

Institutional environment and college students' entrepreneurial willingness: A comparative study of Chinese provinces based on fsQCA

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ABSTRACT

College students are the new force of mass entrepreneurship and innovation. This study classifies 170,759 college students in China by province, based on the institutional theory, and employs necessary condition analysis (NCA) and fuzzy-set qualitative comparative analysis (fsQCA) to analyze six conditional factors at three levels: the regulatory, normative, and cognitive environment. Thereafter, this study empirically explores the influencing path and optimization mechanism of college students' entrepreneurial willingness. The results indicate that: (1) A regulatory environment is necessary for high entrepreneurial willingness. (2) There are two types of innovation models that produce high entrepreneurial willingness. (3) The antecedent condition of the cognition system has a low impact on college students' entrepreneurial willingness. The research conclusion expands the innovation perspective of the association between institutional theory and entrepreneurial willingness, helps to fully understand the influencing factors of college students' entrepreneurial willingness, and provides theoretical reference and practical enlightenment for effectively stimulating college students' entrepreneurial willingness.

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Introduction

Currently, countries worldwide pay more attention to sustainable development, and many sectors and industries are striving to develop new sustainable business models (Romero-Castro, López-Cabarcos & Piñero-Chousa, 2022). Meanwhile, innovation and entrepreneurship have become important carriers of sustainable development (Méndez-Picazo, Galindo-Martín & Castaño-Martínez, 2021). For instance, they can promote innovation and economic growth, accelerate the adjustment of economic structure, promote the sustainable development of enterprises, and address issues related to employment, race, and poverty (Coduras, Saiz-Alvarez & Ruiz, 2016). Innovation and entrepreneurship are crucial for China to build a new development pattern and achieve high-quality development. Innovation and entrepreneurship education are significant for building a high-quality entrepreneurship and employment system to promote

shared prosperity. As the new force of mass entrepreneurship and innovation, Chinese college students are the main source of innovation and entrepreneurship.

On February 11, 2022, eight departments, including the National Development and Reform Commission and the Ministry of Education, jointly emphasized the implementation of entrepreneurship-driven employment to promote entrepreneurship and employment of college graduates. This entailed implementing inclusive policies, strengthening special policy support, and investigating the policy implementation blocking points, focusing on helping college graduates with strong entrepreneurial willingness and a good project foundation to realize their entrepreneurial dreams. Previous studies have found that entrepreneurial willingness is the best predictor of entrepreneurial behavior (Gartner, 1985; Krueger & Brazeal, 1994). Therefore, to promote college students' entrepreneurship, their entrepreneurial willingness must be enhanced first.

The concept of "entrepreneurial willingness" is multifaceted and depends on many factors (Wu & Wu, 2008). Most studies are fragmented and based on one level only (Bergmann, Hundt & Sternberg, 2016; Karabulut, 2016; Lyons & Zhang, 2018; Molino, Dolce, Cortese & Ghislieri, 2018). Contrary to considering a single perspective, this study considers a holistic approach. Thus, instead of using the traditional regression analysis and structural equation model research methods, a qualitative comparative analysis (QCA) method was used;

Abbreviations: NCA, necessary condition analysis; fsQCA, fuzzy-set qualitative comparative analysis; csQCA, clear set qualitative comparative analysis; mvQCA, multivalued set qualitative comparative analysis; PRI, proportional reduction in inconsistency; CR, ceiling regression; CE, ceiling envelopment; PS, policy support; EFSE, entrepreneurship faculty staff and experts; ECU, entrepreneurship courses; ECP, entrepreneurship competition; SNS, social network support; PQ, perception of quality

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this method is based on the overall perspective to systematically investigate the causes of the research phenomenon and the interaction and possible relationship among these factors (Ragin & Strand, 2008) to deepen the understanding of the complex causality of events (Kusa, Duda & Suder, 2021). In particular, this study uses NCA as a complement to fsQCA to explore whether and to what extent a single environmental element is necessary for generating high entrepreneurial willingness of college students (Ragin & Strand, 2008). Furthermore, this study found that the perspective of institutional theory includes three elements: regulation system, normative system, and cognitive system. From a multidimensional perspective, it includes individual, family, education, and social factors, which can systematically analyze the factors affecting college students' entrepreneurial willingness.

The study samples Chinese college students to empirically explore the influence path and optimization mechanism of their entrepreneurial willingness by using NCA and fsQCA based on institutional theory. This study aims to answer the following questions: What conditional configurations affect college students' high entrepreneurial willingness? Are there any necessary conditions that affect their entrepreneurial willingness? Are these antecedents complementary or alternative? The study fills the research gap by investigating college students' entrepreneurial willingness and providing new suggestions for promoting entrepreneurship for students.

The remainder of the paper is outlined as follows. Section 2 provides the literature review and theoretical background, followed by methodology and empirical analysis in sections 3 and 4, respectively. The last section presents the discussion and conclusion.

