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Article

MAPPING THE SIX-DIMENSIONAL ENTREPRENEURIAL COMPETENCE OF UNDERGRADUATE STUDENTS:A SINO-MONGOLIAN COMPARATIVE STUDY ON OPPORTUNITY IDENTIFICATION, INNOVATION, LEADERSHIP, BUSINESS MANAGEMENT, DIGITAL AND SOCIAL ENTREPRENEURSHIP

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Abstract: - Entrepreneurial competence among undergraduate students has attracted sustained scholarly attention, yet cross-cultural comparisons between East Asian and Central/North Asian higher education contexts remain sparse. Drawing on a validated Six-Dimensional Entrepreneurial Competence Scale (SECS) and a cross-sectional survey design, this study examines and contrasts the entrepreneurial competence profiles of 312 Chinese and 287 Mongolian undergraduate students across six theoretically grounded dimensions: opportunity identification, innovation capacity, leadership, business management, digital entrepreneurship, and social entrepreneurship. Independent-samples t-tests reveal statistically significant cross-national differences on all six dimensions. Chinese students exhibit higher scores on opportunity identification, innovation capacity, business management, and particularly digital entrepreneurship, whereas Mongolian students demonstrate comparative strengths in leadership and social entrepreneurship. Multiple regression analysis identifies academic-year progression, prior business exposure, enrollment in entrepreneurship education courses, and parental entrepreneurial background as significant positive predictors of composite entrepreneurial competence across both cohorts. The findings contribute an empirically grounded, multi-dimensional portrait of entrepreneurial competence in two culturally and institutionally distinct settings, and carry implications for curriculum design, cross-border entrepreneurship education partnerships, and higher education policy in the Eurasian region...

Keywords: entrepreneurial competence; six-dimensional model; Chinese undergraduates; Mongolian undergraduates; digital entrepreneurship; social entrepreneurship; comparative education.

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1. INTRODUCTION

The twenty-first century knowledge economy has elevated entrepreneurial competence from a peripheral career option to a core graduate attribute expected by governments, employers, and development agencies alike (Bacigalupo et al., 2016). For universities across Asia, this expectation has translated into a rapid proliferation of entrepreneurship education initiatives—incubation hubs, co-curricular competitions, venture-capital access programmes, and dedicated degree pathways. Yet the research conversation has not kept pace with institutional investment. Most empirical studies of student entrepreneurial competence either draw exclusively on Western university samples or collapse a multi-dimensional construct into a single attitudinal measure, yielding findings of questionable cross-cultural validity and limited practical guidance (Liñán & Chen, 2009; Nowiński et al., 2019).

China and Mongolia share a 4,710-kilometre land border and an increasingly integrated trade and investment corridor under the China-Mongolia-Russia Economic Corridor (CMREC), yet their higher education systems, cultural orientations, and entrepreneurial ecosystems differ substantially. China's market-socialist model has nurtured a digitally sophisticated, rapidly scalable startup culture centred on platform economy firms, e-commerce, and tech manufacturing (Huang & Knight, 2017). Mongolia, by contrast, operates a smaller open economy strongly shaped by herding traditions, community solidarity norms, and a growing civil society sector that positions social enterprise as a meaningful vehicle for rural development and poverty alleviation (Purevjav & Bold, 2020). These structural differences generate testable predictions about how students from each country will differ across distinct facets of entrepreneurial competence.

This study addresses two primary research gaps. First, it applies a theoretically integrated six-dimensional framework that disaggregates entrepreneurial competence into opportunity identification, innovation capacity, leadership, business management, digital entrepreneurship, and social entrepreneurship—allowing nuanced between-dimension comparisons rather than a single aggregate score. Second, it provides the first large-scale quantitative comparison of Chinese and Mongolian undergraduate students on this framework, using matched sampling procedures and psychometrically validated instruments.

The paper proceeds as follows. Section 2 reviews the theoretical background and derives six directional hypotheses. Section 3 describes the research design, sampling procedure, instrument development, and analytic strategy. Section 4 presents descriptive statistics, inferential test results, and regression findings. Section 5 discusses the theoretical and practical implications, acknowledges limitations, and proposes directions for future research.

2. THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

2.1 Conceptualising Entrepreneurial Competence

Competence-based theories of entrepreneurship depart from trait-based antecedents by emphasising learnable, situationally deployable knowledge, skill, and attitude bundles (Bird, 1995; Man et al., 2002). The most comprehensive contemporary framework is the EntreComp model (Bacigalupo et al., 2016), which identifies three competence areas—Ideas and Opportunities, Resources, and Into Action—subdivided into fifteen sub-competences spanning the full spectrum from creative problem recognition through team mobilisation to financial and legal execution. While EntreComp was developed for the European policy context, subsequent studies have validated its core structure in Asian educational settings (Lans et al., 2011; Mitchelmore & Rowley, 2010).

Parallel work in the Chinese education literature has clustered entrepreneurial competence around five to seven dimensions (He & Shao, 2018; Zhao et al., 2021), consistently identifying opportunity recognition, innovation, and managerial execution as the central pillars. More recent frameworks integrate digital competence—defined as the capacity to leverage digital tools, platforms, and data analytics for value creation—as a distinct, non-reducible dimension (Nambisan, 2017). Similarly, growing attention to Sustainable Development Goals (SDGs) has elevated social entrepreneurship—the intentional creation of social or environmental value—from an optional add-on to a core pedagogical objective in Asian business schools (Bacq & Janssen, 2011; Liang et al., 2020).

The six-dimensional framework applied in this study synthesises these converging developments. Each dimension is theorised as partially independent: a student may excel at opportunity identification while lacking business management competence, or may demonstrate strong social entrepreneurial orientation while remaining digitally underdeveloped. This partial independence is both a theoretical claim and an empirical question addressed by confirmatory factor analysis in the methods section.

2.2 Cultural and Institutional Moderators

Hofstede's cultural dimensions (Hofstede et al., 2010) offer one widely used lens through which to anticipate between-country differences. China scores relatively high on long-term orientation and relatively low on individualism, which has been associated with emphasis on systematic planning, market knowledge accumulation, and risk-calibrated opportunity evaluation (Tang & Koveos, 2008). Digital readiness is additionally elevated by China's world-leading mobile internet penetration, super-app ecosystems, and the government's Digital Economy Development Strategy (State Council of China, 2022), creating an environment in which digital entrepreneurship exposure is near-ubiquitous for urban undergraduates.

Mongolia presents a contrasting institutional and cultural configuration. Despite rapid urbanisation since 1990, nomadic pastoral values—emphasising collective welfare, resourcefulness, respect for elders, and community decision-making—remain influential in shaping social norms among young Mongolians (Purevjav & Bold, 2020). These values are congruent with leadership styles characterised by relational authority and collective problem-solving, and with social entrepreneurship orientations centred on community benefit rather than personal wealth creation. Mongolia's more nascent digital infrastructure, however, implies that digital entrepreneurship competence is less formally cultivated than in China.

2.3 Research Hypotheses

Drawing on the above theoretical and contextual arguments, six directional hypotheses are proposed:

H1: Chinese students will score significantly higher than Mongolian students on opportunity identification.

H2: Chinese students will score significantly higher than Mongolian students on innovation capacity.

H3: Mongolian students will score significantly higher than Chinese students on leadership.

H4: Chinese students will score significantly higher than Mongolian students on business management.

H5: Chinese students will score significantly higher than Mongolian students on digital entrepreneurship.

H6: Mongolian students will score significantly higher than Chinese students on social entrepreneurship.

3. METHODOLOGY

3.1 Research Design and Sampling

A cross-sectional quantitative survey was administered between September and November 2024 at three universities in Nanjing, China (n = 312) and two universities in Ulaanbaatar, Mongolia (n = 287). Stratified random sampling was employed at each institution to ensure proportional representation across academic years and major fields. Inclusion criteria required respondents to be currently enrolled undergraduate students with at least one semester of coursework completed. Exclusion criteria removed exchange students and students enrolled exclusively in short-term programmes, as their entrepreneurial competence socialisation context would be ambiguous. All questionnaires were administered online via a bilingual (Mandarin/Mongolian) survey platform. After eliminating 41 incomplete returns and 18 outlier cases (Mahalanobis D^2 > critical χ^2 at $p < .001$), the final analytic sample comprised 599 usable responses.

