

Developing An Entrepreneurial Skills Enhancement Model for Students at Application–Oriented Universities in Central China

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Received September 23, 2025; **Revised** October 27, 2025; **Accepted** March 11, 2026

Abstract

With the rise of the entrepreneurial boom, the entrepreneurial skills among students in applied universities in Central China have attracted increasing attention. However, students in this region have many deficiencies in entrepreneurial knowledge reserves, practical operations, and innovative thinking. This study develops and validates an integrative model to address the root causes of entrepreneurial skill deficiencies. Then, based on the actual situation of Central China and the characteristics of the applied universities, an innovative, integrative entrepreneurial skills enhancement model is proposed, emphasizing project–driven and enterprise–collaborative learning.

This study investigates the effectiveness of entrepreneurial education development models in applied universities in Central China, aiming to align educational outcomes with the labor market demands. The research explores the specific entrepreneurial skills students need and the skills employers expect, striving to develop a tailored operational model to meet these needs. The findings emphasize that Business Planning and Strategizing and strategies provide a comprehensive guide for entrepreneurial actions, serving as a crucial basis for investment decisions, and are the driving force and expectations for the joint efforts of entrepreneurial teams and collaborators, offering a foundation and support for business operations. Compared to the more progressive southern regions. The study highlights the need to transform attitudes towards entrepreneurial education, fostering a culture of innovation and risk–taking. The developed model provides practical advice for enhancing entrepreneurial education, promoting economic growth, and aligning with national development policies. This study provides valuable insights for policymakers, educators, and stakeholders, proposing a comprehensive

approach to entrepreneurship education in Central China, ultimately empowering a new generation of entrepreneurs.

Keywords: Entrepreneurship Education; Application–Oriented Universities; Entrepreneurial Skills

Introduction

Entrepreneurship education has evolved significantly, reflecting changes in economic landscapes, educational philosophies, and the growing importance of fostering entrepreneurial competencies (Brush, 2021). As the global economy becomes increasingly interconnected, the role of entrepreneurship in driving economic growth, job creation, and societal development has never been more critical. Recognizing this, the Chinese government has prioritized the promotion of entrepreneurship and innovation as integral components of its national agenda, with a particular focus on the central provinces of China (Kang & Xiong, 2021).

With the rise of the entrepreneurial boom, the entrepreneurial skills among students in applied universities in Central China has attracted increasing attention. However, at present, students in this region have many deficiencies in entrepreneurial knowledge reserves, practical operations, and innovative thinking (Wang & Ma, 2022). Given this, this study conducts in–depth research to analyze the root causes of the problems. Then, based on the actual situation of Central China and the characteristics of the applied universities, an innovative, integrative entrepreneurial skills enhancement model is proposed, emphasizing project–driven and enterprise–collaborative learning. Using a mixed–methods approach, the study collected data through surveys and interviews across 12 universities in Central China, including Hunan University, Central South University, Wuhan University, Zhengzhou University, and Henan University, to ensure comprehensive and representative insights. Data collection involves surveys, interviews, and skill assessments targeting educators, students, and HR representatives from nearby companies.

This study investigates the effectiveness of entrepreneurial education development models in applied universities in Central China, aiming to align educational outcomes with the labor market demands. The research explores the specific entrepreneurial skills students need and the skills employers expect, striving to develop a tailored operational model to meet these needs. The findings emphasize

that Strategizing provide a comprehensive guide for entrepreneurial actions, serve as a crucial basis for investment decisions, and are the driving force and expectations for the joint efforts of entrepreneurial teams and collaborators, offering a foundation and support for business operations.

Research Questions

1. What are the current deficiencies in entrepreneurial skills among students in Central China's application-oriented universities?
2. How do market adaptability and connectivity mediate entrepreneurial learning outcomes?
3. What are the relationships between inventiveness, opportunity identification, and decision-making?
4. How can a model be developed to strengthen entrepreneurial competence?
5. How does the model inform educational and policy interventions?

Research Objectives

1. To identify key factors influencing entrepreneurial skills development.
2. To examine mediating effects of market and connectivity.
3. To construct and validate a comprehensive enhancement model.
4. To integrate qualitative insights from educators and practitioners.
5. To propose policy and curriculum recommendations for sustainable implementation.

