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# College students' entrepreneurship policy, regional entrepreneurship spirit, and entrepreneurial decision-making

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College students represent a burgeoning force in mass entrepreneurship, underscoring the critical need to nurture their entrepreneurial endeavors. This study adopts a quantitative method, surveying 33,660 Chinese college students engaged in entrepreneurial activities. It examines the impact of various entrepreneurial policies and regional entrepreneurship spirit on these students' decision-making processes. The findings reveal a positive correlation between entrepreneurial policies and entrepreneurial decision-making among college students, with regional entrepreneurship spirit serving as a mediator. Gender influences the relationship between regional entrepreneurship spirit and entrepreneurial decision-making, primarily moderating the effects of supply-based and environmentally-oriented policies. Entrepreneurship must be deeply integrated within China's unique social networks and informal institutional frameworks. The moderating influence of gender also highlights differing policy impacts among various student groups. This research contributes to the enhancement and understanding of the policy support mechanism's effect on college students and underscores the necessity for precise implementation of entrepreneurship policies tailored to college students.

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## Introduction

Entrepreneurship is an endogenous force that promotes social progress and change (Wang and Shao, 2023; Si et al., 2023). It not only generates employment and stimulates innovation but also profoundly influences the establishment of a scientific and balanced economic structure. Entrepreneurial decision-making is a critical event that catalyzes entrepreneurial behavior, marking the transition of an individual's identity to that of an entrepreneur (Gabrielsson et al., 2022). For college students, effective entrepreneurial decision-making not only directs entrepreneurial actions but also assists them in identifying opportunities and securing a competitive edge (Karami et al., 2023; Krueger, 2017). It is argued that entrepreneurial decision-making lies at the heart of the success, longevity, and sustainability of entrepreneurial endeavors (Caputo and Pellegrini, 2019). Thus, adopting suitable entrepreneurial decision-making logic is essential for value creation and acquisition in a dynamic environment.

In recent years, the Party Central Committee and the State Council of China have enacted numerous policies to promote entrepreneurship and employment among college students. For instance, in March 2020, the General Office of the State Council issued the *Implementation Opinions on Strengthening Measures to Stabilize Employment in Response to the Impact of the New Coronary Pneumonia Epidemic*. In September 2021, the General Office of the State Council introduced the *Guiding Opinions on Further Supporting College Students' Innovation and Entrepreneurship*. A survey conducted across 1,231 colleges and universities in China revealed that most students highly value the country's entrepreneurial policies (Huang and Huang, 2019). However, another survey indicated that universities tend to focus on short-term achievements in entrepreneurship policies, prioritizing infrastructure construction over student development (Klofsten et al., 2019). The objectives and approaches of different policies were not always aligned (Wright et al., 2022). Consequently, this study comprehensively analyzes the impact of entrepreneurship policy on college students from the perspective of policy tools. Rothwell's classification of policy tools is particularly notable, dividing them into three categories: demand-based policy tools, supply-based policy tools, and environmentally-oriented tools (Rothwell and Zegveld, 1981). This classification aligns well with the current emphasis on addressing the structural employment contradiction of college students and promoting an innovation-driven strategy.

Moreover, the impact of entrepreneurship on the subjective social stratum of individuals extends beyond the micro level, where it affects individuals' career choices and social standing. The entrepreneurial spirit at the regional level significantly influences individual entrepreneurial decision-making (Guerrero et al., 2020; Jessop, 2005). Within the region, the social environment fostered by a concentration of entrepreneurship also alters people's behavior and psychological perceptions, exerting a notable social impact (Jena, 2020; Peters and Jetten, 2023). Considering the increasingly robust atmosphere of "mass entrepreneurship and innovation" in China, entrepreneurial activities are progressively taking shape regionally. The spillover of regional entrepreneurship spirit on college students' entrepreneurial decision-making has thus become a pressing issue for investigation.

