JOURNAL OF SUSTAINABLE COMPETITIVE INTELLIGENCE

DOI: https://doi.org/10.37497/eagleSustainable.v17i.1369

ARTICLE

Competitive Intelligence and Social Identity in Higher Vocational Education: Evidence from Educational Reform in Yunnan

Inteligência Competitiva e Identidade Social no Ensino Profissional Superior: Evidências da Reforma Educacional em Yunnan

Yu Gao
Department of Education and Society, Institute of Science, Innovation and Culture (ISIC), Rajamangala University of Technology Krungthep, Bangkok, Thailand.

Premsuree Chaumthong
Department of Education and Society, Institute of Science, Innovation and Culture (ISIC), Rajamangala University of Technology Krungthep, Bangkok, Thailand.

ABSTRACT | Purpose: This study examines how competitive intelligence is associated with social identity in higher vocational education during educational reform in Yunnan, China. The study addresses the limited use of direct CI measures in educational research and the lack of evidence on how institutional intelligence becomes identity-relevant. **Methodology/approach:** A sequential explanatory mixed-methods design used 387 valid student questionnaires from five higher vocational colleges, 30 educator questionnaires, 50 employer evaluations, and 19 in-depth interviews with educators and employers. Competitive-intelligence capacity was operationalized through a six-item formative Competitive Intelligence Capacity Index (CICI) comprising policy intelligence and market-responsive intelligence. Social identity captured self-acceptance, belonging, and perceived social value. Regression, moderation, ANOVA, and thematic analysis were integrated. **Originality/Relevance:** The study addresses the limited use of direct CI measures in educational research and the lack of evidence on how institutional intelligence becomes identity-relevant. Vocational colleges should connect policy interpretation, employer intelligence, curriculum revision, practical learning, and stigma monitoring within a single accountable intelligence cycle. **Key findings:** The CICI mean was 3.02 on a five-point scale. Policy intelligence (β = .33, $p < .01$) and market-responsive intelligence (β = .31, $p < .01$) were positively associated with social identity, whereas cultural bias was negatively associated with identity (β = −.27, $p < .01$). Cultural bias weakened the policy-intelligence relationship (β = −.18, $p < .05$) and the market-responsive-intelligence relationship (β = −.16, $p < .05$). Interviews attributed these patterns to unequal resource conversion, weak policy communication, curriculum lag, shallow school-enterprise knowledge exchange, and credential-based recruitment bias. **Theoretical/methodological contributions:** The study proposes an education-specific formative operationalization of competitive-intelligence capacity and shows that intelligence becomes identity-relevant through visible institutional response.

Keywords | Competitive intelligence. Social identity. Higher vocational education. Educational reform. Policy intelligence. Market-responsive intelligence. Cultural bias. Yunnan.

Received: 18 Jul. 2026
Revised: 19 Sep. 2026
Accepted: 26 Sep. 2026
e-ISSN: 3085-7813

Corresponding Author: Premsuree Chaumthong – E-mail: premsuree.c@mail.rmutk.ac.th

Editor in chief: Altieres de Oliveira Silva – Alumni.In Editors

How to cite this article: Gao, Y., & Chaumthong, P. (2027). Competitive Intelligence and Social Identity in Higher Vocational Education: Evidence from Educational Reform in Yunnan. *Journal of Sustainable Competitive Intelligence*, *17*, e01369. https://doi.org/10.37497/eagleSustainable.v17i.1369

Alumni.in

RESUMO | Objetivo: Este estudo examina como a Inteligência Competitiva está associada à identidade social na educação profissional superior durante o processo de reforma educacional em Yunnan, China. O estudo aborda o uso limitado de medidas diretas de Inteligência Competitiva nas pesquisas educacionais e a escassez de evidências sobre como a inteligência institucional se torna relevante para a formação da identidade. **Metodologia/Abordagem:** Foi adotado um desenho de métodos mistos sequencial explicativo, utilizando 387 questionários válidos respondidos por estudantes de cinco instituições de educação profissional superior, 30 questionários de educadores, 50 avaliações de empregadores e 19 entrevistas em profundidade com educadores e empregadores. A capacidade de Inteligência Competitiva foi operacionalizada por meio de um Índice de Capacidade de Inteligência Competitiva (CICI) formativo, composto por seis itens que abrangem inteligência de políticas públicas e inteligência responsiva ao mercado. A identidade social contemplou autoaceitação, sentimento de pertencimento e valor social percebido. Foram integradas análises de regressão, moderação, ANOVA e análise temática. **Originalidade/Relevância:** O estudo aborda o uso limitado de medidas diretas de Inteligência Competitiva nas pesquisas educacionais e a ausência de evidências suficientes sobre como a inteligência institucional se torna relevante para a identidade. As instituições de educação profissional devem integrar a interpretação de políticas, a inteligência proveniente dos empregadores, a revisão curricular, a aprendizagem prática e o monitoramento do estigma em um único ciclo de inteligência com responsabilidades claramente definidas. **Principais Resultados:** A média do CICI foi de 3,02 em uma escala de cinco pontos. A inteligência de políticas públicas ($\beta = 0,33$; $p < 0,01$) e a inteligência responsiva ao mercado ($\beta = 0,31$; $p < 0,01$) apresentaram associação positiva com a identidade social, enquanto o viés cultural apresentou associação negativa com a identidade ($\beta = -0,27$; $p < 0,01$). O viés cultural enfraqueceu tanto a relação entre inteligência de políticas públicas e identidade social ($\beta = -0,18$; $p < 0,05$) quanto a relação entre inteligência responsiva ao mercado e identidade social ($\beta = -0,16$; $p < 0,05$). As entrevistas atribuíram esses padrões à conversão desigual de recursos, à comunicação deficiente das políticas, à defasagem curricular, à limitada troca de conhecimentos entre instituições de ensino e empresas e ao viés de recrutamento baseado em credenciais. **Contribuições Teóricas/Metodológicas:** O estudo propõe uma operacionalização formativa da capacidade de Inteligência Competitiva específica para o contexto educacional e demonstra que a inteligência se torna relevante para a identidade por meio de respostas institucionais visíveis.

Palavras-chave | Inteligência Competitiva. Identidade social. Educação profissional superior. Reforma educacional. Inteligência de políticas públicas. Inteligência responsiva ao mercado. Viés cultural. Yunnan.

1. INTRODUCTION

Higher vocational institutions face considerable challenge in the vocational-education reform in China. They are expected to produce technically capable graduates for the economic transformation of the region and to make vocational education a suitable, mobile and transferable learning pathway. National policy has focused on the need to increase this convergence with technology, the labour market requirements, certification, hands-on training and industry involvement since the adoption of the reform plan in 2019 (State Council of the People's Republic of China, 2019). In 2021, the Guidelines on High-quality Modern Vocational Education and the 2022 Revised Vocational Education Law (General Offices of the CPC Central Committee & State Council, 2021; Standing Committee of the National People's Congress, 2022) further strengthened parity of esteem, system integration, and enterprise engagement. However, critical policy analysis suggests that modernization objectives are not only accompanied by institutional ambiguity and uneven implementation (Liu & Hardy, 2023). These reforms thus present an intelligence challenge as well as an educational one: colleges have to pick up policy and industry signals, understand their significance, share them with decision makers, interpret them into programmes and resources, and assess their outcomes. The OECD (2023)

and UNESCO-UNEVOC (n.d) conclude that responsiveness to changing skill systems is a key TVET challenge in international evidence.

This sequence is similar to the competitive-intelligence (CI) cycle, but the development of CI has been more common in business environments than in education. Modern CI scholarship focuses not only on the informal collection or monitoring of information or on competitor surveillance but also on ethical environmental scanning, analysis, dissemination, decision support, coordinated action and feedback (Madureira et al., 2023; Maungwa & Laughton, 2023). Research in the environment of organizations relates CI to environmental sensing, knowledge integration, dynamic capabilities, strategic flexibility and performance (Hassani & Mosconi, 2022; Markovich et al., 2019; Ranjan & Foropon, 2021). At the higher education level, CI has been applied in various ways, including the recruitment of students and the positioning of institutions in the higher education landscape (Mgweba et al., 2024), but its use in curriculum governance, employer relationships, and student identity is still relatively underdeveloped. Competitiveness of vocational institutions then should be seen not only by the number of students enrolled or their rank but also as the ability to still carry on the existing programs, the trust of stakeholders, the credibility of occupational pathways, and the ability to achieve institutional legitimacy.