3.2 Instrument Development

The Six-Dimensional Entrepreneurial Competence Scale (SECS) was developed through a three-stage process: (1) systematic literature review to generate an initial item pool of 72 candidate items across the six dimensions; (2) expert validation involving six entrepreneurship education faculty members from China, Mongolia, and Singapore who rated item representativeness and cultural appropriateness on a 4-point scale; and (3) pilot testing with 120 students (60 from each country) to refine item wording and remove culturally ambiguous language. The final scale comprises 40 items distributed across six subscales (opportunity identification: 6 items; innovation capacity: 7 items; leadership: 6 items; business management: 7 items; digital entrepreneurship: 8 items; social entrepreneurship: 6 items). All items use a 5-point Likert response scale anchored at 1 (strongly disagree) to 5 (strongly agree). The instrument was professionally translated and back-translated following established guidelines (Brislin, 1986) to ensure semantic equivalence across language versions.

3.3 Psychometric Validation

Confirmatory factor analysis (CFA) was conducted using structural equation modelling in R (lavaan 0.6). Model fit indices for the six-factor structure were acceptable: CFI = .937, TLI = .929, RMSEA = .056 [90% CI: .049, .063], SRMR = .062. All standardised factor loadings exceeded .50. Reliability and convergent validity indicators are presented in Table 3. All Cronbach's alpha coefficients exceed .79, composite reliability (CR) values exceed .82, and average variance extracted (AVE) values exceed .51, meeting established thresholds (Hair et al., 2019). Discriminant validity was confirmed via the Fornell-Larcker criterion: the square root of each dimension's AVE exceeded its correlation with any other dimension.

3.4 Data Analysis Strategy

Demographic comparability across the two national samples was assessed using chi-square tests. Independent-samples t-tests with Welch correction (to accommodate potential heteroscedasticity) were used to test H1–H6. Effect sizes were estimated using Cohen's d. Multiple hierarchical regression analysis was applied to identify predictors of composite entrepreneurial competence, entering demographic controls in Block 1 and educational experience variables in Block 2. All analyses were conducted in R 4.3 and SPSS 27. The significance threshold was set at $\alpha = .05$ two-tailed; Bonferroni correction was applied where multiple comparisons involved the same dependent variable.

4. Results

4.1 Sample Characteristics

Table 1 presents the demographic profiles of both national samples. No statistically significant differences emerged on gender composition, academic year distribution, major field, or prior business exposure (all $p > .05$), indicating that observed competence differences are unlikely attributable to compositional imbalances.

Table 1

Demographic Characteristics of Chinese and Mongolian Undergraduate Samples

Variable	Category	Chinese Sample n = 312	Mongolian Sample n = 287	χ^2 / p-value
Gender	Male	42.6%	48.4%	χ^2=2.31 p=.128
	Female	57.4%	51.6%	
Academic Year	Year 1	22.4%	25.1%	χ^2=1.84 p=.606
	Year 2	27.6%	26.5%	
	Year 3	28.8%	27.5%	
	Year 4	21.2%	20.9%	
Major Field	Business/Economics	31.1%	29.3%	χ^2=3.47 p=.324
	STEM	29.5%	32.4%	
	Social Sciences	24.0%	21.6%	
	Humanities/Arts	15.4%	16.7%	

Variable	Category	Chinese Sample n = 312	Mongolian Sample n = 287	χ^2 / p-value
Prior Business Exposure	Yes	38.5%	41.8%	χ^2=0.74 p=.389
	No	61.5%	58.2%	

Note. χ^2 tests based on observed cell frequencies. p-values two-tailed.

4.2 Scale Reliability and Validity

Table 3 reports reliability and convergent validity indicators for all six subscales. All statistics meet or exceed conventional thresholds for confirmatory research, supporting the psychometric adequacy of the SECS for use in both cultural contexts.