The Hypotheses

- H1: Inventiveness directly impact Strategizing.
- H2: Identifying opportunities has a direct impact on Strategizing.
- H3: Decision-making directly impact Strategizing.
- H4a: Inventiveness indirectly impact Strategizing through market.
- H4b: Inventiveness indirectly impact Strategizing through connectivity.
- H5a: Opportunity identification through market indirectly impacts Strategizing.
- H5b: Opportunity identification through connectivity indirectly impacts Strategizing.
- H6a: Opportunity identification through connectivity indirectly impacts Strategizing.

H6b: Decision-making through connectivity indirectly impact Strategizing.

H7: Market positively impact on Strategizing.

H8: Connectivity positively impact on Strategizing.

Literature Review

Entrepreneurial skills among students in Chinese universities have become a topic of increasing interest and importance as the country continues to promote entrepreneurship and innovation in its education system. This part examines the research and findings related to students' entrepreneurial skills in Chinese universities, focusing on their development, impact, and challenges.

Various studies have investigated the development of entrepreneurial skills among students in Chinese universities. Researchers have found that entrepreneurship education is vital in fostering these skills (Handayati et al., 2020; Zhong et al., 2022). Entrepreneurship courses and experiential learning opportunities have been identified as effective ways to enhance students' creative thinking, problem-solving abilities, and Business Planning and strategizing skills (Zhang et al., 2018). Integrating practical learning experiences, such as internships and industry projects, has contributed significantly to developing students' entrepreneurial mindset and skills (Li & Hu, 2023).

Possessing entrepreneurial skills has been linked to positive outcomes for students in Chinese universities. Research has shown that students with strong entrepreneurial skills are more likely to have higher intentions to start their businesses (Handayati et al., 2020). These skills also correlate positively with students' self-efficacy and confidence in their ability to succeed as entrepreneurs (Zhong et al., 2022). Additionally, students with entrepreneurial skills are more adaptable to job market changes and more willing to take on leadership roles (Zhang et al., 2018).

Despite progress, challenges remain in developing students' entrepreneurial skills in Chinese universities. One significant challenge is the lack of experienced entrepreneurship educators (Li & Hu, 2023). Many current educators may have academic qualifications but lack direct experience in starting and managing businesses, limiting their ability to effectively guide and mentor students in entrepreneurial endeavors. Additionally, there is a shortage of vocational teachers specializing in entrepreneurship education (Zhong et al., 2022).

Research has highlighted regional disparities in developing students' entrepreneurial skills in Chinese universities. Students in top-tier universities and those located in economically developed regions often have better access to resources and opportunities for entrepreneurship education compared to students in less developed areas (Wang et al., 2022). Its disparity will undoubtedly impact students' exposure to entrepreneurial experiences and mentorship, potentially influencing their skill development and entrepreneurial intentions. In conclusion, the literature on students' entrepreneurial skills in Chinese universities underscores the importance of entrepreneurship education in fostering students' creativity, problem-solving abilities, and entrepreneurial mindset. While progress has been made, challenges remain in ensuring the availability of experienced entrepreneurship educators and addressing cultural and regional disparities. Understanding these factors can inform the development of effective strategies and policies to enhance students' entrepreneurial skills and encourage entrepreneurial ventures among Chinese university students.

Inventiveness

Inventiveness are pivotal components of entrepreneurship, determining whether an enterprise can develop new products, services, or business models that possess market competitiveness. Baum & Friel (2017) posits that an entrepreneur's cognitive traits are intricately linked to their creative thinking, with individuals of higher creativity being more adept at identifying opportunities amidst uncertainty. Elliott et al. (2020) further underscore that innovation is not only a prerequisite for launching a business but also a key to sustained growth. In practice, entrepreneurs continuously stimulate innovative inspiration through brainstorming, cross-disciplinary integration, and iterative user feedback. Airbnb's initial concept stemmed from a disruptive rethinking of traditional accommodation models.