Yunnan Province is an empirical example of a geographically dispersed, economically highly diversified economy, which includes manufacturing, tourism, agriculture, health, business services, and public services. The province has been proposing to enhance the quality and efficiency of vocational education in 2024 by bringing together vocational and technical education resources more closely with the needs of industry and improving institutional capabilities (General Office of the People's Government of Yunnan Province, 2024). This is analytically valuable because enterprise partnerships, equipment, industry knowledgeable teachers and policy resources are distributed unevenly between urban and rural institutions, and between public and private colleges. This variation allows us to explore the relationship between social identity and the policy and signals from the labour market that institutions can translate into tangible educational support for the students.

Social identity is key since despite reform, vocational education remains embedded in a culturally entrenched academic status hierarchy. The evidence of vocational pathways is mixed: vocational education can offer hands-on skills and other ways to progress, but outcomes are linked to the quality of the vocational learning institution, regional opportunities, and the flexibility of the labour market (Guo & Wang, 2020; Wang et al., 2023). Stigma also exists and manifests as lower academic performance, poorer future prospects, and reduced status (Wang et al., 2022). Such judgements can influence students' self assessment, sense of self in the institution and value placed on their qualifications by others. Social identity is thus a possible factor to consider when evaluating engagement, confidence, persistence and commitment to an occupational pathway.

The study is aimed at this issue adopting the sequential explanatory mixed methods design with students, educators and employers in Yunnan. Social identity was reported by students as being moderately positive, degree based-preferences were expressed by employers, and higher vocational education was valued by educators. The quantitative outcomes suggest that policy intelligence and education practice that is responsive to the market are positive predictors while identity is a negative predictor and a moderator of cultural bias. Qualitative evidence includes descriptions of resource

inequality, policy-information gaps, curriculum-industry disconnection, shallow school-enterprise cooperation, and hiring prejudice. Combined, the evidence points to an intelligence-conversion issue: the signals of policy and labour market are there, but they are not always translated into a credible experience of the student and the employer.

The ability to conduct competitive intelligence is defined in this article as a Competitive Intelligence Capacity Index (CICI) that is formative and has 6 items observed in the questionnaire. The policy indicators are awareness of vocational-education policy, employment confidence resulting from policy, and provision of training resources via policy. The three aspects of market-oriented intelligence are alignment of course and jobs, practice-oriented teaching and practice, and meaningful internships. These are the perceptions of how well the institution can detect signals of reform and signals of occupation; and how well they can translate them into a response in education. The index does not use a reflective-factor assumption, as the indicators overlap rather than being mutually exclusive. The construct is assessed instead via component statistics and dimension-specific regression coefficients as well as content mapping.

The study addresses four gaps. First, a theoretical gap remains between CI research on institutional sensing and response and social-identity research on the evaluative meaning of group membership. Second, there is limited multi-stakeholder evidence on how reform intelligence, curriculum relevance, and cultural prejudice intersect in Chinese higher vocational education. Third, educational research lacks well-specified formative measures that translate institutional responsiveness into observable CI indicators. Fourth, inland provinces such as Yunnan remain underrepresented in international vocational-education research despite their distinctive regional and institutional conditions.

The study has three objectives. First, it operationalizes competitive-intelligence capacity as a formative index derived from the policy-intelligence and market-response indicators contained in the student questionnaire. Second, it examines how the two CI dimensions and cultural bias are associated with student social identity and whether cultural bias weakens the positive CI-identity relationships. Third, it explains the statistical patterns through educator and employer accounts of policy implementation, curriculum updating, cooperation, and recruitment. The analysis addresses three questions: (RQ1) What is the level and composition of perceived competitive intelligence in Yunnan's higher vocational institutions? (RQ2) How are policy intelligence, market-responsive intelligence, and cultural bias associated with student social identity? (RQ3) How do educators and employers explain the institutional mechanisms and cultural conditions underlying these relationships?

The article advances theory by arguing that the information of competitive intelligence becomes identity-relevant when it is made visible through established institutional practices such as the current courses, learning in practice, employer involvement, and policy support. It contributes methodologically in that it defines a formative CICI consisting of six observed items, but it keeps the two dimensions in regression to allow the distinct contribution of the two dimensions to be understood. It adds to the practice by demonstrating that to be intelligent, the routines of intelligence do not just entail the acquisition of information, but also the interpretation of policy, the reception of feedback from employers, a response to curriculum, the conversion of resources, and the questioning of signals drawn from the status bias of the market. The rest of the paper

elaborates the theoretical model, describes the mixed methods design and direct measurement of CICI, integrates the quantitative and qualitative data, and discusses the theoretical, institutional and policy implications.

2. THEORETICAL FRAMEWORK

2.1 Competitive intelligence as institutional responsiveness

Competitive intelligence is separate from competitor monitoring and from not processed information. Mature CI is a cycle of controlled intelligence which involves defining intelligence requirements, gathering and evaluating intelligence ethically, disseminating intelligence to responsible decision makers, connecting intelligence with action, and providing intelligence feedback to the next cycle (Madureira et al., 2023; Maungwa & Laughton, 2023). In vocational education, it's only when the credibility of the policy circulars, the vacancy data, employer feedback, graduate outcomes, occupational standards, and technology trends are evaluated that they become intelligence. This distinction turns the focus of the analysis from the availability of information to the institutional capacity to make decisions.

The central governance issue for vocational colleges is not the scarcity of information, but the lack of uniformity of information between stakeholders. There are a number of different ways for policy makers, employers, teachers, students, and institutional leaders to have evidence that is either received late or understood differently. Both Oraee (2023) and Lutz and Bodendorf (2020) demonstrate the ability to articulate, search, evaluate, share, and utilize information, while the latter also demonstrates how scattered open-source information can be organized for the purpose of stakeholder intelligence. While they can be considered as solutions for information management, they are incomplete and cannot be used as educational intelligence governance if the responsibility is limited to only these functions: signal validation, conflicting evidence resolution, action authorization, and outcome review across institutions.

Dynamic Capabilities research helps to understand the purpose of CI: the continual sensing, seizing and reconfiguration of data, not the gathering of data (Teece, 2007). While the technologies and settings are different, the common conclusion is that there is no value in heterogeneous signals unless they are translated into responsive action, as found in manufacturing SMEs, in big-data analytics and in the practice of dynamic capabilities, and in the content generated by the professionals (Hassani & Mosconi, 2022; Ranjan & Foropon, 2021; Wu et al., 2023; Qian et al., 2024). The findings of these studies thus support the responsiveness logic of CI, yet fail to fill a void in education that regards the manifestation of institutional response to students and how it aids in the process of establishing legitimacy.

When applied to higher education, this logic is the one that needs to be coordinated at programme, college and provincial levels. Occupational standards are required by programme teams, internship evidence for programme teams, curriculum-gap intelligence for programme teams, cross-programme evidence for college leader decisions on resources, teacher development, partnerships, and student services, and aggregate evidence for use by provincial actors for funding, shared employer networks,

and implementation support. Vertical coordination and horizontal exchange among stakeholders are thus crucial for strategic use. To shift CI from episodic consultation to a capability within an organization, the triggering signal, decision, responsible unit, expected outcome and evidence reviewed in the next cycle should be documented in permanent feedback mechanisms.

Competitive intelligence capacity is conceptualized as the perceived institutional competence to detect policy and labour-market signals, and to turn them into resources and responses to education. It is specified formatively with two complementary dimensions, namely, policy intelligence is awareness, interpretation, confidence related to policy and the perceived conversion of policy into resources while market responsive intelligence is the one related to curriculum job alignment, practical teaching, and internship relevance. Process evidence of stakeholder intelligence exchange is gathered through educator and employer interviews. The CICI thus reflects a visible layer of CI capability at the student-facing end of the CI process, not all aspects of intelligence governance, intelligence analysis or institutional performance.

Competitive must also be qualified in a public educational environment. Sustainable competitive advantage is not interpreted as the "race to the bottom" to outperform neighbouring colleges, but rather the sustained ability to keep the curriculum fresh, build competent faculty, keep employers in trust, translate policy opportunities into curriculum value and keep credible progression pathways. While in the form of an advantage, CI can be used to enhance decision quality and adaptability (Olszak et al., 2023; Teece, 2007), only when intelligence is embedded in recurrent institutional routines and not primarily as a short-term positioning or recruitment device (Markovich et al., 2019; Mgweba et al., 2024). This separation is not just between competitiveness and rivalry, but between competitiveness and institutional resilience and public value.

2.2 Social identity in vocational education

Social identity theory is the notion that one's self comes from group affiliation and the importance of group affiliation (Tajfel & Turner, 1979). Social identity in this study is characterized by self-acceptance, belonging and perceived social value. Confidence in educational trajectories, relational and institutional inclusion, and the perceived social and economic value of membership in vocational institutions constitute these dimensions.