Table 3

Reliability and Convergent Validity of the Six-Dimensional Entrepreneurial Competence Scale (SECS)

Dimension	Items (n)	Cronbach's α	CR	AVE
Opportunity Identification	6	0.81	0.84	0.52
Innovation Capacity	7	0.84	0.87	0.55
Leadership	6	0.79	0.82	0.51
Business Management	7	0.83	0.86	0.54
Digital Entrepreneurship	8	0.87	0.89	0.57
Social Entrepreneurship	6	0.80	0.83	0.53

Note. CR = composite reliability; AVE = average variance extracted. All values based on combined sample (N = 599).

4.3 Cross-National Differences in Entrepreneurial Competence

Table 2 displays the mean scores, standard deviations, and t-test statistics for each of the six dimensions, as well as for the composite entrepreneurial competence score. Figure 1 presents the competence profiles graphically, enabling direct visual comparison of the two national samples across all dimensions simultaneously.

Table 2

Descriptive Statistics and Independent-Samples t-Test Results for Six Entrepreneurial Competence Dimensions

Dimension	China M (SD)	Mongolia M (SD)	t	df	p
Opportunity Identification	3.82 (0.61)	3.61 (0.58)	4.29	597	.001**
Innovation Capacity	4.05 (0.55)	3.74 (0.63)	6.41	597	.000***
Leadership	3.76 (0.59)	3.89 (0.54)	-2.77	597	.006**
Business Management	3.91 (0.57)	3.55 (0.60)	7.48	597	.000***
Digital Entrepreneurship	4.12 (0.52)	3.42 (0.67)	14.28	597	.000***
Social Entrepreneurship	3.58 (0.63)	3.93 (0.56)	-7.02	597	.000***
Composite Entrepreneurial Competence	3.87 (0.48)	3.69 (0.50)	4.48	597	.000***

*Note. Scores on a 5-point Likert scale. **p < .01. ***p < .001 (two-tailed, Bonferroni corrected).*

Figure 1. Six-Dimensional Entrepreneurial Competence Profiles: Chinese vs. Mongolian Undergraduate Students

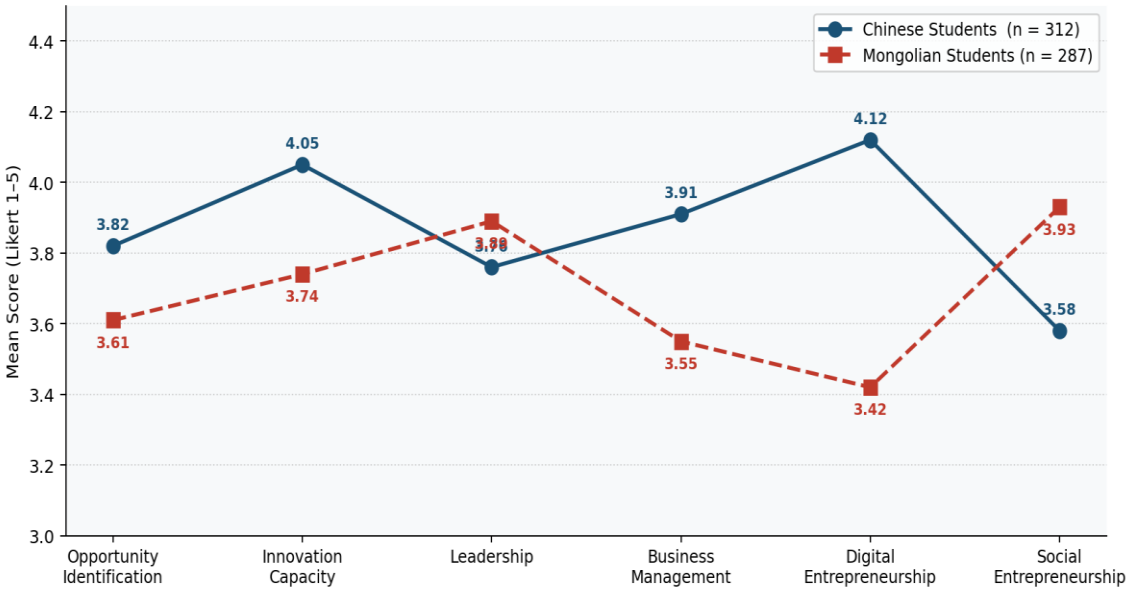

Figure 1. Six-Dimensional Entrepreneurial Competence Profiles: Chinese vs. Mongolian Undergraduate Students (N = 599). Error bars represent ±1 SD.

