joint project meetings, practical training sessions, and "dual-tutor" guidance sessions.

3.2.3 Data analysis

All interviews were transcribed verbatim and anonymized. A hybrid thematic analysis approach was employed, combining both deductive and inductive coding. Using NVivo 14 software, the initial coding cycle was informed by the pre-defined dimensions of the theoretical framework (CIE, UEC, PEA). Subsequent cycles allowed for emergent codes to surface from the data. Codes were then grouped into thematic categories (e.g., "mechanisms of curriculum updating," "barriers to data sharing," "student identity transformation") through an iterative process of constant comparison within and across cases.

3.3 Phase 2: Quantitative Survey

3.3.1 Instrument development and measures

The survey instrument was developed in two stages. First, items were adapted from established scales where possible: Local Identity was measured using a subscale from the Place Attachment Inventory, and Learning Engagement was adapted from the Utrecht Work Engagement Scale for Students. Second, based on the themes identified in Phase 1, new scales were developed to capture the core constructs of our framework:

Perceived Curriculum-Industry Embeddedness (P-CIE): 5 items.

Perceived University-Enterprise Coupling (P-UEC): 6 items.

New Quality Productivity Competency (NQPC):

7 items measuring self-assessed understanding and skills related to digitalization, green technology, and innovative thinking in a local context.

Local Career Intention (LCI): 4 items assessing the likelihood of seeking employment in Wenzhou after graduation.

All items used a 5-point Likert scale (1=Strongly Disagree, 5=Strongly Agree). The draft questionnaire was reviewed by two experts in vocational education and pilot-tested with 80 students. Based on the pilot data, exploratory factor analysis and reliability tests were conducted, leading to minor item refinement. The final scales demonstrated good internal consistency in the main study, with Cronbach's alpha values ranging from .84 to .91.

3.3.2 Sampling and data collection

The target population was full-time undergraduate and vocational undergraduate students in Wenzhou. A stratified random sampling strategy was employed. The sampling frame was stratified first by university type (application-oriented universities vs. higher vocational colleges) and then by field of study ("5+5" industry-related majors vs. other majors). A target sample size of N≥400 was determined a priori using G*Power software for structural equation modeling (SEM), anticipating a medium effect size with 80% power. The final survey was administered online via a professional platform in November 2025. A total of 642 responses were collected. After data cleaning for missing values, straight-lining, and completion time, 415 valid responses were retained (valid response rate: 64.6%).

3.3.3 Quantitative data analysis

Data analysis was conducted using SPSS 27.0 and AMOS 27.0. First, descriptive statistics and reliability analyses were performed. Second, confirmatory factor analysis (CFA) was conducted to validate the measurement model and assess convergent and discriminant validity. Finally, structural equation modeling (SEM) was used to test the hypothesized pathways derived from the theoretical framework (e.g., the effects of P-CIE and P-UEC on NQPC and LCI, with potential mediation effects). Model fit was evaluated using standard indices: χ^2/df, CFI, TLI, and RMSEA.

4. Findings

4.1 Qualitative Findings: The Landscape and Mechanisms of Localized Education

Analysis of the qualitative data revealed three distinct, yet interrelated, operational models of localized civic education in Wenzhou, each illuminating different aspects of the Dynamic Response Framework.

Model 1: The Embedded College Model (Exemplified by Case A). This model is characterized by deep structural coupling. The industry college operates under a joint governance committee, enabling direct and continuous University-Enterprise Coupling (UEC). A key mechanism identified is the "Live Project Pipeline," where participating enterprises feed real-time, minor technical or process optimization challenges into the curriculum. As one enterprise mentor noted, "These are not simulated cases. Students work on actual efficiency bottlenecks from our production line, and the best solutions are evaluated for implementation." This model demonstrated high Curriculum-Industry Embeddedness (CIE), as course modules were co-developed and updated semi-annually based on industry feedback. However, it also revealed a dependency on the strategic commitment of a single, large anchor enterprise.

Model 2: The Platform Intermediary Model (Exemplified by Case B). This model functions as a multi-actor hub, facilitated by municipal government investment. Its primary strength lies in enhancing Policy-Education Alignment (PEA) by aggregating demand from dozens of SMEs and matching it with student cohorts from various universities. A prominent theme was "Structured Exposure." Students engaged in short-term, rotating practicums across different firms within the industrial park. A student participant described, "It was like a 'buffet' of Wenzhou's digital economy. I saw different company cultures and tech applications, which helped me understand where I might fit." While this model broadened access, interviews indicated a challenge in achieving the deeper, skill-building engagement found in Model 1, sometimes leading to a "touristic learning" experience.