Belonging research builds this history by tracing identity in the context of relationships, institution and social context (Allen et al., 2021). This point is particularly relevant for the Chinese vocational education system, where students can be internally included but still feel an external hierarchy between vocational and academic education. There is no compelling evidence of 'compensatory' and 'disadvantaging' effects, the quality of the programmes is relevant, as is the opportunity available in the region and the status of vocational educators in the labour market (Guo & Wang, 2020; Wang et al., 2023); and vocational educators negotiate disempowering labels and professional recognition (Trent & Liu, 2024). The important point is that vocational identity is not solely an individual psychological reaction, but is a relation between the individual and the institution as well as society.

The external classification of vocational credentials is described through the lenses of stigma and cultural-capital perspectives, while the institutional conditions that can support or undermine

such classifications are described by employability research. Vocational education still carries with it stereotypes and a loss of status (Wang et al., 2022), and the meaning of credentials can be socially graded, serving as a signal of competency, not necessarily a neutral one (Bourdieu, 1986). On the contrary, curriculum relevance, work-based learning, skill development, and institutional support strengthen graduate transitions (Huang et al., 2022; Jiang et al., 2023; Zhang et al., 2022); however, the development of soft skills is still limited by their aspiration and structure (Liu, 2025). As set out in the above literatures, it is clear that better institutional performance can foster identity, but employer recognition should not be used as an impartial gauge since the market signals may carry status-based distinctions.

2.3 Linking competitive intelligence to social identity

The suggested mechanism is not one of changing social identity of the information itself, but rather of the social identity reacting to the institutional implications of intelligence. Policy and market signals become identity relevant when they are translated into visible commitments like a new curriculum, available training materials, relevant and engaging practical learning, reputable internships, and school-enterprise co-design. Responses that indicate that students' learning group is up-to-date, appreciated, and linked to meaningful work opportunities are the indicators for successful conversion, while unsuccessful conversion signals otherwise.

The combination of CI embeddedness and stakeholder theory provides an answer to the question of why conversion can fail. The use of intelligence in an organization's process is highlighted by Markovich et al. (2019) and the idea of using CI for directional change is presented by Sadeghiani et al. (2022) when the evidence calls for a change in action. In addition to this, the theory of stakeholders also claims that students, teachers, employers, government bodies, families and communities have unequal information and interests (Freeman, 1984). In vocational colleges, intelligence can thus be gathered without relating to curriculum committees, teachers or student services. A mature CI process should make the pathway from signal to decision clear and provide clearly defined responsibilities for interpretation, action and feedback to relevant stakeholders.

Intelligence by an employer must also be critical, not automatic, market orientation. Employer preferences may be a reflection of actual competency needs, but they may also be a reproduction of degree-based exclusion, as outlined in the cultural-capital theory (Bourdieu, 1986). So, educational CI should first ask, what is desired by employers, why, does this desire predict job performance, and can there be other evidence of competence. The question is not about the limits of responsiveness, it is about the importance of critical evaluation as an element of intelligence governance.

2.4 Cultural bias as a boundary condition

Cultural bias is considered as a boundary condition since the improvement of institutions does not ensure external recognition. However, students can have improved training and families or employers may still devalue vocational qualifications. Bias is thus a loss of conversion between institutional response and social recognition; policy intelligence can be turned into resources,

market intelligence into curricula and real opportunities, but all these enhancements are viewed through pre-established status systems. In itself, publicity will not be enough to solve this issue, but more effective counter-signals include clear graduate outcomes, proven progression, employer accountability, competencies in selection procedures and explicit connections between qualifications and occupational performance.

2.5 Hypotheses

The cross-sectional design supports association and statistical prediction rather than causal identification. H1a: Policy intelligence is positively associated with students' social identity. H1b: Market-responsive intelligence is positively associated with students' social identity. H2: Cultural bias is negatively associated with students' social identity. H3a: Cultural bias weakens the positive association between policy intelligence and social identity. H3b: Cultural bias weakens the positive association between market-responsive intelligence and social identity. H4: Student social identity differs across major categories and institution types.

The CICI is a formative composite composed of policy intelligence and market-responsive intelligence. The regression model retains these two dimensions as separate predictors, allowing the empirical test to show which parts of competitive intelligence carry the relationship with identity. Figure 1 presents the direct measurement model and the moderating role of cultural bias.

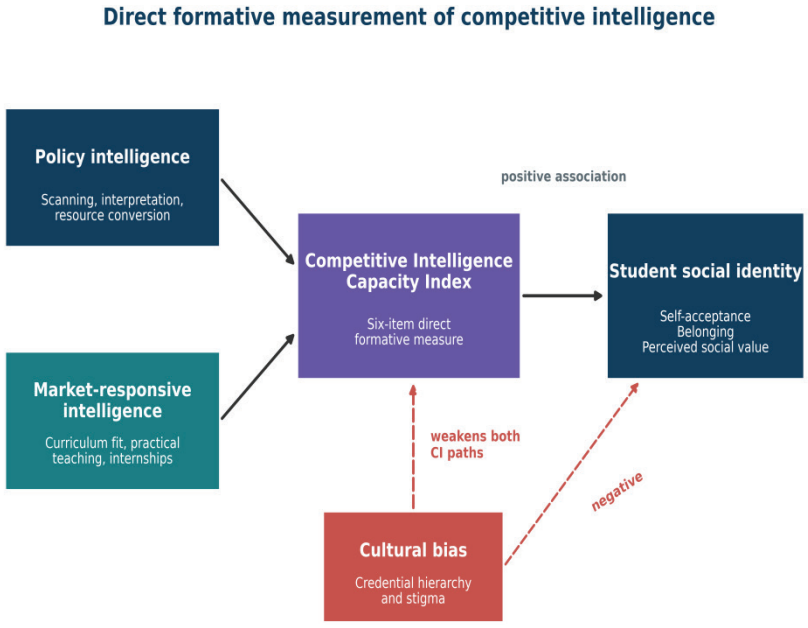


Figure 1. Formative competitive-intelligence measurement model and cultural-bias moderation.

3. METHOD

3.1 Research design and setting

The study was of sequential explanatory mixed methods design. The patterns in competitive intelligence, social identity, and cultural bias were first identified by quantitative surveys, and then the qualitative interviews examined the implications for the school cultural patterns and educational practice of the school and the employer's perception of the patterns of policy implementation. It is a good design to use when there are statistical relationships to explain in a context and multiple stakeholder groups provide various evidence types (Creswell & Plano Clark, 2018). Integration took place at interpretation when a joint display was created to link quantitative coefficients with themes from the educator and employer.

The survey was carried out in the field during the period of June to December 2024 in Yunnan Province. The 5 higher vocational colleges included 3 in the Double-High Plan, and 2 not in the Double-High Plan. The institutional frame was public and private colleges, and aimed for urban-rural and discipline diversity. The quantitative strand included student, educator and employer questionnaires, and the qualitative strand included semi-structured interviews with educators and employers.

3.2 Participants and unit of analysis

Overall, 400 student questionnaires were sent to 387 were completed and considered valid (96.75% valid response rate). Students were sampled by stratified random sampling by year level, institution type, and major category. Valid sample consisted of 200 men and 187 women and had 312 students from public institutions and 75 students from private institutions. The main categories covered were: science-related (engineering, agriculture and medicine); finance (economics and business); culture (tourism); education (physical education); and public services. In the case of regression, moderation and group comparisons, the individual student was the unit of analysis.

The educator sample included 30 faculty and administrative staff, all of whom had experience teaching and implementing policies. This employer sample comprised 50 employers from the sectors that recruit vocational graduates such as manufacturing, IT, tourism, finance and business, public services, education, agriculture and health. Employer questionnaire information was used in order to provide context for graduate characteristics and recruitment practices, but was not used in place of student scale scores; quantitative data from educators and employers were used for context triangulation.

The completed qualitative corpus comprised 19 in-depth interviews: nine educators and ten employers. Participants were assigned de-identified codes. Interviews examined policy implementation, resource allocation, curriculum-industry alignment, school-enterprise cooperation, recruitment practices, credential bias, and strategies for strengthening vocational education. Table 1 summarizes the analysed evidence.

Table 1. Analysed samples and evidence structure

Evidence source	Analysed n	Selection/role	Use in the study
Students	387 valid	Stratified random sampling across institution type, major and year	CICI, social identity, cultural bias, regression, moderation and ANOVA
Educators	30	Purposive sampling of teachers and administrators	Policy and educational-practice context
Employers	50	Purposive sampling of enterprises hiring vocational graduates	Graduate capability and recruitment context
Interviews	19 (9 educators; 10 employers)	Semi-structured purposive interviews	Explanation of policy conversion, curriculum response, cooperation and bias

3.3 Measures

Student social identity was measured by six five-point Likert items assessing pride in the major, confidence in the career choice, institutional identification, respect within the school, family support for the vocational choice, and the perceived social contribution of vocational graduates. The scale combines self-acceptance, belonging, and perceived social value. The reported internal consistency was Cronbach's alpha = .84, and the reported confirmatory model showed RMSEA = .06 and CFI = .92.