Literature review and theoretical background

Entrepreneurial willingness

Entrepreneurial willingness is a psychological state that guides entrepreneurs to pursue entrepreneurial goals, pay more attention to these goals, and invest energy and behavior (Bird, 1988). According to Krueger (2000), entrepreneurial willingness is a subjective attitude of individuals toward entrepreneurial activities in the process of career development, which reflects whether potential entrepreneurs will start a business in the future. This is consistent with the general rule defined by Ajzen (1991): the stronger the will, the greater the possibility of related behavior. Individuals with entrepreneurial characteristics, abilities, and insights need to initially find themselves in an environment conducive to entrepreneurship. Researchers have identified education and training, national policies, and family businesses as the environmental factors affecting both young people and new graduates (Karimi, Biemans, Lans, Chizari & Mulder, 2016; Molino et al., 2018). Therefore, this study defines college students' entrepreneurial willingness as the psychological state guiding them to truly implement entrepreneurial goals after graduation, which can encourage them to perform entrepreneurial activities.

Institutional theory

Scott (2013) defined an institution as regulatory, normative and identity structures and activities that provide stability and significance for social behavior, including laws, regulations, customs, social and professional norms, culture, and ethics. Based on North (1990), Williamson (1994), and DiMaggio and Powell (1983), Scott revised the institutional approach and proposed three dimensions of an institutional environment: regulation, norms, and cultural cognition. Regulatory elements emphasize external systems, including policies, laws, and regulations, while normative elements mainly include the traditions and practices shared within the society, which are related to values and social norms. This dimension is not as formal as regulatory elements. Lastly, cultural cognitive elements emphasize personal

perception, including a shared series of symbol systems internalized in the individual's heart, and provide a meaningful framework for action (Scott, 2013).

The premise of institutional environment research is that innovation and entrepreneurship do not occur in a vacuum. They involve the relationship between entrepreneurial individuals and the environment (Ogunsade, Obembe, Woldesenbet & Kolade, 2021). Institutions (including regulation, normative and cultural cognitive environment) are typically approached as antecedents, creating conditions that can be favorable to or hinder entrepreneurship (Shirokova, Morris, Laskovaia & Micelotta, 2021). Bernardino et al. (2016) also confirmed that institutions, directly and indirectly, affect the willingness to become a social entrepreneur. This study maintains the same logic and examines the entrepreneurial willingness of college students through these three elements. Regulation is related to government support, the norm is related to college education and social network, and cultural cognition is related to personal quality.

Institutional regulatory environment

The institutional regulatory environment is considered the most formal of the three elements. The function of the regulatory environment can be considered as setting rules and establishing rewards or punishments for a society (Valdez & Richardson, 2013). Specifically, individual entrepreneurial willingness will be enhanced when government policies and other support mechanisms provide support and a favorable environment for establishing new enterprises (Ogunsade et al., 2021). In the Chinese context, the government is an indispensable environmental factor for entrepreneurship (Li, He & Zhao, 2020). Specifically, the improvement of the regional system can effectively promote innovation and entrepreneurship (Huggins, Waite & Munday, 2018). The standardization of the entrepreneurship platform, the optimization of the investment environment, and the free provision of various entrepreneurship services can help college students grasp opportunities and mobilize their entrepreneurial enthusiasm. Concurrently, adjusting a series of preferential policies, such as taxation, can help individuals reduce entrepreneurial costs and risks and enhance college students' entrepreneurial willingness. The greater the policy support, the stronger the willingness of college students to start a business.

Therefore, this study defines the institutional regulatory environment as policy support and proposes the following:

Proposition 1. College students' entrepreneurial willingness relates to policy support.

Normative institutional environment

A normative institutional environment refers to the recognition and perception of entrepreneurial thinking and innovation activities by residents of a country (Busenitz, Gomez & Spencer, 2000). It includes social values and norms related to entrepreneurship and establishes basic rules that people consciously abide by Scott (2008). Such values and norms mainly come from studying entrepreneurship education for college students. Education provides a favorable environment for shaping students' entrepreneurial willingness (Haddad Ghada, Haddad Gloria & Nagpal, 2021). Therefore, compared with political and economic policies and other factors, college education significantly impacts college students' entrepreneurial willingness (Lu, Song & Pan, 2021). Many studies have empirically explored the significant effect of college education on college students' entrepreneurial willingness from the aspects of entrepreneurship curricula (Karimi et al., 2016), entrepreneurship faculty staff, and experts (Urban & Kujinga, 2017; San-Martín, Fernández-Laviada, Pérez & Palazuelos, 2021), and entrepreneurship competitions (Duval-Couetil, 2013; Rideout & Gray, 2013). In addition, the normative mechanism also comes from the social structure, which is responsible for shaping

perceived appropriate and expected entrepreneurial behavior (See-los, Mair, Battilana & Dacin, 2011). This social network refers to an informal group comprising college student entrepreneurs.

The network's composition includes independent individuals, such as family and classmates, and various social resources. The support of social networks composed of family and friends will enhance college students' entrepreneurial willingness (Saeed, Yousafzai, Yani-De-Soriano, & Muffatto, 2015).

Therefore, this study defines the normative institutional environment as college entrepreneurship education and social network support and proposes the following:

Proposition 2. College students' entrepreneurial willingness relates to entrepreneurship education (including EFSE, courses, and competitions).

Proposition 3. College students' entrepreneurial willingness is related to social network support.