Opportunity Identification

Opportunity identification marks the inception of the entrepreneurial process, involving the entrepreneur's ability to discern unmet needs or untapped market domains through market observation and logical reasoning. Lei (2023) propose that "opportunities" reside within technological changes, societal trends, and institutional shifts, with the entrepreneur's task being to transform these latent opportunities into tangible commercial activities. Bauman & Lucy (2021) emphasize that opportunity identification is not a fortuitous occurrence but is influenced by personal experiences, cognitive styles, and social networks. By analyzing consumer trends or technological iterations, entrepreneurs can identify niche markets and seize early advantages.

Market

Effective market empower entrepreneurs to gain insights into customer needs, understand competitive landscapes, and evaluate industry trends, facilitating informed business decisions. contend that data-driven market can significantly enhance the probability of entrepreneurial ventures. Entrepreneurs should master surveys, focus groups, and SWOT analysis to collect and interpret market information. In the early stages of entrepreneurship, businesses can formulate precise market positioning strategies and improve marketing conversion rates.

Decision-making

In the complex and ever-changing entrepreneurial environment, entrepreneurs frequently encounter challenges such as limited resources, information asymmetry, and uncertain risks, making their decision-making abilities crucial. Mei & Symaco (2020) points out that problem-solving ability manifests in accurately identifying the essence of problems and designing creative solutions. Motta & Galina (2023) emphasize that entrepreneurs should possess a "proactive" mindset, enabling them to make swift judgments amidst changes. When faced with unfavorable market feedback, entrepreneurs should decide whether to adjust product designs, pivot, or exit the market, all of which rely on their decision-making capabilities.

Connectivity

Resources in the entrepreneurial process are often acquired through personal connections and collaborations, with a robust interpersonal network facilitating access to capital, information, and market channels. Liu (2021) posits in his "Strength of Weak Ties" theory that loose social connections are more effective in acquiring new information and opportunities. Maritz et al. (2020) demonstrate that social networks play a pivotal role in entrepreneurial financing. In practice, entrepreneurs should actively participate in industry associations, business incubators, trade shows, and other platforms to expand their networks and achieve mutual benefits through collaboration.

Strategizing

A well-crafted business plan is not only a tool for attracting investors but also a strategic blueprint guiding the healthy development of an enterprise. Long et al. (2021) argue that a business plan helps entrepreneurs systematically organize corporate goals, market positioning, resource allocation, and risk preparedness. Liu et al. (2019) emphasize that strategic planning capabilities enable

enterprises to maintain flexibility and long-term perspectives in competition. Businesses should establish short-term and long-term strategic objectives, allocate human, financial, and time resources judiciously, and enhance corporate resilience and growth potential.

Conceptual Framework

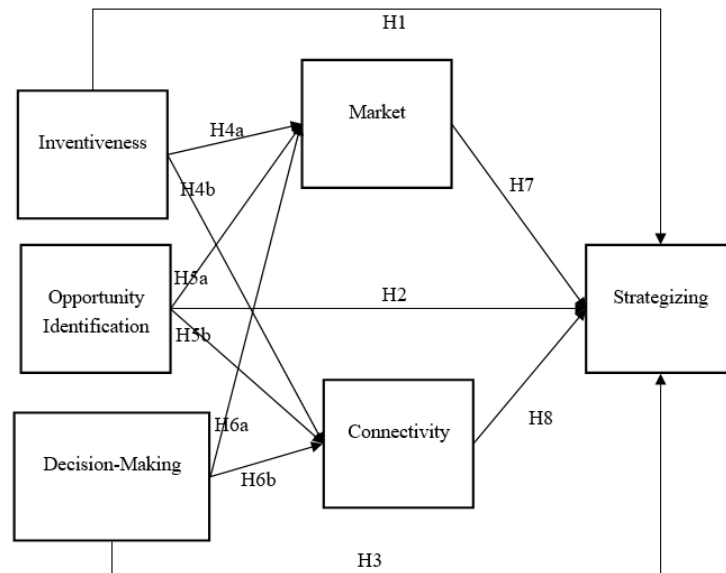


Figure 1 Conceptual Framework

Based on this analysis, this study constructs an entrepreneurial skill enhancement model with inventiveness, opportunity identification, decision-making as independent variables, market, connectivity as mediating variables, and strategizing as the dependent variable. The framework, illustrated in Figure below, serves as the intellectual foundation for exploring and understanding entrepreneurship education, particularly in the context of international and Chinese universities. This section delves into the theoretical underpinnings of entrepreneurship education abroad and in China, shedding light on these educational systems' discussions, reviews, and distinctive characteristics.