Policy intelligence was measured through three observed items: awareness of vocational support policies such as the Double-High Plan, employment confidence arising from policy, and access to practical-training resources through policy. The student dimension mean was 2.95 (SD = .91), and the policy-perception scale had a reported alpha of .78. The indicators capture the student's direct perception that policy information is understood and converted into institutional support.

Market-responsive intelligence was measured through three observed items: curriculum-job alignment, practical orientation of teaching, and the sufficiency and meaningfulness of internships. The student dimension mean was 3.08 (SD = .85). These indicators measure whether labour-market and occupational information becomes visible in programme content and practical learning.

Cultural bias was measured through perceptions that vocational education is inferior to undergraduate education, family support for vocational choice, workplace prejudice, and growing respect for skilled talent. Positive items were reverse-oriented so that higher scores represented stronger bias. The reported cultural-bias reliability coefficient was alpha = .75, and the student mean was 3.42 (SD = .74).

Educator questionnaires covered policy understanding, resource acquisition, uneven implementation, curriculum-industry match, school-enterprise cooperation, practical teaching, student identity, credential prejudice, employer degree preferences, and changes in social recognition. Employer questionnaires assessed satisfaction with professional skills, practical operation, and teamwork. The interview guides elicited examples of policy use, curriculum updating, cooperation mechanisms, recruitment criteria, social prejudice, and institutional response.

3.4 Formative operationalization of competitive-intelligence capacity

Competitive intelligence was measured directly as a formative index rather than as a reflective personality-like scale. The Competitive Intelligence Capacity Index (CICI) comprises all six policy-

intelligence and market-responsive-intelligence items listed in Table 2. Each item was recorded on the same five-point response scale and assigned equal weight. This specification treats policy sensing and labour-market response as defining components of institutional intelligence: the construct changes when any component changes, and the indicators need not be interchangeable or highly correlated.

$$CICI(i) = [PI1(i) + PI2(i) + PI3(i) + MI1(i) + MI2(i) + MI3(i)] / 6$$

Equivalently, $CICI(i) = [PI(i) + MI(i)] / 2$, where $PI(i)$ is the mean policy-intelligence score and $MI(i)$ is the mean market-responsive-intelligence score for student i. With three equally weighted indicators in each dimension, the aggregate student mean is $(2.95 + 3.08)/2 = 3.015$, reported as 3.02. The formative index was content-mapped to the CI cycle: PI1 represents environmental scanning; PI2 represents interpretation of policy consequences; PI3 represents conversion into resources; MI1 represents market-information application to curriculum; MI2 represents knowledge conversion in teaching; and MI3 represents stakeholder and workplace intelligence through internships.

The six indicators were mapped to the competitive-intelligence cycle through a theory-led content analysis. The original questionnaire items had been reviewed by three vocational-education experts, with Item–Objective Congruence values above .50; however, that review addressed the original policy and educational-practice constructs rather than a newly developed CI scale. CICI is therefore treated as a formative operationalization of competitive-intelligence capacity. Its interpretation rests on transparent indicator mapping, equal-weight scoring, component statistics, and the separate regression coefficients for policy intelligence and market-responsive intelligence.

Qualitative stakeholder intelligence exchange was analysed as process evidence supporting the formative interpretation. Interview questions examined whether employers and educators exchanged decision-relevant information, whether feedback influenced curriculum and training, and whether policy information was clear enough to support cooperation. The qualitative evidence was integrated with, but not numerically added to, the six-item student CICI. Table 2 presents the complete item-to-construct mapping and scoring rule used for the direct CICI measure.

Table 2. Formative Competitive Intelligence Capacity Index: observed indicators and scoring map

Code	Observed item	CI function	Dimension
PI1	Awareness of vocational-education support policies	Environmental and policy scanning	Policy intelligence
PI2	Government policies have enhanced employment confidence	Interpretation of policy consequences	Policy intelligence
PI3	Policy enabled access to practical-training resources	Conversion of intelligence into resources	Policy intelligence
MI1	Course content matches future job requirements	Application of labour-market intelligence	Market-responsive intelligence
MI2	Teaching methods emphasize practical skills	Knowledge conversion into pedagogy	Market-responsive intelligence
MI3	The institution provides meaningful internships	Stakeholder/workplace intelligence exchange	Market-responsive intelligence

3.5 Quantitative models

Multiple regression estimated the dimension-specific contribution of competitive intelligence to student social identity. The model retained policy intelligence and market-responsive intelligence separately because they are the formative components of CICI and may contribute differently to identity:

$$SI(i) = \beta_0 + \beta_1 PI(i) + \beta_2 MI(i) + \beta_3 CB(i) + \varepsilon(i)$$

SI(i) is student social identity, PI(i) is policy intelligence, MI(i) is market-responsive intelligence, and CB(i) is cultural bias. The analysis reports standardized coefficients for these three focal predictors. Moderation was tested through hierarchical regression using mean-centered dimensions and cultural bias (Hayes, 2022):

$$SI(i) = \beta_0 + \beta_1 PIc(i) + \beta_2 MIc(i) + \beta_3 CBc(i) + \beta_4 [PIc(i) \times CBc(i)] + \beta_5 [MIc(i) \times CBc(i)] + \varepsilon(i)$$

The interaction terms test whether cultural bias changes the strength of the two competitive-intelligence dimensions. ANOVA compared social identity across major categories and institution types. The ANOVA results are reported using the available F statistics and significance thresholds; effect sizes were not available for assessing the magnitude of the group differences.

3.6 Qualitative analysis and integration

NVivo 12 was used to code the interview transcripts, and the material was analysed thematically. The distinction between coding topics and developing analytic themes was informed by Braun and Clarke (2021). Policy implementation and resource allocation were interpreted as reform-intelligence conversion; curriculum-industry disconnection as a labour-market intelligence gap; superficial school-enterprise cooperation as weak stakeholder intelligence exchange; and employer credential bias as a cultural condition capable of distorting market information.

Integration was achieved by interpreting quantitative and qualitative evidence around the same institutional problems rather than converting qualitative evidence into numerical scores. Interview material was used to contextualize each reported statistical relationship and to identify plausible institutional mechanisms. This explanatory integration does not establish mediation or causation.

3.7 Missing data, validity, ethics, and reproducibility

After data screening, 13 student questionnaires were excluded as invalid, leaving 387 valid cases for analysis. Scale validity was supported by expert content review, pretesting, internal-consistency estimates for the principal reflective scales, reported CFA fit for social identity, and triangulation across students, educators, and employers.

Methodological constraints include cross-sectional measurement, the predominant use of perceptual measures, uneven stakeholder sample sizes, incomplete reporting of some control

coefficients and effect sizes, and the content-based formative specification of the six observed CI indicators. Student perceptions are appropriate for capturing experienced policy responsiveness, curriculum relevance, and identity, but they are vulnerable to common-method influence, recall, and differences in policy awareness. Because family support appears within both the social-identity and cultural-bias item sets, some conceptual overlap is also possible and may inflate observed associations; independent validation should separate these domains more clearly. Triangulation with educator and employer evidence broadens the evidential base but does not eliminate these limitations. The CICI should therefore be interpreted as a context-grounded formative operationalization rather than as a universally validated reflective scale.

The survey cover pages informed participants of the research purpose, anonymity, confidentiality, and academic use of responses. Interview quotations were de-identified, anonymous IDs were used, and files were stored with password protection. No directly identifying information is reported in the article.

Reproducibility materials include the aggregate analysis dataset, the CICI codebook, and Python syntax for reproducing the descriptive tables and figures and for implementing the documented regression, moderation, and group-comparison procedures with authorized participant-level data. No synthetic participant records were generated.

3.8 Methodological limitations and transferability

The regional context bias cannot be ruled out either because all the five participating colleges are in Yunnan. In terms of geographic, institutional and sectoral diversity, the province is analytically useful, but the results do not automatically apply to the overall higher-vocational system in China or to other countries. All policy regimes, labour markets, institutional governance, resource conditions and status hierarchies need to be comparable for the external validity. These reports, therefore, should be viewed as a reflection of the regional institutional context in which they occurred.