Cultural cognitive institutional environment

Entrepreneurs' resources, personality characteristics and psychological quality determine the entrepreneurial differences. Through the external environment, entrepreneurs will quickly perceive a favorable environment and accurately start these entrepreneurial activities (Yan, Gu, Liang, Zhao & Lu, 2018). Entrepreneurship requires corresponding knowledge, skills, and quality. The study found that improving college students' entrepreneurial skills and promoting their perceptions of entrepreneurial feasibility to enhance individual self-efficacy could significantly improve their entrepreneurial willingness (Liu, Lin, Zhao, G. & Zhao, D., 2019).

Therefore, this study defines the cultural cognitive institutional environment as college students' perceptions of their quality and proposes the following:

Proposition 4. College students' entrepreneurial willingness relates to their perceptions of their quality.

Based on the above analysis, this study constructs the theoretical analysis framework as shown in Fig 1 below:

Methodology

Method of mixing NCA and QCA

Necessary and sufficient causalities are two new explanations of causality. Necessary causality means that the result will not occur without an antecedent. In contrast, sufficient condition causality means that an antecedent (combinations) produces results (Dul,

2016). To better analyze the necessary and sufficient causalities, this study adopts a new method of NCA (Dul, Van der Laan & Kuik, 2020). Although fsQCA can identify the necessary relationship, it only qualitatively states "whether a condition is necessary or unnecessary for a result" and does not quantitatively reflect the degree of necessity, that is, "to what extent a condition is a necessary condition for a result." Fuzzy sets, because their changes are not only "yes" or "no," but also include detailed membership scores, make the combination of NCA and fsQCA more valuable (Vis & Dul, 2018).

This study still focuses on QCA, which was based on the overall perspective, paid attention to mining the antecedent complexity, and tried to explain how the interacting parts of the whole produce the expected results. Unlike traditional quantitative research methods, QCA provides an innovative method to conduct cross-case studies using Boolean algebra and set theory to analyze how causal conditions lead to specific results (Ragin, 2008). The qualitative comparative analysis mainly includes clear set qualitative comparative analysis (csQCA), fuzzy set qualitative comparative analysis (fsQCA), and multivalued set qualitative comparative analysis (mvQCA). The sample data cannot be logically divided directly according to the standard of "whether it belongs to" set, and fsQCA can better deal with the problem of partial subordination, which fully matches the research process of different ways to improve college students' entrepreneurial willingness based on the theoretical analysis of the institutional environment. Therefore, this study uses fsQCA for empirical analysis.

Data and collection

As a case-oriented research method, QCA follows the principle of theoretical sampling rather than random sampling (Ragin, 2008); thus, selecting sample cases is critical. Under the key project research group of the Chinese National Social Science Foundation, the research group conducted research and questionnaire data collection on college students across the country. From September 2018 to January 2019, the research group conducted an online questionnaire survey among students of more than 1000 universities in 31 provinces (autonomous regions and municipalities directly under the Central Government) who had received innovation and entrepreneurship education. A total of 187,914 questionnaires were collected by stratified sampling (stratified by school type and province) and convenience sampling. A total of 17,150 invalid questionnaires due to short answer times and invalid school names were excluded, leaving us with 170,764 valid questionnaires, accounting for 90.87%. Since there were only five questionnaires from Ningxia, this study excluded that

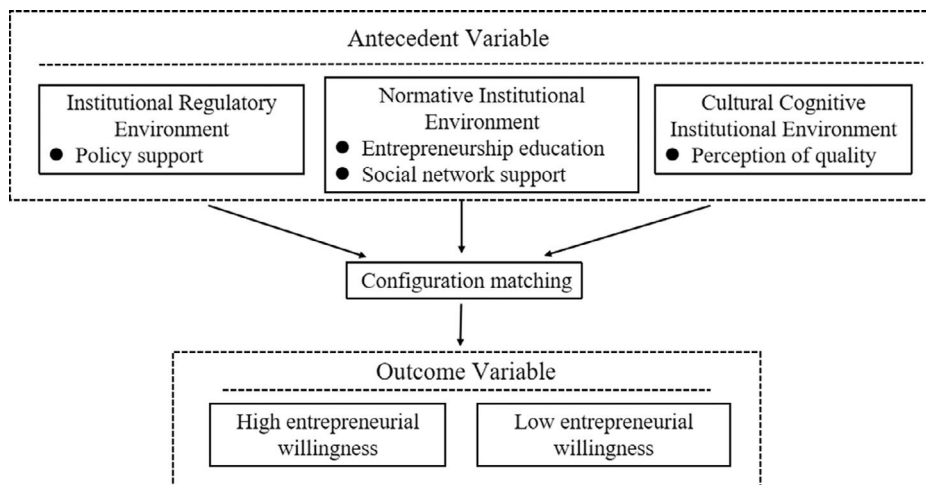


Fig. 1. Theoretical model.

Table 1
Variable selection and assignment.