While previous research has systematically revealed gender differences in entrepreneurial decision-making (Shepherd et al., 2015), current studies still face some limitations. First, there is a constraint regarding sample size, with a lack of nationwide surveys that challenge the generalizability of the results. Second, some studies focus exclusively on qualitative analysis without the support of quantitative data, thus restricting a comprehensive

understanding of gender differences. Current academic studies concentrate on comparative entrepreneurship policy (Egan, 2022), entrepreneurship education (Mei and Symaco, 2022), and talent training for college students' entrepreneurship research (Li et al., 2023; Yang et al., 2021). However, there is a scarcity of studies exploring how the entrepreneurial policies of a country impact college students' entrepreneurial decision-making. China's entrepreneurship and innovation policies slightly differ from those of the United States regarding innovation and entrepreneurship. Some studies indicate that current entrepreneurship policies, across various dimensions, exert distinct influences on college students' entrepreneurial pursuits (Lu et al., 2021). Entrepreneurial alertness, as suggested by Minniti (2004), plays a crucial role in influencing the entrepreneurial decision-making process, guiding entrepreneurs to make a series of judgments, particularly when interpreting national policies. Consequently, it becomes imperative to scrutinize how these policies can effectively support and unleash the full entrepreneurial potential among Chinese college students.

In summary, this study aimed to answer the following research question: What is the internal mechanism of college students' entrepreneurial policies and entrepreneurial decision-making? Through a national survey of 33,660 college students, this study investigates the influence of various entrepreneurial policy types and regional entrepreneurship spirit on college students' entrepreneurial decision-making. Additionally, the study assesses the mediating effect of regional entrepreneurship spirit and the moderating effect of gender. This research makes significant contributions to the entrepreneurship literature. First, it addresses a gap in empirical evidence concerning the importance of college students' entrepreneurship policies in fostering entrepreneurial decision-making by thoroughly investigating the mediating mechanism of regional entrepreneurship spirit. Second, gender may influence individuals' perceptions of themselves as entrepreneurs, their behavioral tendencies, and their role positioning in the entrepreneurial environment (Verheul et al., 2005). Considering the observed differences between men and women in entrepreneurial activities (Kalleberg and Leicht, 1991), this study introduces gender as a moderating variable. This addition is conducive to strengthening research on the precise implementation of college students' entrepreneurship policy and contributes to a deeper understanding of the mechanisms involved. Finally, the study highlights the need for government and society to enhance the entrepreneurial decision-making capabilities of college students through the formulation of relevant policies and the creation of a conducive entrepreneurial atmosphere.

## Theoretical basis

**Entrepreneurship policies for college students.** Entrepreneurship policy, formulated and implemented by countries or regional economies, aims to stimulate entrepreneurship and increase entrepreneurial activities (Collins, 2003; Kirschning and Mroźewski, 2023). Entrepreneurship serves as a means to address instability and uncertainty (Zayadin et al., 2023). Given the increasingly severe employment challenges faced by college students, there are high expectations for their entrepreneurship to drive employment. In May 2003, the State Council of the People's Republic of China (PRC) first proposed "encouraging college graduates to start businesses and find flexible employment." Consequently, the State Council of PRC has enacted regulations concerning micro-loans and administrative fee reductions and exemptions. Over time, the imperative for entrepreneurship policies has become evident. In recent years, the employment situation for college graduates has grown complex and severe.

The Ministry of Education of PRC has implemented various measures, including the establishment of a Steering Committee for College Graduates' Employment and Entrepreneurship, to foster full and high-quality employment and entrepreneurship. Internationally, it is recognized that startups contribute to employment and economic revitalization (Barboza and Capocchi, 2020; Sreenivasan et al., 2023). Growth-oriented policies and measures also significantly influence the development of new startups (Heredia et al., 2023). Studies have emphasized the continuous need for China to introduce entrepreneurial policies to adapt to a dynamic environment and foster an entrepreneurial nation (Mok et al., 2020). To promote employment through entrepreneurship, China has launched a series of preferential policies in recent years. In 2021, *the Guiding Opinions of the General Office of the State Council on Further Supporting Innovation and Entrepreneurship of College Students*, unveiled by the State Council of PRC (2021), proposed that small-scale taxpayers with monthly sales of less than 150,000 yuan are exempt from value-added tax, while improving the achievement transformation mechanism, strengthening the integration of industry, academia, and research achievement transformation services, and tracking and supporting outstanding projects in the "Internet + " College Student Entrepreneurship Competition. In 2023, *the Guidelines on Preferential Tax Policies to Support the Employment and Entrepreneurship of Young People, including College Graduates*, unveiled by the State Administration of Taxation of PRC (2023), proposed to reduce taxes and fees, support young people to return to the country and start businesses in their hometowns, improve incubation services, expand financing channels, and make tax reduction and fee reduction policies precise and targeted at different needs of entrepreneurs.