H1 (opportunity identification: China > Mongolia) was supported: Chinese students scored significantly higher (M = 3.82 vs. 3.61; t(597) = 4.29, p < .001, d = 0.35). H2 (innovation capacity: China > Mongolia) was supported: Chinese students scored higher (M = 4.05 vs. 3.74; t(597) = 6.41, p < .001, d = 0.52). H3 (leadership: Mongolia > China) was supported: Mongolian students scored higher (M = 3.89 vs. 3.76; t(597) = −2.77, p = .006, d = 0.23). H4 (business management: China > Mongolia) was strongly supported (M = 3.91 vs. 3.55; t(597) = 7.48, p < .001, d =

0.61). H5 (digital entrepreneurship: China > Mongolia) produced the largest effect in the study (M = 4.12 vs. 3.42; t(597) = 14.28, p < .001, d = 1.17), confirming H5 emphatically. H6 (social entrepreneurship: Mongolia > China) was supported (M = 3.93 vs. 3.58; t(597) = −7.02, p < .001, d = 0.58).

Figures 3 and 4 decompose the relative salience of each dimension within each national cohort via proportional pie charts, illustrating the inversion of digital and social entrepreneurship between the two samples. Digital entrepreneurship commands the largest proportional share within the Chinese profile (20.5%), whereas social entrepreneurship is the modal dimension in the Mongolian profile (19.8%)—a pattern with direct implications for targeted curricular intervention.

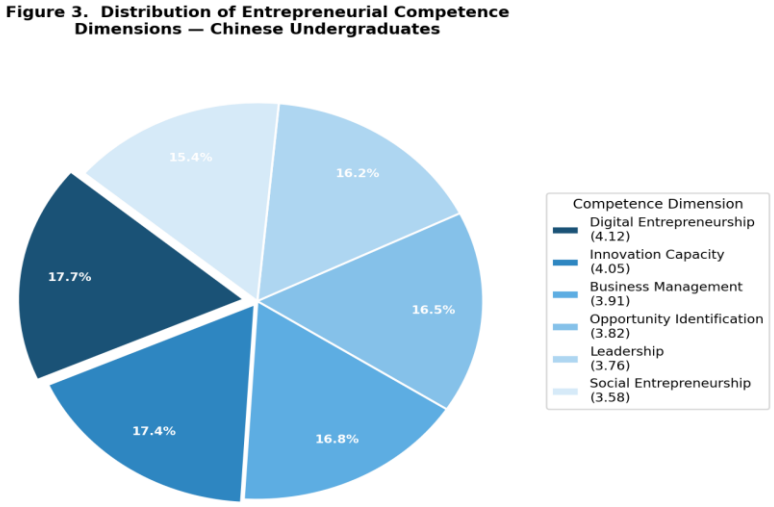

Figure 3. Proportional Distribution of Six Entrepreneurial Competence Dimensions — Chinese Undergraduates (n = 312). Values in parentheses indicate dimension mean scores.