Variable	Secondary indicators	Variable definition and description
Entrepreneurial Willingness	—	Plan to start a business after graduation
Institutional Regulatory Environment	Policy support	Thinking that the state should reduce or exempt the enterprise tax of College Students' independent entrepreneurship; Local governments should simplify the application process of college students' enterprise registration; Colleges should provide start-up funds for entrepreneurship (interest free loans); The society should provide free training to guide entrepreneurship
Normative Institutional Environment	College entrepreneurship education	Quality of EFSE: Thinking that EFSE have diverse teaching methods, entrepreneurial experience, and rich entrepreneurship education experience Entrepreneurial courses: Thinking that the types of courses are diverse, the content is closely integrated with the professional knowledge, and the trends of the times Entrepreneurial competition: Thinking that the competition types are diverse, the project and the professional are highly integrated, and it is easier to land
	Social network support	Thinking that their families have extensive social resources for entrepreneurship; Students or friends started their own businesses in the past year
Cultural Cognitive Institutional Environment	Perception of quality	Think you have enough knowledge, skills and experience to start a business

province, and a total of 170,759 questionnaires were finally included for analysis. Then this study selected and integrated the collected questionnaires and classified more than 1000 universities in China according to provinces. Finally, this study took the other 30 provincial administrative regions as the research samples. The measurement of each variable takes the mean value of the questionnaire items.

Design of research variables

Outcome variable

Several existing studies have not established a unified and recognized measurement method for entrepreneurial willingness. Therefore, this study uses a Likert 5-point scale to measure the dependent variable, entrepreneurial willingness. The higher the score, the more pronounced the college students' entrepreneurial willingness and the greater the possibility that they would engage in entrepreneurial activities after graduation.

Antecedent condition

Using the questionnaire, this study measured policy support (4 measures), EFSE, courses, and competitions (3 measures), social network support (2 measures), and self-quality perceptions (1 measure).

Table 1 presents the definitions of variables according to the concept of research variables. The above variables are measured using the Likert 5-point scale. The higher the score, the greater the adequacy. Among them, the three secondary indicators of entrepreneurship education involve three items. SPSS 25.0 is used to test the reliability and validity of nine items in the three dimensions of the questionnaire. Each dimension and the overall Cronbach's α are above 0.7, KMO = 0.947, and Bartlett's spherical test sig < 0.001, indicating that the questionnaire has good reliability and validity. The measurement of each element comprises the mean value of the item.

The descriptive statistical analysis of the research variables is shown in Table 2.

Data calibration

Using QCA requires recalibration of the measured variables and conversion into a set concept. Referring to Ragin's (2008) research, the analysis of fuzzy sets usually uses three limit values for calibration: 0.05 as a non-belonging threshold, 0.50 as a turning point of maximum ambiguity, and 0.95 as the threshold of fully belonging to the set. Therefore, consistent with prior studies (e.g., López-Cabarcos, Vázquez-Rodríguez & Pieiro-Chousa, 2016; Veríssimo, 2018; Kusa et al., 2021), this study also uses three centile values: 5%, 50%, and 95% of the data values. The calibration anchor points for each variable are listed in Table 3.

Analysis and results

This study used fsQCA software to analyze the questionnaire data from 30 provinces and obtained the configuration that determines high entrepreneurial willingness. Following Fiss's (2011) suggestions, this study set the original consistency threshold to 0.8, the threshold of PRI consistency to 0.70, and the case threshold to 1. Lastly, this study retained the cases with high entrepreneurial willingness.

Necessity analysis of single condition

NCA analysis results include the effect quantity obtained by two estimation methods: CR and CE. In the NCA method, two necessary conditions need to be met: the effect size (d) is greater than 0.1 (Dul, 2016), and the Monte Carlo simulations of permutation tests show that the effect size is significant (Dul et al., 2020). Table 4 shows the analysis results of NCA. Overall, the p-values of policy support,

Table 2
Descriptive statistical analysis results of the research variables.

Statistical indicator	Antecedent variable					Outcome variable	
	Regulatory Institution Policy support	Normative Institution			Cultural-Cognitive Institution Perception of quality	Entrepreneurial Willingness	
		Entrepreneurship education		Social network support			
		Quality of EFSE	Entrepreneurial courses				Entrepreneurial competition
Mean	3.61	3.43	3.37	3.39	2.56	2.71	3.76
Standard deviation	0.13	0.14	0.14	0.15	0.12	0.13	0.11
Minimum	3.36	3.14	3.15	3.10	2.34	2.50	3.52
Maximum	4.00	3.81	3.76	3.82	2.90	2.96	4.09

Table 3
Calibration anchor points of various variables.

Variable	Target collection	Anchor point				
		Fully affiliated	Crossover point	Completely unaffiliated		
Antecedent variable	Regulatory Institution	Policy support	Great policy support	3.88	3.61	3.39
		Normative Institution	Entrepreneurship education	High quality of EFSE	3.71	3.44
	High quality of entrepreneurship courses		3.66	3.39	3.16	
	High quality of entrepreneurship competition		3.71	3.40	3.14	
	Social network support		Great social network support	2.83	2.54	2.35
	Cultural Cognitive Institution	Perception of quality	High awareness of entrepreneurial knowledge, ability and experience	2.93	2.68	2.51
Entrepreneurial Willingness		High entrepreneurial willingness	3.99	3.75	3.58	

Table 4
Analysis results of necessary conditions of NCA.