Research Methodology

The research methodology combines both qualitative and quantitative approaches to provide a comprehensive analysis of entrepreneurial skills required by technological companies in Central China.

With a mixed–method approach, the author endeavors to capture in–depth insights and statistically significant patterns, and offer a robust understanding of the entrepreneurial skill landscape.

Research Population and Sample

In the study design, clarifying the study population and selecting the appropriate sampling method are key to ensuring the validity and reliability of the study results. The overall goal of this study is to establish the entrepreneurial skills improvement model of applied students in central China, and this group was selected for its uniqueness and representativeness in the whole study. To obtain representative samples within limited resources, this study used stratified random sampling, which can effectively control for potential bias and ensure that the samples are evenly distributed at different levels. With this approach, studies can improve the universality of results and provide a solid foundation for subsequent analysis.

The population of interest for this research consists of 5 universities, Hunan University, Wuhan University, Zhengzhou University, Henan University, and Xi'an University, are selected for an in–depth study of entrepreneurial skills. Through online and offline methods, 400 questionnaires were distributed to students, and 400 limited questionnaires were collected. The research interviews 8 people, including college teachers, entrepreneurs, and many HR.

Research Tool

This study employed a mixed–method approach using both a questionnaire and a semi–structured interview guide to gain a comprehensive understanding of the current state and desired development of entrepreneurial skills.

The questionnaire consisted of two parts. Part 1 collected general demographic information from the respondents, including gender, age, and education level. Part 2 was based on the entrepreneurial skills enhancement model and used a 5–point Likert scale to assess respondents' current level of mastery and their desired level across six key entrepreneurial skills. This quantitative tool aimed to identify gaps between the existing state and the expectations for entrepreneurial skill development.

In addition, a semi–structured interview guide was used to explore three core areas: the understanding of entrepreneurial skills, the educational processes that support them, and the expectations from the industry. The guide maintained a balance between structure and flexibility, with tailored questions designed for different respondent groups—students, educators, and industry professionals—enabling in–depth proration of personal experiences and practical insights. This qualitative

tool enriched the data set and supported systematic coding and analysis, providing nuanced and authentic perspectives. By integrating both quantitative and qualitative tools, this study was able to capture a multi-dimensional view of entrepreneurial skill development and propose more targeted strategies for improvement.

Research Results

Reliability and Validity

Validated instruments measured constructs of inventiveness, opportunity identification, and strategizing (Cronbach's $\alpha > 0.8$). NVivo 12 software was used for coding qualitative data to ensure thematic reliability. The excellent reliability of the scale used in the study, with high internal consistency among items and no need for the elimination of any low-correlation items, effectively measuring the research variables.

Table 1 Scale Reliability Analysis

Variables	Cronbach's Alpha
Inventiveness	0.878
Opportunity Identification	0.841
Decision-making	0.860
Market	0.809
Connectivity	0.801
Strategizing	0.858

The AVE (Average Variance Extracted) values, which measure the convergent validity of latent variables, are required to be greater than 0.5. All latent variables have AVE values exceeding 0.5, indicating good convergent validity of the scale. The AVE values for CI, ORe, QD, MA (Market), NC (Connectivity), and BPS (Strategizing) are 0.644, 0.643, 0.607, 0.586, 0.578, and 0.616, respectively, all meeting the standard for convergent validity. The CR (Composite Reliability) values, which assess the internal consistency of latent variables, typically require CR values above 0.7. All latent variables have CR values exceeding 0.7, indicating high internal consistency. The CR values for CI, ORe, QD, MA, NC, and BPS are 0.878, 0.844, 0.860, 0.809, 0.804, and 0.865, respectively, all conforming to good reliability standards. The data suggests that the scale possesses high validity and reliability in measuring

various latent variables, with significant path relationships effectively reflecting the underlying relationships among the study variables.