Replicability should be assessed by independent replication across other provinces and institutional types, including multiple assessment of students' performance and administrative data of the frequency of curriculum revisions, internship quality data, allocation of resources, records of employer feedback, and outcomes for graduates. Further research is also needed to see how sensitive the formative weights are, to measure the multilevel differences in performance between programmes and institutions, and to understand if the same set of CI dimensions are relevant in different governance contexts. The extensions are required before the CICI can be considered as a transferable institutional benchmark.

4. RESULTS AND DISCUSSION

4.1 Competitive intelligence capacity and construct profile

Students reported a mean social-identity score of 3.18 (SD = .82), slightly above the midpoint of the five-point scale. Policy intelligence was close to the midpoint (M = 2.95, SD = .91), market-

responsive intelligence was moderately positive (M = 3.08, SD = .85), and perceived cultural bias was higher (M = 3.42, SD = .74). The CICI, calculated from the six equally weighted observed indicators, was 3.02. Table 3 presents the construct profile, and Figure 2 displays the relative levels.

The CICI mean indicates moderate, rather than fully developed, perceived institutional intelligence capacity. Market-responsive intelligence was slightly higher than policy intelligence, suggesting that curriculum alignment, practical teaching, and internship experience were more visible to students than policy interpretation and resource conversion. Cultural bias exceeded both CI dimensions, indicating that institutional responsiveness operates within a comparatively strong credential-status environment.

Educators reported relatively high recognition of higher vocational education (M = 3.59, SD = .73) and policy awareness/support (M = 3.52, SD = .78), with moderately positive evaluations of educational practice (M = 3.30, SD = .72). Employers reported moderate satisfaction with professional skills (M = 3.30, SD = .88), practical operation (M = 3.45, SD = .82), and teamwork (M = 3.25, SD = .85). These stakeholder results contextualize the student CICI by showing that educators perceived institutional responsiveness and employers recognized practical competence, even though such recognition did not necessarily translate into equivalent credential status.

Table 3. Descriptive statistics for competitive intelligence, social identity, cultural bias, and stakeholder evaluations

Respondent group	Construct	n	M	SD	Interpretation
Students	Competitive Intelligence Capacity Index	387	3.02	—	Moderate formative index
Students	Policy intelligence	387	2.95	.91	Near midpoint
Students	Market-responsive intelligence	387	3.08	.85	Moderately positive
Students	Social identity	387	3.18	.82	Moderately positive
Students	Cultural bias	387	3.42	.74	Above midpoint
Educators	Recognition of vocational education	30	3.59	.73	Relatively high
Educators	Policy awareness/support	30	3.52	.78	Above midpoint
Educators	Educational practice	30	3.30	.72	Moderately positive
Employers	Professional skills satisfaction	50	3.30	.88	Moderate
Employers	Practical operation satisfaction	50	3.45	.82	Moderate-high
Employers	Teamwork satisfaction	50	3.25	.85	Moderate

Note. CICI is a formative composite. Its mean was calculated from the equally weighted policy-intelligence and market-responsive-intelligence dimension means. An index-level standard deviation was not available from the aggregate analysis results.

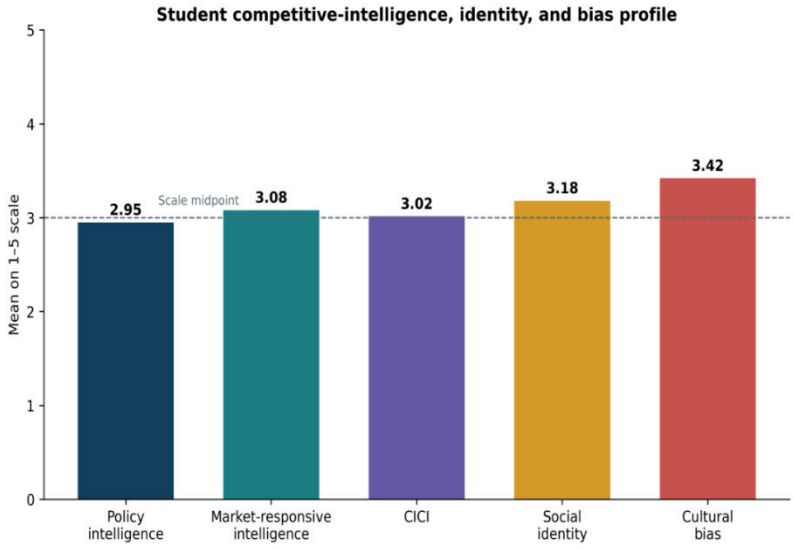


Figure 2. Student profile for policy intelligence, market-responsive intelligence, CICI, social identity, and cultural bias**.**

The descriptive pattern supports the formative interpretation of competitive intelligence. Policy intelligence and market-responsive intelligence are related institutional functions but are not identical. An institution may communicate policy effectively yet fail to update curricula, or it may provide practical learning while students remain unaware of the reform and resource logic supporting it. Retaining both dimensions therefore preserves actionable information that a single undifferentiated score would conceal.

4.2 Competitive-intelligence dimensions and social identity

Policy intelligence was positively associated with student social identity (β = .33, t = 4.56, p < .01), supporting H1a. Market-responsive intelligence was also positively associated with identity (β = .31, t = 4.23, p < .01), supporting H1b. Cultural bias was negatively associated with identity (β = −.27, t = −3.85, p < .01), supporting H2. The positive coefficients for both dimensions indicate that each component of the formative CICI is independently associated with the identity value students attach to vocational education. Table 4 and Figure 3 summarize the inferential results.

Table 4. Regression, moderation, and group-comparison results

Hypothesis/test	Predictor or factor	Reported statistic	p	Decision
H1a	Policy intelligence -> social identity	β = .33; t = 4.56	< .01	Supported
H1b	Market-responsive intelligence -> social identity	β = .31; t = 4.23	< .01	Supported
H2	Cultural bias -> social identity	β = -.27; t = -3.85	< .01	Supported
H3a	Policy intelligence x cultural bias	β = -.18; t = -2.56	< .05	Supported
H3b	Market-responsive intelligence x cultural bias	β = -.16; t = -2.34	< .05	Supported
H4	Major-category differences	F = 3.78	< .05	Supported
H4	Institution-type differences	F = 2.95	< .05	Supported

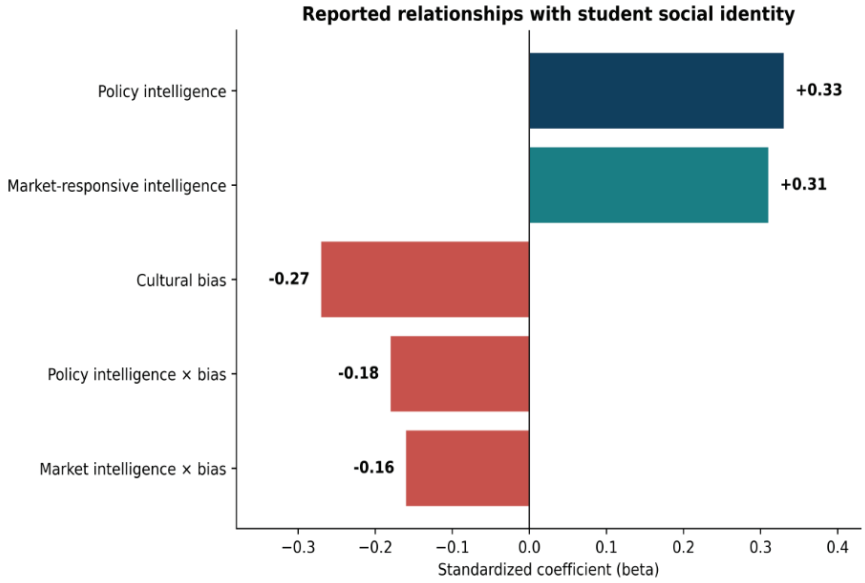


Figure 3. Standardized coefficients for the two CI dimensions, cultural bias, and interaction terms.

The policy-intelligence coefficient is substantively important because it indicates that policy becomes identity-relevant only when students perceive its institutional consequences. Awareness of reform, confidence in employment prospects, and access to policy-enabled resources jointly signal that the institution can convert external direction into student-facing value. A policy announcement without corresponding changes in equipment, internships, teacher capacity, or opportunity is unlikely to strengthen identity. The qualitative evidence supports this distinction by showing that participants evaluated policy primarily through implementation rather than through formal policy language.

The association for market-responsive intelligence is similarly strong. Curriculum-job fit, practical teaching, and meaningful internships make vocational membership both useful and socially connected, consistent with evidence that institutional practices shape employability and transition (Huang et al., 2022; Jiang et al., 2023; Zhang et al., 2022). The result also extends CI research beyond its common emphasis on organizational sensing: labour-market intelligence becomes educationally consequential only when it changes teaching, practice, and partnership arrangements that students can observe.