Antecedent Variable	Method	C-accuracy	Ceiling Zone	Scope	Effect Size (d)	P-Value (p)
PS	CR	76.7%	0.406	0.93	0.436	0.000
	CE	100%	0.428	0.93	0.460	0.000
EFSE	CR	90%	0.303	0.92	0.329	0.000
	CE	100%	0.342	0.92	0.371	0.000
ECU	CR	83.3%	0.289	0.91	0.317	0.000
	CE	100%	0.301	0.91	0.330	0.000
ECP	CR	90%	0.332	0.92	0.360	0.000
	CE	100%	0.362	0.92	0.393	0.000
SNS	CR	90%	0.109	0.91	0.120	0.341
	CE	100%	0.089	0.91	0.097	0.534
PQ	CR	83.3%	0.172	0.90	0.190	0.098
	CE	100%	0.144	0.90	0.160	0.138

Note: $0.0 \leq d < 0.1$: low level; $0.1 \leq d$: high level.

entrepreneurship faculty staff and experts, entrepreneurship courses, and entrepreneurship competitions are all 0.000, which is significant, and the effect size is also greater than 0.1, so they are all candidate conditions of entrepreneurial willingness (Dul, 2016).

Further, this study used fsQCA to analyze the necessity of elements. In fsQCA analysis, when the consistency value of a single item is greater than 0.9, it indicates that the single condition is a necessary condition for the result variable (Schneider, Schulze-Bentrop & Paunescu, 2010). The necessary conditions for high and low entrepreneurial willingness are shown in Table 5. It can be seen from the table that the PS exceeds a consistency of 0.9, which can be regarded as a necessary condition to promote the high entrepreneurial willingness of college students. In the analysis of the necessary conditions for

college students' low entrepreneurial willingness, the consistency of the three conditions of low policy support (~PS), low-quality courses (~ECU), and low competition (~ECP) are 0.9483, 0.9185, and 0.9308, respectively, which also constitute the necessary conditions. The coverage of the above four conditions is more than 0.8, which indicates a good interpretation of the results. This result is consistent with the NCA result.

Among them, policy support, as a necessary condition, is fully reflected in the provinces with advanced entrepreneurship. Table 6 extracts the entrepreneurship support policies and their characteristics in relevant provinces with the high entrepreneurial willingness of college students.

The results of the necessary analysis confirm that the influencing factors of college students' entrepreneurial willingness in various provinces of China are uneven. Considering the asymmetry of the antecedent conditions for sharing the results of high and low entrepreneurial willingness, the synergistic and concurrent effects of multiple conditions should be comprehensively considered.

Configuration analysis

This study uses fsQCA3.0 software to analyze the configurations leading to high and low entrepreneurial willingness. These different configurations represent different paths to achieving the same result (high entrepreneurial willingness). At the same time, statistical analysis and case studies pay more attention only to the results of "high entrepreneurial willingness," while the asymmetry of fsQCA causality allows us to analyze the two results to enhance their universality.

In this study, the original consistency threshold was set to 0.8, the PRI consistency threshold to 0.7, and the case frequency threshold to 1. Owing to the lack of evidence and theory on the exact direction of

Table 5
Necessity testing of high entrepreneurial willingness and low entrepreneurial willingness.

Conditional variable	Outcome variable				
	High entrepreneurial willingness		Low entrepreneurial willingness		
	Consistency	Coverage	Consistency	Coverage	
Regulatory Institution	PS	0.9305	0.9442	0.5006	0.5401
	~PS	0.5468	0.5073	0.9483	0.9355
Normative Institution	EFSE	0.8741	0.8747	0.5298	0.5637
	~EFSE	0.5640	0.5301	0.8823	0.8817
	ECU	0.8122	0.9036	0.4715	0.5578
	~ECU	0.6024	0.5174	0.9185	0.8387
	ECP	0.8824	0.9230	0.5013	0.5576
	~ECP	0.5770	0.5211	0.9308	0.8938
Cultural Cognitive Institution	SNS	0.6740	0.6384	0.7225	0.7277
	~SNS	0.7125	0.7072	0.6410	0.6765
	PQ	0.6499	0.6124	0.7232	0.7246
	~PQ	0.7077	0.7062	0.6132	0.6507

Note: the symbol ~ denotes the absence of the condition.

Table 6
Selected provinces and policies.

Advanced entrepreneurial Province	Excerpt policy	Year	Characteristic
Guangdong Province	1. Notice of the people's Government of Guangdong Province on transmitting the opinions of the State Council on promoting the high-quality development of innovation and entrepreneurship and creating an upgraded version of "mass entrepreneurship and innovation" 2. Publicity of Guangdong College Students' innovation and entrepreneurship education demonstration college (2018–2021)	2018	Support is strong, and pay attention to the role of education and training
Shanghai	1. Notice on printing and distributing the measures of Shanghai for the implementation of entrepreneurship guaranteed loans 2. Notice of the general office of Shanghai Municipal People's Government on printing and distributing the special action plan of Shanghai for encouraging entrepreneurship and promoting employment (2018–2022) 3. Notice on completing the work related to the employment of fresh college graduates from non-Shanghai students in 2018		The policy is highly open and there are many subsidies
Jiangsu Province	1. Notice of the Provincial Department of science and technology on holding the sixth "entrepreneurship Jiangsu" science and technology entrepreneurship competition 2. Notice of the office of the Provincial Department of education on carrying out the summary and publicity of innovation and Entrepreneurship of colleges and universities in the province in 2018 3. Implementation opinions of the general office of the provincial government on deepening the integration of industry and education		There are many universities and scientific research institutes, a strong innovation team, and many educational policies
Zhejiang Province	1. Notice of five departments including the Department of human resources and social security of Zhejiang Province on paying job hunting and entrepreneurship subsidies for college graduates in 2018 2. The general office of Zhejiang Provincial People's Government on printing and distributing the implementation opinions on comprehensively optimizing the construction of development zones and promoting the deepening of reform, opening up and innovative development of development zones 3. Notice of the general office of Hangzhou Municipal People's Government on printing and distributing the three-year action plan for entrepreneurship of college students in Hangzhou (2017–2019)		Precise support and key introduction of talents