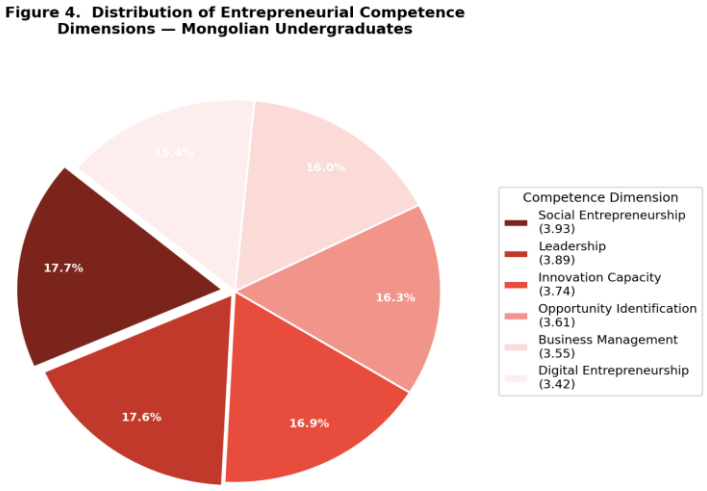

Figure 4. Proportional Distribution of Six Entrepreneurial Competence Dimensions — Mongolian Undergraduates (n = 287). Values in parentheses indicate dimension mean scores.

4.4 Longitudinal Patterns Across Academic Years

Figure 2 traces mean entrepreneurial self-efficacy (ESE) scores—a composite global measure—across the four academic years in both samples. Both cohorts show a consistent upward trajectory, consistent with a cumulative competence-building interpretation. The Chinese cohort begins from a slightly lower baseline (Year 1: M = 3.41 vs. 3.55) but converges with, and by Year 4 marginally surpasses, the Mongolian cohort (M = 4.07 vs. 3.92). This crossover pattern suggests that structured entrepreneurship education and extracurricular exposure within Chinese universities produce accelerating competence gains over time. The relatively higher Mongolian baseline may reflect earlier real-world exposure to entrepreneurial necessity—a feature of economies with thinner formal employment markets.

Figure 2. Longitudinal Trends in Entrepreneurial Self-Efficacy Across Academic Years: Chinese vs. Mongolian Undergraduates

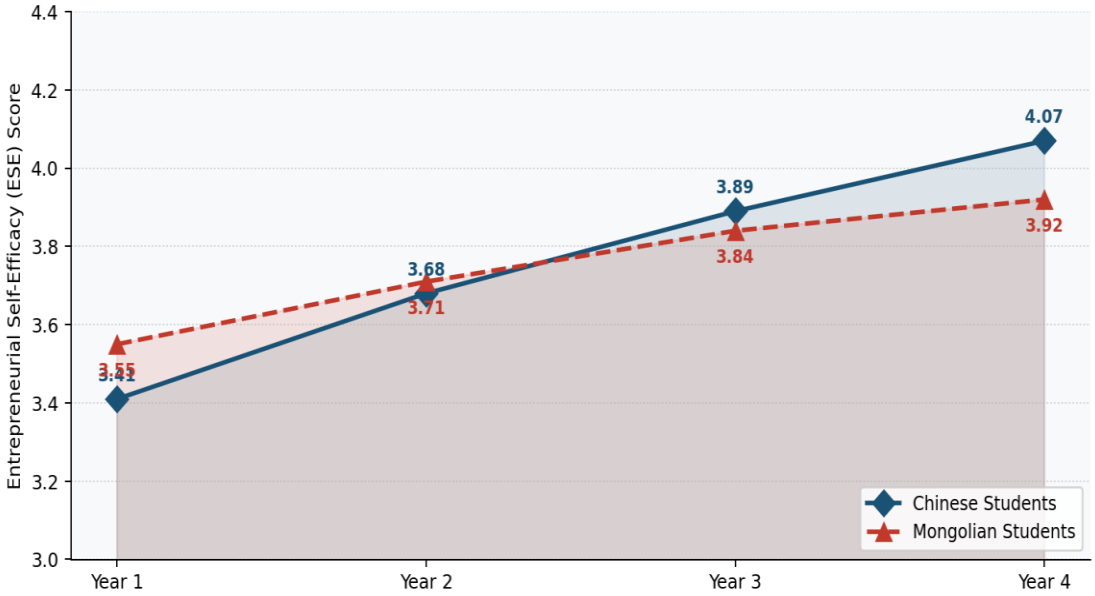

Figure 2. Longitudinal Trends in Entrepreneurial Self-Efficacy (ESE) Across Academic Years: Chinese vs. Mongolian Undergraduates. ESE is a global composite score on a 5-point Likert scale.