Model 3: The Agile Micro-Credential Model (Exemplified by Case C). This model prioritized rapid Curriculum-Industry Embeddedness (CIE) in response to emerging skill gaps, such as data analytics for e-commerce. It operated through "Modular Injection," where industry experts co-taught intensive, 1-credit skill-specific modules.

Analysis highlighted the theme of "Just-in-Time Knowledge." A faculty coordinator explained, "We bypass the 2-year curriculum revision cycle. If a new digital marketing tool becomes prevalent in Wenzhou's SME community, we can have a module on it within the next semester." This model was highly responsive but faced systemic constraints regarding faculty recognition and the integration of micro-credentials into traditional degree frameworks.

Cross-case synthesis identified two pervasive, system-level barriers: (1) The Data Silo Dilemma, where firms' precise skill data and universities' learning outcome data were not interoperable due to privacy and competitive concerns, hindering precise CIE; and (2) The Incentive Misalignment, where university promotion systems undervalued industry collaboration work for faculty, and SMEs lacked clear fiscal incentives for deep educational investment, constraining UEC.

4.2 Quantitative Findings: Validating Pathways and Relationships

4.2.1 Measurement model and descriptive statistics

Confirmatory Factor Analysis (CFA) confirmed the validity of the measurement model. All factor loadings exceeded 0.65, and the model fit indices were satisfactory ($\chi^2/df = 2.18$, CFI = 0.94, TLI = 0.93, RMSEA = 0.053). Composite Reliability (CR) values ranged from 0.85 to 0.92, and Average Variance Extracted (AVE) values were all above 0.50, establishing convergent validity. The square roots of AVEs were greater than the inter-construct correlations, supporting discriminant validity. Descriptive statistics and correlations are presented in Table 1.

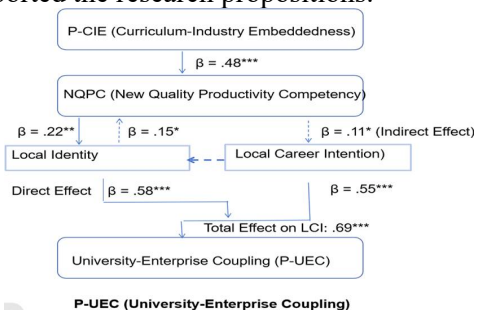
Table 1. Descriptive Statistics and Correlations of Key Variables (N=415)

Variable	Mean	SD	1	2	3
1. P-CIE	3.42	0.78	(0.82)		
2. P-UEC	3.21	0.85	.51**	(0.86)	
3. NQPC	3.65	0.71	.62**	.58**	(0.88)
4. Local Identity	3.89	0.80	.44**	.67**	.48**
5. LCI	3.28	0.92	.38**	.60**	.41**

Note: P-CIE = Perceived Curriculum-Industry Embeddedness; P-UEC = Perceived University-Enterprise Coupling; NQPC = New Quality Productivity Competency; LCI = Local Career Intention. Diagonal elements (in bold) are the square roots of AVEs. ** $p < .01$.

4.2.2 Structural model and hypothesis testing

The structural equation model exhibited a good fit with the data ($\chi^2/df = 2.31$, CFI = 0.93, TLI = 0.92, RMSEA = 0.056). The standardized path coefficients are presented in Fig. 2 and supported the research propositions.



***p < .001, **p < .01, p < .05

Figure 2. Structural Equation Modeling Results (Standardized Estimates)

Proposition 1 (P1) was strongly supported. Perceived Curriculum-Industry Embeddedness (P-CIE) had a significant direct effect on New Quality Productivity Competency (NQPC) ($\beta = .48$, $p < .001$).

Proposition 2 (P2) was supported. Perceived University-Enterprise Coupling (P-UEC) showed a weaker direct effect on NQPC ($\beta = .15$, $p < .05$) but a very strong direct effect on Local Identity ($\beta = .55$, $p < .001$). Crucially, Local Identity itself was the strongest direct predictor of Local Career Intention (LCI) ($\beta = .58$, $p < .001$). P-UEC also had a significant indirect effect on LCI via Local Identity ($\beta = .32$, $p < .001$).

Additional Pathway: An indirect path from P-CIE to LCI, mediated by NQPC, was also significant ($\beta = .11$, $p < .05$), though smaller than the identity-mediated path from UEC.