Cultural bias remained negatively associated with identity after the two CI dimensions were considered. This matters strategically because it separates institutional quality from social recognition: students may acknowledge programme value while simultaneously perceiving a lower-status credential environment. The result is consistent with stigma research and cultural-capital theory, which show that credentials are socially classified as well as evaluated for competence (Bourdieu, 1986; Wang et al., 2022). Quality improvement is therefore necessary but may be insufficient for sustainable legitimacy unless institutions also produce credible evidence that challenges status-based screening.

4.3 Cultural bias as a moderator

The interaction between policy intelligence and cultural bias was negative and significant ($\beta = -.18$, $t = -2.56$, $p < .05$), supporting H3a. The interaction between market-responsive intelligence and cultural bias was also negative ($\beta = -.16$, $t = -2.34$, $p < .05$), supporting H3b. Thus, the positive associations between both CI dimensions and social identity became weaker as perceived cultural bias increased.

The interactions indicate that institutional responses are interpreted within a broader cultural field. Improved resources or curricula can signal institutional value, but persistent status hierarchies may reduce the extent to which those improvements translate into social esteem. In CI terms, the institution may respond effectively to policy or labour-market information while the external environment continues to discount the resulting vocational credential. This finding strengthens the case for integrating stigma monitoring, employer engagement, and evidence-based communication into the intelligence cycle rather than treating responsiveness as complete once internal changes are implemented.

The interaction coefficients are interpreted as conditional associations rather than causal effects because the design is cross-sectional. The interview evidence is consistent with the observed moderation pattern and provides contextual explanations, but it does not establish mediation or causation. Employers acknowledged vocational graduates' practical abilities while often preferring bachelor's-degree credentials in initial screening, and educators described students who perceived limited opportunities despite possessing relevant skills. Together, these accounts illustrate how status-based screening can weaken the social recognition of institutional improvements.

4.4 Differences by major and institution type

Social identity differed significantly across major categories ($F = 3.78$, $p < .05$) and institution types ($F = 2.95$, $p < .05$). Post hoc comparisons indicated higher identity among students in science, engineering, agriculture, and medicine than among students in education/physical education and public services. Students attending public institutions also demonstrated higher social identity than those attending private institutions. Because effect sizes were not available, the magnitude of these differences cannot be assessed.

The major pattern is consistent with visible labour-market signalling. Disciplines linked to recognized technical, health, agricultural, or engineering roles may provide clearer occupational identities. Public-service and education-related vocational programmes may face less distinct labour-market positioning or stronger competition from degree-level credentials. The institutional pattern corresponds with interview evidence that public institutions accessed policy resources, equipment, and enterprise teachers more easily. Resource visibility can become an identity signal: students may infer the value of their group from the quality and recognition of their institution.

A second CI implication is that intelligence needs differ across programmes, so a single undifferentiated college-wide system is unlikely to be sufficient. Each programme requires its own intelligence questions, employer network, occupational standards, and review cycle, while central

governance should provide shared infrastructure, ethics, data standards, and accountability. Programme teams can then interpret sector-specific signals within a common institutional framework.

4.5 Qualitative theme 1: Unequal reform sensing and resource conversion

Educators described uneven implementation. Respondents from private colleges reported more cumbersome funding procedures, slower approvals, and greater difficulty accessing equipment or industry-experienced teachers. Public-college respondents acknowledged that larger institutions often had an advantage in securing resources. Employers also reported uncertainty about how the Double-High Plan and industry-education integration policies affected enterprise participation.

This theme distinguishes policy availability from policy intelligence. A policy may be publicly available yet remain difficult for decision makers to translate into operational choices. Reform sensing requires targeted interpretation: what opportunities exist, which institutions or enterprises are eligible, what commitments are required, and how collaboration risks are allocated. Interview evidence suggested that policy communication did not always answer these questions, contributing to enterprise hesitation and limiting cooperation to internships or occasional lectures.

The problem is also distributive. Institutions with stronger administrative capacity are better positioned to interpret applications, document compliance, and secure funding, creating a cumulative advantage in which existing capability facilitates access to further resources. A CI perspective therefore extends policy-implementation analysis by treating information-processing capacity itself as a strategic resource. Provincial support should include shared policy-intelligence services, templates, advisory teams, and transparent allocation dashboards alongside funding mechanisms.

4.6 Qualitative theme 2: Curriculum-industry disconnection as an intelligence failure

Curriculum lag was repeatedly identified by educators and employers. Nursing respondents cited intelligent-care technologies that had not yet entered teaching; IT employers reported gaps in graduates' exposure to current programming, big-data, and artificial-intelligence tools; and tourism and business respondents sought stronger coverage of personalized travel, livestream commerce, market research, and data analysis. Although the examples are sector-specific, the underlying process is consistent: industry change was visible outside the institution but was not always incorporated into curricula quickly enough.

This pattern reflects a disconnect between sensing and reconfiguration. Employer feedback can be collected, but curriculum change may be constrained by approval processes, textbook cycles, teacher development, and resource availability. A CI system should therefore specify how a signal moves from source to decision. Employer feedback should be triangulated with occupational standards, vacancy data, graduate outcomes, and other evidence, then routed to programme committees for a documented decision and follow-up. Without this chain, school-enterprise cooperation can generate activities without producing organizational learning.

This theme also clarifies the link with social identity. Students may devalue vocational membership when they encounter outdated tools or discover that expected workplace skills are absent from training. Conversely, a programme that is visibly updated and explains why changes were made can signal that students belong to a current and developing profession rather than to a residual educational track.

4.7 Qualitative theme 3: Shallow stakeholder intelligence exchange

Both groups described school-enterprise partnerships as more formal than substantive. Enterprises delivered lectures or hosted interns, but they did not consistently participate in curriculum design, and institutions did not always respond to requested curriculum changes. Employers called for clearer cooperation platforms, responsibilities, training bases, and lower communication costs, while teachers sought greater access to industry expertise and more effective professional development.

Stakeholder theory distinguishes mere presence from participation and influence (Freeman, 1984). In an intelligence system, an employer becomes a useful source when its information is systematically captured and analysed, and a strategic partner when that evidence is incorporated into decisions and feedback. The interviews indicated weak dissemination and feedback loops: information was exchanged between schools and enterprises, but the route from information to action was often unclear.

A stronger model would involve students, teachers, alumni, employers, and public agencies in programme-level intelligence councils. Cooperation should be evidence-based, drawing on occupational forecasts, vacancy analysis, internship quality, student performance in placements, equipment trends, graduate outcomes, and student-identity indicators. Decisions and their rationale should be documented, and subsequent meetings should assess whether agreed changes were implemented and whether the underlying problem changed.

4.8 Qualitative theme 4: Credential bias as contaminated market information

Employers in finance, research and development, and large organizations reported screening job applicants by degree level, with a preference for bachelor's-degree holders. Some acknowledged the practical strengths of vocational graduates but continued to treat academic credentials as the safer screening signal. Educators described students who internalized these expectations, lowered their career ambitions, or withdrew from opportunities.

From a CI perspective, this creates a serious analytic problem: market signals should not be accepted at face value. An employer preference may indicate a genuine theoretical-knowledge requirement, a convenient screening rule, or an inherited status judgement. Ethical intelligence requires institutions to distinguish among these possibilities. Colleges should ask which competencies are actually required, whether credential screens predict job performance, and how vocational graduates perform after hiring; employers should likewise review job descriptions and selection stages for degree requirements that are not demonstrably related to the role.

The moderation findings reinforce this interpretation. Prejudice is not merely an external attitude; it can enter institutional decision making through recruitment standards, parental guidance, programme expectations, and students' anticipated opportunities. Reducing its influence therefore requires coordinated evidence rather than isolated publicity. More credible counter-evidence includes competency-based hiring pilots, transparent graduate outcomes, longitudinal employer evaluations, and documented progression pathways. Table 5 integrates these quantitative relationships with the corresponding qualitative themes.

Table 5. Joint display integrating quantitative relationships with qualitative themes

Integrated theme	Interview evidence	Competitive-intelligence interpretation	Identity implication
Unequal resource conversion	Private institutions described slower access to funds, equipment and industry teachers	Policy intelligence is not equally converted into institutional capacity	Unequal visible support weakens perceived group value
Policy communication gaps	Employers were uncertain about cooperation rules and benefits	Policy information is not transformed into decision-ready intelligence	Cooperation remains shallow and career signals remain weak
Curriculum-industry disconnection	Nursing, IT, tourism and business content lagged behind occupational change	Labour-market sensing does not reach curriculum response quickly enough	Students encounter evidence that programmes trail workplace requirements
Superficial school-enterprise exchange	Lectures and internships occurred without sustained employer influence on curricula	Stakeholder information is exchanged but not embedded in decisions	Employer recognition remains conditional
Credential prejudice	Employers preferred bachelor-degree applicants despite recognising practical skills	Market signals contain status bias that requires critical evaluation	Bias lowers confidence and perceived social value

4.9 Theoretical contributions

The first theoretical contribution is an information-to-identity mechanism. CI research commonly evaluates intelligence through decision quality, responsiveness, or organizational performance. The present findings identify an additional educational pathway: environmental information becomes socially meaningful when it is converted into visible practices from which students infer the value of their group membership. Policy support and curriculum responsiveness therefore function not only as operational inputs but also as institutional signals of legitimacy.