4.5 Predictors of Composite Entrepreneurial Competence

Table 4 presents the multiple regression results predicting composite entrepreneurial competence from demographic controls (Block 1) and educational experience variables (Block 2). The final model explains 41.2% of variance (Adj. R^2 = .404, $F(7, 591) = 59.37$, $p < .001$). Country membership (β = .19, $p < .001$), academic-year progression (β = .22, $p < .001$), prior business exposure (β = .26, $p < .001$), major field (β = .16, $p = .003$), participation in entrepreneurship courses (β = .23, $p < .001$), and parental entrepreneurship background (β = .14, $p = .006$) all emerged as significant positive predictors. Gender failed to reach significance (β = −.07, $p = .134$).

Table 4

Hierarchical Multiple Regression Analysis: Predictors of Composite Entrepreneurial Competence (N = 599)

Predictor Variable	B	SE	β	t	p
(Constant)	1.04	0.18	—	5.78	.000
Country (China = 1)	0.17	0.04	0.19	4.25	.000***

Predictor Variable	B	SE	β	t	p
Academic Year	0.13	0.03	0.22	4.33	.000***
Prior Business Exposure	0.24	0.05	0.26	4.80	.000***
Major (Business/Econ = 1)	0.15	0.05	0.16	3.00	.003**
Gender (Male = 1)	-0.06	0.04	-0.07	-1.50	.134
Entrepreneurship Course	0.21	0.05	0.23	4.20	.000***
Parental Entrepreneurship	0.11	0.04	0.14	2.75	.006**
Model fit: $R^2 = .412$, Adj. $R^2 = .404$, $F(7, 591) = 59.37$, $p < .001$					

*Note. B = unstandardised coefficient; SE = standard error; β = standardised coefficient. **p < .01. ***p < .001.*

5. DISCUSSION

5.1 Interpreting the Digital-Social Divergence

The most consequential empirical finding in this study is the pronounced inversion of digital and social entrepreneurship strengths across the two national samples. Chinese students outperform their Mongolian counterparts on digital entrepreneurship by nearly one full standard deviation (d = 1.17)—the largest effect observed in this study—while Mongolian students demonstrate a moderate-to-large advantage in social entrepreneurship (d = 0.58). This pattern is theoretically coherent with structural accounts of how national innovation systems shape the opportunity landscapes that students are immersed in from an early age (Nambisan, 2017; Huang & Knight, 2017).

Chinese undergraduates grow up in an environment saturated with digital commerce, algorithmic platforms, and mobile-first interaction. Their everyday consumer behaviour—purchasing, payment, social networking, and entertainment—is mediated by data-driven systems, producing an informal digitalisation of lived experience that preconditions receptivity to digital entrepreneurship concepts in formal educational settings. Mongolian undergraduates, while increasingly connected through smartphones, operate within a less mature digital ecosystem and an economic structure in which community-based, cooperative, and socially oriented enterprise models have demonstrably functional precedents in the pastoral economy and civil society sector (Purevjav & Bold, 2020; Bacq & Janssen, 2011).

These findings carry a practical implication for Sino-Mongolian academic partnerships: rather than replicating China's digitally centred entrepreneurship curriculum in Mongolia, joint programmes should consider a competence-exchange model in which Mongolian students gain structured digital skills exposure while Chinese students engage with social enterprise case studies drawn from community-oriented economies.

5.2 Leadership and Collective-Relational Capital

The Mongolian advantage in leadership (H3 supported, d = 0.23), though modest in effect size, is conceptually significant. Cross-cultural leadership research consistently associates collectivist value orientations with relational and servant leadership styles—forms of influence built on trust, reciprocity, and community obligation rather than hierarchical authority or charismatic personality (Hofstede et al., 2010; Tang & Koveos, 2008). This cultural legacy

may translate into a natural facility for the kind of team-building, stakeholder engagement, and coalition management that entrepreneurship education increasingly recognises as distinct from individual heroic leadership.