environmental conditions affecting the results, this study assumed that the presence or absence of each condition contributed to high entrepreneurial willingness when conducting counterfactual analysis (Ragin, 2008). By comparing the nested relationship between the intermediate solution and the reduced solution, this study identified the core condition of each solution: the condition appearing in the intermediate and the reduced solution has an important impact on the result. The condition in which only the intermediate solution appears is the edge condition, termed the condition of auxiliary contribution (Ragin, 2008). The results of the QCA analysis are shown in Table 7.

Two configurations (H1a and H1b) produced high entrepreneurial willingness; they constituted a second-order equivalent configuration; that is, their core conditions were the same (Fiss, 2011), but they had different edge conditions concurrently. The consistency indexes of the two configurations were 0.966 and 0.998, respectively, indicating that both configurations were sufficient conditions for high entrepreneurial willingness. Simultaneously, the consistency of the solution was 0.967, which showed that the two configurations covering most cases were also sufficient conditions for high entrepreneurial willingness. The coverage of the model solution was 0.832, indicating that the two configurations explained nearly 85% of the

Table 7
Configurations that produce high entrepreneurial willingness and low entrepreneurial willingness.

Antecedent variable	High entrepreneurial willingness		Low entrepreneurial willingness	
	H1a	H1b	NH1a	NH1b
PS	●	●	▲	▲
EFSE	○	△	△	△
ECU	○	△	▲	▲
ECP	●	●	▲	▲
SNS		○	△	○
PQ		△	△	○
Consistency	0.966	0.998	0.940	0.967
Raw coverage	0.797	0.382	0.523	0.611
Unique coverage	0.450	0.034	0.180	0.268
Solution consistency	0.967		0.949	
Solution coverage	0.832		0.790	

Note: Black circle = core causal condition (present); Black triangle = core causal condition (absent); White circle = contributing causal condition (present), White triangle = contributing causal condition (absent); Blank spaces indicate a "don't care" condition (Fiss, 2011).

reasons for high entrepreneurial willingness. Also, two configurations produced low entrepreneurial willingness: NH1a and NH1b. The consistency were 0.940, 0.967. The overall coverage of the solution was 0.79, which proved that the configuration was a sufficient condition for the result and explained nearly 80% of the reasons for low entrepreneurial willingness.

Model analysis of high entrepreneurial willingness

Given the emergence of the core conditions PS and ECP in each configuration with high entrepreneurial willingness, to distinguish the differences between the two modes, this study named them respectively as policy-education-driven type and policy-competition-social network-driven type according to the occurrence of each condition in the two configurations and combined with the actual phenomena of each province.

(1) **Policy-education-driven model.** The policy-education-driven path summarized from configuration H1a indicated that college students were mainly motivated by high-quality entrepreneurship education, especially entrepreneurship competition and sound policies. On the one hand, entrepreneurship education in colleges and universities could significantly improve the entrepreneurial quality of college students. Students who received entrepreneurship education represented by EFSE, courses, and competitions showed an increasingly common attitude and perceived behavior control and were better at taking risks (Rauch & Hulsink, 2015). However, all kinds of policy support can effectively strengthen the government's, colleges', and society's attention and recognition of college students' entrepreneurship to improve their entrepreneurial willingness. Therefore, colleges need to focus on improving the professional quality of entrepreneurship faculty staff and experts in entrepreneurship-related fields, expand the construction of the entrepreneurship curriculum system, and enrich the existing entrepreneurship curricula by equipping them with certain teaching mechanisms such as competition and practice (Mei, Lee & Xiang, 2020).

A typical case under this driving mechanism is Zhejiang Province. In 2015, to implement the national opinions, the Zhejiang Provincial Government argued about supporting mass entrepreneurship and promoting employment, focusing on promoting higher quality employment and entrepreneurship, and promoting college graduates' independent entrepreneurship through multiple channels. Concurrently, Zhejiang province regarded entrepreneurship education as an important breakthrough in educational reform, especially in promoting high-quality economic development. It focused on promoting the construction of an innovation and entrepreneurship curriculum system and strengthened practical teaching with various entrepreneurship competitions as the carrier. Under the guidance of the spirit of many documents, college students had become the main group of policy dividends. On February 17, 2022, Chen Zhong, deputy director of the Department of human resources and social security of Zhejiang Province, said at a press conference that if college students fail to start a business, the government would compensate for the loan of less than 14,800 \$, and 80% of the loan of more than 14,800 \$. Similar "compensation" policies were implemented as early as 2015. The superposition of such support policies and policies related to common prosperity in Zhejiang Province will further promote college students' entrepreneurship and employment and accelerate the realization of common prosperity.