Proposition 3 (P3), regarding Policy-Education Alignment as a moderator, was explored through multi-group analysis based on students' self-reported awareness of relevant local talent policies. While the overall model held, the strength of the path from P-UEC to Local Identity was significantly stronger ($\Delta\chi^2 = 6.24$, $p < .05$) for the high-awareness group, providing preliminary support for PEA's amplifying role.

4.3 Integration of Qualitative and Quantitative Findings

The mixed-methods results converge to paint a coherent picture. The qualitative data explain how the key constructs operate in practice: CIE is realized through live projects and modular injections, while UEC works through deep mentorship and structured exposure. The quantitative data then validate the strength and

direction of these relationships at scale: CIE is the primary driver of competency development (NQPC), whereas UEC is the primary engine for fostering local attachment, which is the dominant force behind retention intentions. The identified systemic barriers from the qualitative phase provide a plausible explanation for the moderate mean scores observed in the quantitative survey, suggesting room for improvement through better policy-institutional alignment.

5. Discussion

The primary objective of this study was to dissect how higher education, at the prefectural-city level, responds to the novel talent demands generated by “New Quality Productivity” through localized practices. The convergent findings from the mixed-methods approach reveal a dual-pathway driving mechanism: curriculum-industry embedding primarily empowers students' cognitive and competency dimension, while deep university-enterprise coupling profoundly shapes their affective and identity dimension, jointly contributing to the formation of localized new quality human capital. This section interprets these findings theoretically, clarifies the contributions and practical implications of this research, and acknowledges its limitations.

5.1 Theoretical Dialogue and Contributions

The primary theoretical contribution of this study lies in constructing and empirically testing the "Dynamic Response" framework, providing a meso-level theoretical explanation for understanding the local practice of the "third mission" of universities during periods of rapid techno-economic paradigm shift. The findings robustly engage with and extend existing literature.

First, this study deepens the discussion on knowledge flows and talent supply within Regional Innovation Systems (RIS) theory. Traditional RIS theory emphasizes the university's role as a knowledge source, often treating the cultivation process of "talent"—a core element—as a black box. Our framework opens this black box, clearly identifying "curriculum-industry embeddedness" as the key process for encoding localized, cutting-edge explicit knowledge into the main educational channel. In contrast, "university-enterprise coupling" facilitates the transfer of tacit knowledge concerning local industrial practices and problem-solving paradigms. These two pathways respectively enhance the "technical adaptability" and "socio-cultural embeddedness" of the talent element within the regional innovation system, collectively ensuring the vitality of the innovation ecosystem.

Second, the findings refine the interactive mechanisms of the Triple Helix model in the prefectural-city context. Our results indicate that government, industry, and academia do not contribute homogeneously. In the Wenzhou case, Colleges and universities, especially vocational colleges, have demonstrated a posture of proactive response, while the participation of private enterprises, particularly small and medium-sized enterprises (SMEs), has shown a pragmatic tendency.—deep involvement depends on whether it can directly obtain short-term, low-cost human resources or solutions to practical problems. The local government's role was more evident in building platforms and providing initial policy signals rather than engaging in sustained, fine-grained coordination. This asymmetric triple helix model of "proactive university - conditionally participating enterprise - platform-guiding government" may constitute the unique dynamics of industry-education integration in regions with vibrant private economies in China, contrasting with models commonly dominated by large corporations or strong regional governments in developed economies.

Finally, this study provides crucial micro-level educational evidence for the burgeoning scholarly discussion on "New Quality Productivity." It successfully operationalizes this macro-level policy concept into observable educational practices and student competency variables, demonstrating that localized education serves as an effective micro-foundation for talent development in support of "New Quality Productivity." This moves beyond previous research that often remained at the level of policy interpretation or macro-level coupling, establishing a bridge connecting national strategy to classroom practice.

5.2 Practical Implications

The findings offer clear directions for improvement to different stakeholders:

For university administrators and faculty, it is necessary to move beyond the simplistic mindset of "offering a local course" and undertake

systematic curriculum restructuring. We recommend adopting the "agile micro-credential" model by establishing "rapid curriculum response teams" composed of industry experts, academic faculty, and instructional designers to transform the dynamics of local industrial technological iteration into modular, assemblable course components. Concurrently, it is imperative to reform faculty evaluation systems by incorporating high-quality industry collaboration and curriculum innovation achievements into promotion and performance assessment criteria to resolve the "incentive misalignment" dilemma. For enterprises, especially leading firms within industrial clusters, they should reframe the value logic of their educational engagement from "talent procurement" to "joint investment in talent." Enterprises need to more openly share non-core "real-world problem banks" as teaching resources and systematically design the responsibilities and development paths for "enterprise mentors," enabling them to guide not only skills but also convey professional identity and corporate culture.