Table 2 AVE and CR

	Path Relationship		Estimate	S.E.	C.R.	P	Factor Loading	AVE	CR
Q4	<---	CI	1.000				0.821		
Q3	<---	CI	0.958	0.056	17.074	***	0.795		
Q2	<---	CI	0.885	0.054	16.318	***	0.767		
Q1	<---	CI	1.001	0.056	17.860	***	0.825	0.644	0.878
Q7	<---	ORe	1.000				0.800		
Q6	<---	ORe	1.259	0.079	15.957	***	0.844		
Q5	<---	ORe	1.049	0.071	14.852	***	0.760	0.643	0.844
Q11	<---	QD	1.000				0.778		
Q10	<---	QD	1.007	0.066	15.306	***	0.778		
Q9	<---	QD	0.917	0.060	15.252	***	0.775		
Q8	<---	QD	0.946	0.061	15.434	***	0.784	0.607	0.86
Q14	<---	MA	1.000				0.726		
Q13	<---	MA	1.110	0.083	13.355	***	0.809		
Q12	<---	MA	0.967	0.075	12.941	***	0.760	0.586	0.809
Q17	<---	NC	1.000				0.791		
Q16	<---	NC	0.913	0.066	13.871	***	0.780		
Q15	<---	NC	0.895	0.070	12.874	***	0.706	0.578	0.804
Q21	<---	BPS	1.000				0.796		
Q20	<---	BPS	1.117	0.069	16.087	***	0.799		
Q19	<---	BPS	0.829	0.054	15.260	***	0.761		
Q18	<---	BPS	1.244	0.079	15.754	***	0.783	0.616	0.865

NOTE: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$, CI is Inventiveness. ORe is Opportunity Identification. QD is Decision-making. MA is Market. NC is Connectivity. BPS is Strategizing

Correlation analysis

The correlation analysis results among various dimensions reveal the correlation and statistical significance of each variable with others. The $\sqrt{\text{AVE}}$ column represents the square root of the Average Variance Extracted for each dimension, reflecting the convergent validity of the latent variables. All dimensions have $\sqrt{\text{AVE}}$ values exceeding 0.7, indicating good convergent validity.

Table 3 Results of Correlation Analysis for Each Dimension

Variables	√AVE	CI	ORe	QD	MA	NC	BPS
CI	0.802	0.802					
Ore	0.802	.401**	0.802				
QD	0.779	.497**	.390**	0.779			
MA	0.766	.406**	.346**	.411**	0.766		
NC	0.760	.401**	.314**	.481**	.372**	0.760	
BPS	0.785	.357**	.280**	.330**	.363**	.381**	0.785

NOTE: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

The Structural Equation Models and Hypothesis Testing

The various indices and their observed values for the model fit are as follows: The chi-square value is 192.903, with 175 degrees of freedom, resulting in a chi-square to degrees of freedom ratio (Chi-square/df) of 1.102, which meets the criterion of being less than 3, indicating a good model fit. The Goodness of Fit Index (GFI) and Adjusted Goodness of Fit Index (AGFI) are 0.955 and 0.941, respectively, both exceeding 0.9, signifying excellent fit. The Comparative Fit Index (CFI) and Tucker–Lewis Index (TLI) are both 0.995, far exceeding 0.9, demonstrating a good model fit. The Root Mean Square Error of Approximation (RMSEA) value is 0.016, substantially below 0.08, indicating an outstanding model fit. The model performs well across all fit indices, possessing a high degree of fit.

Table 4 Results of Structural Equation Modeling

Path Relationship			Estimate	S.E.	C.R.	P	Factor Loading
MA	<---	CI	0.196	0.060	3.249	0.001	0.235
NC	<---	CI	0.174	0.064	2.734	0.006	0.193
MA	<---	ORe	0.177	0.067	2.639	0.008	0.174
NC	<---	ORe	0.112	0.071	1.591	0.112	0.103
MA	<---	QD	0.249	0.062	3.995	***	0.294
NC	<---	QD	0.383	0.068	5.676	***	0.421
BPS	<---	CI	0.117	0.062	1.986	0.049	0.138
BPS	<---	ORe	0.168	0.068	1.988	0.030	0.166
BPS	<---	QD	0.201	0.070	2.086	0.010	0.199
BPS	<---	MA	0.229	0.072	3.195	0.001	0.227
BPS	<---	NC	0.252	0.070	3.589	***	0.269