The second contribution is the identification of cultural bias as a conversion loss. Dynamic-capabilities theory emphasizes sensing, seizing, and reconfiguration (Teece, 2007), but a successful institutional response may still receive weak social recognition when status hierarchies persist. The moderation results indicate that institutional improvement and credential legitimacy can move at different speeds. This extends the CI argument from whether the institution can respond to how that response is interpreted by students and external audiences.

The third contribution is a critical-intelligence perspective. Employers are essential sources of occupational information, yet they can also transmit biased credential assumptions. Students are not merely recipients of institutional decisions; their experiences provide intelligence about the legitimacy and consequences of those decisions. A mature educational CI system therefore requires

market responsiveness, critical evaluation of source quality, stakeholder accountability, and explicit governance of conflicting signals.

4.10 Methodological contribution of the formative index

The study operationalizes competitive-intelligence capacity through observable educational indicators rather than treating it only as an abstract concept. The six-item CICI captures awareness of reform, perceived conversion of policy into confidence and resources, curriculum-job alignment, practical teaching, and meaningful internships as sources of occupational information. A key advantage of the formative specification is that it avoids an inappropriate reflective assumption: weakness in one component does not imply equivalent weakness in the others.

Policy intelligence and market-responsive intelligence remain separate components in the regression, which strengthens interpretation. Their similarly positive coefficients indicate that social identity is associated with both the policy-facing and labour-market-facing sides of CI. The qualitative evidence then explains why these components may vary through resource conversion, curriculum updating, stakeholder feedback, and scrutiny of credential-biased market signals.

4.11 Practical and policy implications

For institutional managers, the priority is to replace one-off consultation with permanent intelligence routines. Each programme should maintain an intelligence agenda covering policy, technology, employer demand, graduate outcomes, and student experience. Evidence should be drawn from multiple sources, summarized in decision briefs, assigned to responsible committees, and linked to explicit timelines for curriculum, equipment, teacher-development, internship, or partnership decisions. The following cycle should then review whether the agreed action occurred and whether the original problem changed. This creates an auditable feedback mechanism rather than an informal flow of information.

At institutional and provincial levels, intelligence governance should address differences in capacity to interpret and use reform opportunities. Smaller or private colleges may require shared analytic services, employer networks, implementation guidance, or technical support so that access to intelligence does not become another source of cumulative advantage. Policy communication should also specify operational responsibilities—including funding, equipment ownership, student supervision, data protection, and intellectual-property arrangements—so that enterprises and colleges can convert general direction into coordinated action. Yunnan's quality-improvement plan provides a relevant policy basis for such institutional strengthening (General Office of the People's Government of Yunnan Province, 2024).

Employer cooperation should likewise move from occasional consultation to shared evidence use. Employers can provide structured evaluations of graduate performance, participate in competency mapping, second practitioners into teaching, and use skills-based selection where appropriate. Managers should distinguish role-relevant competency requirements from inherited

credential filters. This is both an equity issue and an intelligence-quality issue because automatic degree screens can suppress useful information about capable vocational candidates.

Students should also be treated as intelligence participants rather than passive recipients. Institutions should explain how employer and policy evidence has influenced programme decisions, which competencies are being prioritized, and which progression pathways are realistic. Internship and early-employment feedback should be captured systematically and returned to programme committees. Such transparency reduces information asymmetry, strengthens accountability, and makes the intelligence cycle visible to the group whose identity is directly affected by institutional decisions.

4.12 Intelligence governance, sustainable competitive advantage, and international positioning

The study expands CI scholarship by treating vocational colleges as organizations that must sense, interpret, coordinate, act, and learn under conditions of policy change, labour-market uncertainty, and legitimacy pressure. In this setting, sustainable competitive advantage is not best represented by short-term enrolment gains or institutional rivalry. It is the durable capability to keep curricula current, sustain trusted employer relationships, convert policy opportunities into educational value, reduce avoidable information asymmetry, and preserve credible progression routes for students. This interpretation connects the study with dynamic-capability and CI-embeddedness perspectives while adapting them to the public purposes of education (Markovich et al., 2019; Olszak et al., 2023; Teece, 2007).

The findings also clarify intelligence governance across institutional levels. Programme committees need detailed occupational and student-experience intelligence; college leaders need cross-programme information for resource allocation and partnership strategy; and provincial actors need aggregate evidence on implementation capacity, employer demand, and unequal access to intelligence resources. Permanent feedback mechanisms should connect these levels so that intelligence requirements, decisions, actions, and outcomes can be traced over time. Without such governance, well-resourced institutions may gain from analytics and networks while weaker institutions face greater information asymmetry, thereby undermining system-level sustainability.

The international comparison is also instructive. Research in manufacturing SMEs links CI to sensing and responsive capability (Hassani & Mosconi, 2022), analytics research emphasizes the integration of heterogeneous information into organizational intelligence (Ranjan & Foropon, 2021), and higher-education research has used CI strategically for student recruitment (Mgweba et al., 2024). The present study supports the common emphasis on sensing and action but extends it by showing that educational CI also has governance and legitimacy consequences: intelligence must move into curriculum, employer cooperation, resource allocation, and student-facing feedback, while biased market signals must be critically evaluated rather than merely absorbed. This broadens CI from a tool of positioning to an institutional intelligence system capable of supporting sustainable educational advantage.

5. FINAL CONSIDERATIONS

This article aimed at operationalizing the concept of competitive-intelligence capacity in higher vocational education, on the basis of a six item formative Competitive Intelligence Capacity Index, which comprises the areas of policy intelligence and market-responsive intelligence. The overall CICI was moderate (M = 3.02) from 387 valid student questionnaires in five vocational colleges in Yunnan. Social identity was positively related to policy intelligence and market-responsive intelligence, while cultural bias was negatively related to identity, and cultural bias reduced the positive relationship between social identity and policy intelligence, and social identity and market-responsive intelligence. The results suggest that CI can be seen as an institutional sensing and responding ability that can be revealed for students in policy implementation and market responsive education practice.

The mixed-methods evidence helps to understand how these relationships can occur institutionally. Access to resources may be uneven, limiting the impact of the use of reform intelligence on real school improvement; the communication of policy may be unclear, hindering cooperation between schools and employers; curriculum change may be delayed by occupational change; and knowledge of employers may be poorly integrated into policies decisions. Simultaneously, credential prejudice can pollute market signals, because a degree level is used as an indicator of competency. Such mechanisms illustrate the need for intelligence governance to be responsive and subject to critical analysis.

The main theoretical argument is an information-to-identity mechanism. Competitive intelligence is socially meaningful when institutions interpret external signals into curricula, resources, learning on the job, partnerships, and open decision-making processes that are evident to students as a representation of their group's value. A second contribution is the recognition of cultural bias as conversion loss: responsive institutions can secure a weaker return on the identity, even when it is responsive. This is an institutional legitimacy connection and an operational responsiveness connection to CI.

The results must be treated within the proper methodological limits. It is a cross sectional design, perceptual core student measures, all five colleges located in Yunnan, a purposive and relatively small educator and employer samples, and a content based formative operationalization of the CICI which is not a fully validated universal scale. These features hinder causal inference, generalizability to other institutions, and generalizability to other settings. The model must be replicated across provinces, institution types and national contexts (preferably longitudinal and administrative indicators).

The gathering of information is not enough for higher vocational institutions in Yunnan. Policy interpretation should be linked to equitable access to resources; employer intelligence should be considered and applied to curriculum decisions; feedback from students and internships should be brought to the attention of responsible decision makers; and preference for degree vs. demonstrated competency should be distinguished. This routines help minimize information asymmetry and promote the feedback loops vital to organizational learning.

Competitive intelligence in Vocational Education should then be seen as an ability of the institution, which is able to sense relevant change, interpret evidence from a variety of stakeholders,

make and apply strategic decisions, assess results, and incorporate results into the next round of intelligence. This power can be used to create a sustainable competitive advantage, based on adaptability, trust of stakeholders, and curriculum relevance, and a credible social recognition, not just on the short-term competition in given positions.