(2) **Policy-competition-social network-driven model.** The policy-competition-social network-driven path summarized from configuration H2b suggests that college students are mainly driven by entrepreneurship competition, social networks, and good policy support to stimulate their entrepreneurial will. Specifically, to motivate them, entrepreneurship competitions provided students with a real entrepreneurial environment to familiarize them with entrepreneurial processes and understand the true meaning of entrepreneurship.

The influence of personal social networks on entrepreneurial willingness mainly lies in behavior examples and network support, which will form a supportive entrepreneurial atmosphere and strongly impact college students' entrepreneurial willingness. For relevant government departments, regulating entrepreneurship platforms, adjusting taxes, and other policies and measures can also create a relaxed and good atmosphere and encourage college students to start their own entrepreneurial activities.

A typical case of this configuration is that of Shanghai. On June 25, 2018, Shanghai issued the "Shanghai special plan of action to encourage entrepreneurship and employment" (2018–2022 years), which called for more inclusive entrepreneurship-driven employment policies. It also proposed a focus on different fields and types of innovation and entrepreneurship. It continues to organize various competitions, such as the Shanghai Entrepreneurship Plan and the China College Students' "Internet+" Innovation and Entrepreneurship Competition, and to stimulate the enthusiasm for innovation and entrepreneurship across a broad spectrum. According to the Shanghai Observer (2021), current entrepreneurs fully use social resources and focus on strategic emerging industries such as biomedicine, new materials, energy conservation and environmental protection, and new-generation information technology.

Among these two models, the coverage of the policy education-driven model was high, which explained 45% of the results of high entrepreneurial willingness, indicating that many colleges and universities drive college students' entrepreneurial willingness through the synergy of entrepreneurial education and institutional regulatory environment. Also, stemming from these two models, when the policy conditions were linked and matched with the corresponding normative and institutional elements, the same goal could be achieved in different ways to improve the entrepreneurial will of college students.

Model analysis of low entrepreneurial willingness

Configuration NH1a: \sim psfs * \sim efsefs * \sim ecufs * \sim ecdfs * \sim snfs * \sim pqfs, indicated that the lack of the two core conditions of policy support and entrepreneurship competition and the lack of other marginal conditions would not create a high willingness to start a business. According to the analysis results, configuration NH1a explained 18% of the result variables. This proved that in the special situation of institutional transformation, with a lack of policy support and incentives coupled with a lack of effective implementation of college entrepreneurship competitions, the entrepreneurial willingness of college students continued to be depressed. The typical provinces with this configuration were Guizhou, Yunnan, and Guangxi. Configuration NH1b: \sim psfs * \sim efsefs * \sim ecufs * \sim ecdfs * snfs * pqfs showed that even if college students had abundant social network support or could perceive their own entrepreneurial knowledge and skills, as long as they lacked good policy incentives and an entrepreneurial education environment, their willingness to start a business would be inhibited. The typical provinces in this configuration were mainly Xinjiang, Hainan, Jiangxi, and others. By comparing the above two configurations, it was also found that, compared with the other two environmental elements, the impact of the cultural cognitive institutional environment on college students' entrepreneurial willingness was low.

Robustness analysis

Much previous literature has used the adjusted consistency threshold for robustness analysis (Alonso-Dos-Santos & Llanos-Contreras, 2019; Xiong & Sun, 2022). Therefore, this study selected to change the consistency threshold (adjusted from 0.8 to 0.85) to reprocess the sample data (Kraus, Ribeiro-Soriano & Schüssler, 2018). The results indicated that the high and low entrepreneurial willingness paths were identical as the subset of the original results, and the

resulting configuration was consistent, and thus, the conclusion was stable.

Discussion

As mentioned above, contrary to considering a single perspective on college students' entrepreneurial willingness, this study employed NCA and fsQCA to analyze six conditional factors at three levels: the regulatory, normative, and cognitive environment. First, the research results showed that a regulatory institutional environment is necessary for high entrepreneurial willingness, fully reflected in the advanced entrepreneurial provinces. These results are consistent with previous studies in this area, which argued for Proposition 1 that college student's entrepreneurial willingness relates to policy support (e.g., [Ogunsade et al., 2021](#); [Karimi et al., 2016](#); [Bergmann et al., 2016](#)). As entrepreneurship becomes an important factor in changing economic growth goals to achieve sustainable development ([Méndez-Picazo et al., 2021](#)), policymakers should actively implement policies and measures to support college students' innovation and entrepreneurship.