NOTE: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

In terms of path estimates, Inventiveness (CI) exhibit significant positive impacts on Market (MA) and Connectivity (NC), with estimates of 0.196 ($p = 0.001$) and 0.174 ($p = 0.006$) respectively, indicating statistically significant influences of CI on these two variables. The influence of Opportunity identification (ORE) on MA also reaches a significant level, with an estimate of 0.177 ($p = 0.008$), but its impact on NC is not significant ($p = 0.112$), suggesting a weaker influence of ORE on NC.

Decision-making (QD) has the most significant impacts on MA and NC, with estimates of 0.249 ($p < 0.001$) and 0.383 ($p < 0.001$) respectively, demonstrating QD's strong role in enhancing market capabilities and collaboration abilities. In influencing Strategizing (BPS), both MA (estimate = 0.229, $p = 0.001$) and NC (estimate = 0.252, $p < 0.001$) exhibit significant positive impacts. The influences of CI, ORE, and QD on BPS reach significant levels, indicating that market capabilities and collaboration abilities play crucial roles in strategizing, while creativity, opportunity identification, and problem-solving abilities exhibit direct influences.

Regarding factor loadings, QD has an impact on NC (0.421), suggesting a role of decision-making abilities in facilitating connectivity. The factor loadings of MA and NC on BPS are 0.227 and 0.269 respectively, indicating significant impacts of these two factors on business planning. The factor loadings of ORE on NC (0.168) and QD on BPS (0.201) are low, suggesting weaker influences of these pathways.

Table 5 Results of Indirect Effects Tests

Path	Effect	SE	p-value	Bias Corrected (95%)		%
				LLCI	ULCI	
CI--> BPS Direct Effect	0.138	0.078	0.000	0.018	0.294	56.8%
CI ---> MA ---> BPS Indirect Effect	0.105	0.036	0.000	0.048	0.192	43.2%
CI ---> NC ---> BPS Indirect Effect	0.243	0.077	0.005	0.088	0.390	100%
ORE--> BPS Direct Effect	0.066	0.067	0.000	0.063	0.199	49.6%
ORE ---> MA ---> BPS Indirect Effect	0.067	0.030	0.005	0.017	0.138	50.4%
ORE ---> NC ---> BPS Indirect Effect						

Path	Effect	SE	p-value	Bias Corrected (95%)		%
				LLCI	ULCI	
ORE--> BPS Total Indirect Effect	0.133	0.071	0.056	-0.004	0.278	100.0%
QD --> BPS Direct Effect	0.007	0.083	0.000	0.155	0.175	3.7%
QD ----> MA ----> BPS Indirect Effect	0.180	0.050	0.000	0.094	0.293	96.3%
QD ----> NC ----> BPS Indirect Effect						
QD ----> BPS Total Effect	0.187	0.077	0.016	0.033	0.342	100%

Collectively, the results indicate that in influencing Strategizing (BPS), Inventiveness (CI), Opportunity identification (ORE), and Decision-making (QD) all operate through the mediating variable of Market (MA) rather than directly affecting BPS. QD exerts the indirect effect through MA, while ORE's overall indirect effect is weak. This suggests that in enhancing entrepreneurial capabilities, Market and Analysis capabilities play a crucial bridging role in connecting individual entrepreneurial qualities (such as creativity, opportunity identification, and problem-solving abilities) with business planning and strategic capabilities.

Qualitative Analysis

This study employed a qualitative research approach, focusing on the alignment between entrepreneurial skills cultivated in education and those demanded in the labor market. A semi-structured interview guide was designed, and in-depth interviews were conducted with eight representative participants from diverse fields, including university students, educators, entrepreneurs, and human resource experts. During the research process, interview data were first collected and organized, followed by open coding, axial coding, and selective coding analysis of the interview content using Nvivo 14. Through Nvivo coding analysis of the interview content of 8 respondents, it was found that: The student population is more concerned with the understanding and access to skills, with particular emphasis on practical opportunities. Teaching groups focus on the support of teaching methods and education systems for entrepreneurial skills. Entrepreneurs and HR representatives pointed out the importance of practical experience and team ability from the perspective of the industry, and put forward suggestions for the education system that are closer to the market. Axial coding focuses on the gap and integration path between education and industry, and open coding enriches the dimensions of

entrepreneurial skills, such as leadership, and resource integration. Several interviewees suggested improving the effectiveness of education through “project-driven + enterprise collaboration”.