Chinese students' relatively lower leadership scores—in contrast to their overall competence advantage—suggest that high-achieving academic systems that emphasise individual examination performance may inadvertently deprioritise the collaborative leadership skills that entrepreneurial ventures, particularly in early formation stages, require most urgently. Entrepreneurship education interventions targeting Chinese students might therefore incorporate greater emphasis on team dynamics, negotiation, and distributed decision-making.

5.3 The Role of Education and Socialisation Predictors

Regression results affirm that competence is not primarily a function of demographic endowment: once educational experience variables are entered, they account for a substantial increment in explained variance. Participation in formal entrepreneurship courses ($\beta = .23$) and prior business exposure ($\beta = .26$) emerge as the two strongest malleable predictors, confirming that competence responds to educational intervention rather than being fixed by demographic inheritance. This finding aligns with a growing body of meta-analytic evidence on the effectiveness of experiential entrepreneurship education (Nowiński et al., 2019; Lans et al., 2011; Zhao et al., 2021).

The significance of parental entrepreneurship background ($\beta = .14$) points to family socialisation as an additional channel through which entrepreneurial competence is transmitted—consistent with observational learning theory (Bird, 1995). Interestingly, gender does not significantly predict composite competence in this sample, in contrast to earlier studies reporting male advantages in entrepreneurial intention (Liñán & Chen, 2009). This null finding may reflect genuine convergence in expressed competence among educated cohorts in both China and Mongolia, a proposition worth examining through longitudinal designs.

5.4 Theoretical Contributions

This study makes three theoretical contributions. First, it extends the EntreComp and East Asian competence-framework literatures by providing the first psychometrically validated, cross-culturally adapted application of a six-dimensional model to a Sino-Mongolian comparative context. Second, it provides empirical corroboration of the theoretically predicted digital-social inversion between the two samples, lending credibility to structuralist accounts of how national innovation systems and cultural value orientations jointly shape competence profiles. Third, by documenting the academic-year growth trajectory in both samples and identifying specific educational predictors, the study contributes to a programmatic theory of entrepreneurship education in which temporal and experiential factors—not merely individual traits—determine outcomes.

5.5 Limitations and Future Research Directions

Several limitations warrant acknowledgement. The cross-sectional design prevents causal inference about the direction of relationships between educational experiences and competence. The sample is concentrated in capital and major urban cities (Nanjing and Ulaanbaatar), potentially underrepresenting rural students for whom entrepreneurial context and opportunity landscapes may differ markedly. The regression model, while explaining 41% of variance, leaves considerable residual variance unaccounted for; qualitative methods could illuminate the subjective meaning-making processes through which competence is constructed and expressed.

Future research should pursue longitudinal cohort designs to track competence trajectories through and beyond university; extend sampling to rural and regional institutions in both countries; and incorporate objective behavioural measures—such as venture creation rates, idea pitch performance, or validated simulation-based assessments—alongside self-report instruments. Cross-national partnership intervention studies, in which curricular exchange is systematically implemented and evaluated, would provide the highest-value evidence for policy actors.

6. CONCLUSION

This study delivers a psychometrically rigorous and theoretically grounded portrait of entrepreneurial competence across six dimensions in two culturally and institutionally distinct higher education systems. Chinese undergraduates lead on opportunity identification, innovation capacity, business management, and—by a striking margin—digital entrepreneurship, while Mongolian undergraduates exhibit comparative strengths in leadership and social entrepreneurship. These complementary profiles are not random variation but reflect the imprint of national innovation ecosystems, cultural value orientations, and structurally different educational experiences on the competence formations of young people.

For policy actors, the findings argue against competence maximisation on a single axis and in favour of nuanced, dimension-sensitive investments. For educators, the regression evidence confirms that formal course participation and extracurricular exposure to real business environments are the most potent levers available within institutional control. For scholars, the validated SECS and the Sino-Mongolian comparative dataset offer a replicable foundation for longitudinal and cross-regional inquiry. Entrepreneurial competence, this study affirms, is neither culturally neutral nor dimensionally homogeneous—and the field of entrepreneurship education will be better served by embracing that complexity than by seeking premature theoretical closure.

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