Regarding the normative environment, previous studies have proved that entrepreneurship education (including EFSE, courses, and competitions) can stimulate college students' entrepreneurial willingness ([Welsh, Tullar & Nemat, 2016](#); [Lyons & Zhang, 2018](#)). Our findings also support Proposition 2; therefore, the government should encourage more colleges to conduct innovation and entrepreneurship education. According to the literature cited in this study, social network support has an important role in promoting college students' entrepreneurial willingness ([Saeed et al., 2015](#); [Molino et al., 2018](#)). Our findings also supported Proposition 3. Therefore, the government should vigorously publicize the necessity and importance of strengthening innovation and entrepreneurship education in colleges, actively implement relevant policies, and help college students solve practical problems when appropriate. All sectors of society should attach importance to and support college students to engage in innovation and entrepreneurship activities.

Finally, concerning the cognitive environment (Proposition 4), the results show that the antecedent condition of the cultural cognitive system has little influence on college students' entrepreneurial willingness. This finding validates [Ogunsade et al.'s \(2021\)](#) argument that many college students have entrepreneurial knowledge and skills but think less of converting them to a vocation or engaging the ideas in venture creation. The main reason is that college students are afraid of risks and have no entrepreneurial experience. Through empirical research, [Dehghanpour Farashah \(2015\)](#) found that improving college students' widely available knowledge and entrepreneurship skills significantly reduce their fear of failure, which is an important determinant of inhibiting entrepreneurial willingness. Therefore, policymakers need to provide support and enable an environment that enhances individual entrepreneurial willingness and a propensity for creativity, risk-taking, and using available opportunities.

Theoretical contribution

This study expands the research on entrepreneurial willingness as well as the new perspective of innovative and entrepreneurial education to promote college students' high entrepreneurial willingness. First, from the perspective of institutional theory, this study analyzes the impact of three dimensions of the institutional environment on college students' entrepreneurial willingness and found that there are two configurations (including the regulatory and normative environment) that produce high entrepreneurial willingness. In contrast, the cultural cognitive environment has little impact, contrary to previous research. Second, this study surmounts the fragmentation of

existing research in investigating college students' entrepreneurial willingness and considers various factors affecting it. This study also enhances the influence conditions of previous studies that remained at a single level to investigate college students' entrepreneurial willingness and provides a new direction for innovation and entrepreneurship education in colleges and universities in China under the new situation. Thirdly, this study adopts the hybrid method of NCA and QCA. Necessity and sufficiency are two different causal relationships ([Fiss, 2011](#); [Dul et al., 2020](#)). Combining NCA and QCA to explore the complex causal relationship can help analyze the causal relationship of necessary conditions, which is helpful to promote the development of the research on the necessary and sufficient relationship between the institutional environment and college students' entrepreneurial willingness.

Managerial implications

This study also provides important practical enlightenment. First, regulating environmental factors is necessary to stimulate college students' entrepreneurial willingness, and, therefore, provincial governments should strengthen organizational leadership, understand the situation in depth, and optimize the innovation and entrepreneurship environment. Policymakers should actively study, formulate, and implement policies and measures to support college students' innovation and entrepreneurship and help college students solve practical problems at the appropriate time. In economically underdeveloped areas, policymakers timely summarize and promote the good experience and practices of advanced provinces in entrepreneurship, select successful examples of college students' innovation and entrepreneurship, and enrich the form of publicity. At the same time, all provinces should effectively promote policies, encourage college students to make full use of supporting policies such as tax reduction and enterprise registration, and create a social atmosphere to support college students' innovation and entrepreneurship. In addition, the development of rural areas in various countries, especially in developing countries, is still significantly behind. To develop the country's rural areas, the government could provide more incentives to encourage more college students to start businesses in the regions, thus enhancing economic growth ([Olugbola, 2017](#)).

Second, colleges and universities in each country should also actively respond to the policies, promote the integration of specialty and innovation, create an upgraded version of innovation and entrepreneurship education, and effectively adapt it to the policy factors. Third, the occurrence of high entrepreneurial willingness is asymmetric. Therefore, policymakers should not unilaterally push back the mode of high entrepreneurial willingness based on the factors that produce low entrepreneurial willingness, but should analyze specific problems, grasp the dynamic matching relationship between various antecedents and the role of core conditions to explore an effective path to improve college students' entrepreneurial willingness.

Limitations

This study has limitations: (1) Only the factors affecting the entrepreneurial willingness of Chinese college students are deeply discussed, and the influencing factors of college students in other countries globally are not discussed. Therefore, the sample scope needs to be further improved. (2) Since the generation of willingness is the premise of behavior, this study focuses on the influencing factors of entrepreneurial willingness and does not conduct further research on the impact of willingness on behavior. Future research can explore the impact of Chinese college students' entrepreneurial willingness on their entrepreneurial behavior.

Conclusion

Having entrepreneurial willingness is the core of entrepreneurial behavior, and college students are the main source of innovation and entrepreneurship. It is, therefore, necessary to understand how to promote entrepreneurial willingness among them. This study differentiates itself from previous studies by identifying several combinations of factors that affect college students' entrepreneurial willingness. These factors include policy support, entrepreneurship education, and social network support. The analysis reveals that the regulatory environment is a necessary condition for high entrepreneurial willingness, while, the antecedent condition of the cognition system has a low impact on college students' entrepreneurial willingness. This finding could be a promising aspect for future research. This study provides a reference for further studying college students' entrepreneurial willingness from an overall perspective and confirms the usefulness of fsQCA and NCA in entrepreneurial research.

Declaration of Competing Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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