Discussion

This research, through the integration of quantitative and qualitative data, unveils the internal mechanisms underlying the formation of entrepreneurial capabilities. It reveals the mediating role of market capability and networking collaboration capability between individual qualities and business planning. Decision-making capabilities demonstrate the strongest influence across various pathways, highlighting the pivotal role of higher-order cognitive abilities in the formulation of entrepreneurial strategies. Although opportunity identification capability is effective in market, reflecting a disconnect between internal cognition and external integration in entrepreneurial capabilities.

The results show that the effects of inventiveness (CI), opportunity identification (ORe), and decision-making (QD) on Strategizing (BPS) are mainly mediated through the mediator variables of market (MA) and connectivity (NC). The indirect effect of QD through MA suggests that problem-solving ability is crucial in entrepreneurial skill enhancement. In addition, MA and NC have a key role in promoting BPS, further emphasizing the importance of market research skills and collaborative networks in entrepreneurial practice. The study verifies that entrepreneurial skill enhancement is a hierarchical process and emphasizes that entrepreneurship education should focus on developing students' market research, collaborative networking, and problem-solving skills to improve their entrepreneurial success.

Conclusion

This study delves into the pathways influencing entrepreneurial competence and its alignment between education and industrial demands through a combination of quantitative and qualitative methodologies. The quantitative analysis unveils the influence pathways of creativity and innovativeness, opportunity identification capability, and decision-making abilities on business planning and strategic capabilities. The research highlights the pivotal mediating roles played by market ability and networking and collaborative ability. Creativity and innovativeness exert a significant positive impact on market (path estimate value of 0.196, $p = 0.001$) and connectivity (path estimate value of 0.174, $p = 0.006$). Decision-making abilities demonstrate the effects in promoting market (estimate value of 0.249, $p <$

0.001) and connectivity (estimate value of 0.383, $p < 0.001$), thereby indirectly fostering the development of business planning and strategic capabilities. The overall results suggest that market connectivity serve not only as mediating variables but also as crucial hubs in the transformation of entrepreneurial qualities into strategic capabilities.

This study delves deeply into the dynamic relationships among variables within the entrepreneurial skills model, emphasizing that the formation of entrepreneurial skills is a hierarchical, progressive, and structurally interconnected process, rather than being directly determined by a single ability. Inventiveness (CI), Opportunity identification (ORe), and Decision-Making (QD) abilities, as individual-level entrepreneurial qualities, do not directly influence Strategizing (BPS) capabilities. Instead, they exert their effects indirectly through two pivotal mediating variables: Market (MA) and Connectivity (NC) capabilities. This structural pathway configuration suggests that the enhancement of entrepreneurial skills hinges on the activation and integration of intermediate capabilities, rather than merely possessing creative ideas or the ability to identify opportunities.

Entrepreneurs and human resource experts from the industrial sector explicitly point out the significance of practical experience and team capabilities in the workplace, echoing the core influence pathways of "decision-making abilities" on "connectivity" and "market" in the quantitative analysis. They generally advocate for enhanced collaboration between higher education institutions and enterprises, promoting an educational model of "project-driven + enterprise collaboration" to enhance the effectiveness of entrepreneurship education. This recommendation is prominently reflected in the coding results, particularly during the axial coding phase, highlighting the mismatch in ability supply and demand between education and industry and its integration pathways.

Therefore, synthesizing the results of the quantitative structural model and qualitative interview analysis, it is evident that the formation of entrepreneurial competence is not a direct result of a singular ability but rather a transformation process from cognition to practice through the "bridging role" of market and collaborative abilities in the interplay among education, industry, and individual qualities. Achieving efficient alignment between educational content and market demands.

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