Funding: This research received no external funding.

Conflict of Interest: The authors declare no conflict of interest.

Author Contributions: Conceptualization: Yu Gao and Premsuree Chaumthong; data source identification and curation: Yu Gao; formal analysis and interpretation: Yu Gao and Premsuree Chaumthong; writing – original draft: Yu Gao; writing – review and editing: Yu Gao and Premsuree Chaumthong; supervision: Premsuree Chaumthong. All authors have read and agreed to the final version of the manuscript.

Declaration on the Use of Artificial Intelligence: OpenAI's ChatGPT was used to assist with English-language editing, text organization, and editorial refinement of the authors' manuscript in response to peer-review comments. It was not used for data collection, statistical analysis, or the generation of empirical results. The authors reviewed and verified the final manuscript and assume full responsibility for its content.

Data Availability Statement: Participant-level data are not publicly available because the original consent and confidentiality procedures did not cover public release. Aggregate analysis data, the CICI codebook, and reproducible analysis syntax may be obtained from the corresponding author upon reasonable request, subject to the original consent and confidentiality conditions.

Ethics Statement: Participation was voluntary and anonymous. Participants were informed of the research purpose, confidentiality, and academic use of responses. Interview quotations were de-identified, anonymous codes were used, and no directly identifying information is reported.

6. REFERENCES

Allen, K.-A., Kern, M. L., Rozek, C. S., McInerney, D. M., & Slavich, G. M. (2021). Belonging: A review of conceptual issues, an integrative framework, and directions for future research. *Australian Journal of Psychology*, *73*(1), 87–102. https://doi.org/10.1080/00049530.2021.1883409

Bourdieu, P. (1986). The forms of capital. In J. G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). Greenwood Press.

Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*. SAGE.

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research (3rd ed.)*. SAGE.

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.

General Office of the People's Government of Yunnan Province. (2024, March 19). *Yunnan Province vocational education quality and efficiency improvement implementation plan (Yunzheng Banfa [2024] No. 22)*. https://ynrb-wap.yndaily.com/news_details.html?id=1331079

General Offices of the CPC Central Committee & State Council. (2021, October 12). *Opinions on promoting the high-quality development of modern vocational education*. https://chinajob.mohrss.gov.cn/c/2021-10-14/326781.shtml

Guo, D., & Wang, A. (2020). Is vocational education a good alternative to low-performing students in China? *International Journal of Educational Development*, *75*, 102187. https://doi.org/10.1016/j.ijedudev.2020.102187

Hassani, A., & Mosconi, E. (2022). Social media analytics, competitive intelligence, and dynamic capabilities in manufacturing SMEs. *Technological Forecasting and Social Change*, *175*, 121416. https://doi.org/10.1016/j.techfore.2021.121416

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach (3rd ed.)*. Guilford Press.

Huang, X., Cao, J., Zhao, G., Long, Z., Han, G., & Cai, X. (2022). The employability and career development of finance and trade college graduates. *Frontiers in Psychology*, *12*, 719336. https://doi.org/10.3389/fpsyg.2021.719336

Jiang, L., Chen, Z., & Lei, C. (2023). Current college graduates' employability factors based on university graduates in Shaanxi Province, China. *Frontiers in Psychology*, *13*, 1042243. https://doi.org/10.3389/fpsyg.2022.1042243

Liu, S., & Hardy, I. (2023). Understanding Chinese national vocational education reform: A critical policy analysis. *Journal of Vocational Education & Training*, *75*(5), 1055–1077. https://doi.org/10.1080/13636820.2021.1998195

Liu, Z. (2025). China's higher vocational education and training (HVET) graduates' soft-skill gap: Individual aspirations and structural constraints. *Research in Post-Compulsory Education*, *30*(4), 698–722. https://doi.org/10.1080/13596748.2025.2550847

Lutz, C. J., & Bodendorf, F. (2020). Analysing industry stakeholders using open-source competitive intelligence: A case study in the automotive supply industry. *Journal of Enterprise Information Management*, *33*(3), 579–599. https://doi.org/10.1108/JEIM-08-2019-0234

Madureira, L., Popovič, A., & Castelli, M. (2023). Competitive intelligence maturity models: Systematic review, unified model, and implementation frameworks. *Journal of Intelligence Studies in Business*, *13*(1), 6–29. https://doi.org/10.37380/jisib.v13i1.988

Markovich, A., Efrat, K., Raban, D. R., & Souchon, A. L. (2019). Competitive intelligence embeddedness: Drivers and performance consequences. *European Management Journal*, *37*(6), 708–718. https://doi.org/10.1016/j.emj.2019.04.003

Maungwa, T., & Laughton, P. (2023). The use of theories in competitive intelligence: A systematic literature review. *Journal of Intelligence Studies in Business*, *13*(2), 43–60. https://doi.org/10.37380/jisib.v13i2.1083

Mgweba, C., Rawjee, V. P., & Naidoo, P. (2024). The use of competitive intelligence as a strategic tool for student recruitment in public universities. *International Journal of Business Ecosystem & Strategy*, *6*(3), 196–203. https://doi.org/10.36096/ijbes.v6i3.523

OECD. (2023). *Education at a glance 2023: OECD indicators*. OECD Publishing. https://doi.org/10.1787/e13bef63-en

Olszak, C. M., Bartuś, K., & Sączewska-Piotrowska, A. (2023). Competitive intelligence as a lever of added value. *Procedia Computer Science*, *225*, 1796–1805. https://doi.org/10.1016/j.procs.2023.10.169

Oraee, N. (2023). Identifying the information behavior in competitive intelligence process: A paradigm model for medical sciences universities. *Aslib Journal of Information Management*, *75*(4), 708–729. https://doi.org/10.1108/AJIM-05-2021-0147

Qian, Y., Ling, H., Meng, X., Jiang, Y., Chai, Y., & Liu, Y. (2024). Voice of the professional: Acquiring competitive intelligence from large-scale professional generated contents. *Journal of Business Research*, *180*, 114719. https://doi.org/10.1016/j.jbusres.2024.114719

Ranjan, J., & Foropon, C. (2021). Big data analytics in building the competitive intelligence of organizations. *International Journal of Information Management*, *56*, 102231. https://doi.org/10.1016/j.ijinfomgt.2020.102231

Sadeghiani, A., Shokouhyar, S., & Ahmadi, S. (2022). How digital startups use competitive intelligence to pivot. *Digital Business*, *2*(2), 100034. https://doi.org/10.1016/j.digbus.2022.100034

Standing Committee of the National People's Congress. (2022, April 20). *Vocational Education Law of the People's Republic of China (2022 revision)*. https://www.moe.gov.cn/jyb_sjzl/sjzl_zcfg/zcfg_jyfl/202204/t20220421_620064.html

State Council of the People's Republic of China. (2019). *National vocational education reform implementation plan (Guofa [2019] No. 4)*. https://www.moe.gov.cn/jyb_xxgk/moe_1777/moe_1778/201904/t20190404_376701.html

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33–47). Brooks/Cole.

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, *28*(13), 1319–1350. https://doi.org/10.1002/smj.640

Trent, J., & Liu, X. (2024). A 'useful' vocational education English language teacher by any other name: Short stories of teacher identity construction and reconstruction in vocational education in China. *Journal of Vocational Education & Training*, *76*(5), 1205–1223. https://doi.org/10.1080/13636820.2023.2169840

UNESCO-UNEVOC. (n.d.). *Dynamic TVET country profile: China*. Retrieved July 27, 2026, from https://connect.unevoc.unesco.org/home/Dynamic%2BTVET%2BCountry%2BProfiles/country%3DCHN

Wang, G., Zhang, X., & Xu, R. (2023). Does vocational education matter in rural China? A comparison of the effects of upper-secondary vocational and academic education: Evidence from the CLDS survey. *Education Sciences*, *13*(3), 258. https://doi.org/10.3390/educsci13030258

Wang, X., Leng, J., Cong, X., & Fan, Z. (2022). Development of junior high school students to secondary vocational students stigma scale. *Psychology Research and Behavior Management*, *15*, 2957–2970. https://doi.org/10.2147/PRBM.S381069

Wu, Q., Yan, D., & Umair, M. (2023). Assessing the role of competitive intelligence and practices of dynamic capabilities in business accommodation of SMEs. *Economic Analysis and Policy*, *77*, 1103–1114. https://doi.org/10.1016/j.eap.2022.11.024

Zhang, Y., Zhang, Y., Xiong, X., Liu, J., & Zhai, R. (2022). An empirical study on the improvement of college students' employability based on university factors. *Frontiers in Psychology*, *13*, 793492. https://doi.org/10.3389/fpsyg.2022.793492