For local governments, the key role is to become a "trusted data intermediary and matching platform." Breaking down "data silos" requires government leadership to collaborate with universities, industry associations, and enterprises to jointly establish data desensitization and exchange standards, and to build a dynamic mapping platform for "industrial skill demand – educational supply." The policy focus should shift from one-time subsidies to performance-based incentives tied to the depth and effectiveness of collaboration. Furthermore, promoting the inclusion of indicators such as students' high-quality local employment and enterprise satisfaction with cooperative education into the university evaluation system is crucial.

5.3 Limitations and Future Research Directions

This study has several limitations, which also point to directions for future research. First, relying primarily on cross-sectional data, while revealing correlations and influencing pathways among variables, necessitates stronger causal inference through longitudinal research designs. Future studies could track the career trajectories of graduates who participated in specific programs to more precisely assess the long-term effects of educational interventions. Second, as both the cases and the sample are concentrated in Wenzhou City, the generalizability of the findings must be approached with caution due to its highly developed private economy and unique local culture. Future comparative studies could select a government-led industrial city or a city with a higher proportion of state-owned economy as a control to examine the universality and variability of the "Dynamic Response" model under different institutional environments. Third, the measurement of the "policy-education alignment" dimension in this study primarily relied on perceptual data. Future research could incorporate quantitative content analysis of specific policy texts or ethnographic studies of policy implementation processes to delve deeper into how policy instruments concretely influence micro-level behaviors in university-enterprise cooperation

6. Conclusion

This study aims to explore a crucial yet under-researched question: how municipal localized higher education practices respond to the talent demands of innovation-driven regional development represented by China’s agenda for new productive forces.. Through an explanatory sequential mixed-methods design centered on Wenzhou, a quintessential hub of China’s private economy, the research yields a clear and actionable conclusion: the cultivation of localized human capital for new quality productivity is not a singular intervention but a systemic process driven by two distinct yet synergistic educational pathways.

The qualitative exploration uncovered three operational models—Embedded College, Platform Intermediary, and Agile Micro-credential—each embodying different configurations of curriculum- industry embeddedness (CIE) and university-enterprise coupling (UEC). These models elucidate the specific mechanisms that connect education to local industrial ecosystems, including real-world project chains and structured engagement. Crucially, they also highlighted persistent systemic barriers, chiefly data silos and incentive misalignments, that constrain optimal responsiveness. The subsequent quantitative survey of 415 students validated and generalized these insights. It confirmed that CIE is the primary driver for developing students’ New Quality Productivity Competencies, while UEC

is the paramount force for fostering local occupational identity, which in turn is the strongest predictor of local career intention. This dual-pathway model provides a nuanced explanation for how education contributes to regional talent supply: by building both the capability to work in innovative local industries and the commitment to do so.

The principal theoretical contribution of this work is the development and empirical validation of the "Dynamic Response" framework. By integrating and extending RIS and Triple Helix theories, this framework moves beyond stating that universities should engage regionally, to clarifying the distinct dimensions of participation including CIE, UEC, PEA and other related constructs function interdependently to translate dynamic industrial signals into human capital outcomes. It offers a meso-level analytical tool applicable to other regional contexts undergoing rapid technological transition.

For practitioners and policymakers, the implications are direct. University leaders must champion deep, credit-bearing industry collaboration and agile curriculum governance to simultaneously strengthen both the CIE and UEC pathways. Enterprise managers, particularly in leading enterprises, should evolve their role from consumers to co-investors in the talent ecosystem. For local governments, the mandate is to transition from providing generic subsidies to acting as architects of data infrastructure and smart incentives that reduce transaction costs and align the motives of all stakeholders.

This study is not without limitations. Its cross-sectional design advises caution in inferring causality, and its geographic focus in Wenzhou invites future comparative research in cities with differing economic structures. Further investigation is needed into the long-term career outcomes of participants and the precise policy instruments that most effectively enhance alignment. Nonetheless, this research firmly establishes that for cities navigating the imperatives of new quality productivity, investing in the systematic localization of higher education is not merely an educational reform, but a foundational strategy for sustainable regional innovation

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