However, Yang (2004) introduced the concept of institutional loopholes, highlighting that policies may not always align with the needs of entrepreneurs. Therefore, a comprehensive analysis of the impact of entrepreneurship policy on college students is necessary, examining it from the perspective of policy tools. Rothwell's classification of policy tools is particularly notable, dividing them into three categories: demand-, supply-, and environmentally-oriented policy tools (Rothwell and Zegveld, 1981). First, supply-oriented policies act as a direct driving force for entrepreneurial decision-making. The government enhances the supply of innovation elements, including talents, funds, and other resources necessary for innovation activities (Liang and Li, 2023; Huang et al., 2022). It supports college students in starting businesses through investments in education, provision of facilities, personnel training, and more. Second, environmental policies create a conducive development environment for educational reform by implementing measures such as educational goal planning, financial services, tax systems, and regulatory strategies. These actions aim to foster the formation of innovative and entrepreneurial talents (Kostetska et al., 2020). Finally, demand-based policies in industry, academia, and research encourage various entities to seek innovative achievements. This policy tool acts as a pull from the government for the reform and development of innovation and entrepreneurship education in colleges and universities. Essentially, the government expands the education resource market, reduces external instability, and accelerates the cultivation of high-quality innovative talents through mechanisms like government procurement, education service outsourcing, education overseas exchanges, and shaping the education market (Wang et al., 2022).

Therefore, referring to the policy tool research methods of Rothwell and Zegveld (1981) and Xu et al. (2023), this study categorizes the main policy into three: demand-based, supply-based, and environmentally oriented policy tools. This classification resonates with the current emphasis on addressing the

structural employment contradiction among college students and promoting an innovation-driven strategy.

**Entrepreneurial policies and decision-making for college students.** The decision-making process typically involves identifying and selecting alternatives, primarily dependent on the values and preferences of decision-makers (Albahri et al., 2023). This aspect is particularly critical for entrepreneurs, as decision-making strategies vary, particularly in a deeply rooted decision-making environment where they are both supported and constrained by their surroundings (De Winnaar and Scholtz, 2019). A conducive entrepreneurial policy environment can stimulate new market forces, invigorate talent, and influence entrepreneurial decision-making. Shepherd et al. (2015) highlight that entrepreneurial decisions are intricately linked to the environment. Entrepreneurial decision-making is influenced by industry conditions and institutional forces, including laws and regulations, general economic conditions, and the entrepreneurial culture within organizations. According to Shepherd and Patzelt (2017), individuals may also be embedded in specific environments, as per institutional theory. They found that entrepreneurs in different countries employ different decision-making criteria to evaluate opportunities based on the policy environment. For instance, compared with British entrepreneurs who benefit from strong intellectual property rights, Chinese entrepreneurs, owing to weak protection of intellectual property rights, may pay less attention to safeguarding their creative patents. Melović et al. (2022) also asserts that the decision-making process of entrepreneurs is predominantly influenced by environmental factors, such as rapid institutional change, which plays a pivotal role.

Therefore, this study focuses on the entrepreneurial decision-making of college students as the dependent variable, measured by two items: the extent to which entrepreneurial policy contributes to improving individual entrepreneurial intention and the degree to which entrepreneurship policies foster entrepreneurial activities. In summary, this study's first hypothesis is to identify the impact of entrepreneurial policies on college students' entrepreneurial decision-making.

**H1a:** Supply-oriented policies positively impact college students' entrepreneurial decision-making.

**H1b:** Demand-based policies positively impact college students' entrepreneurial decision-making.

**H1c:** Environmental policies positively impact college students' entrepreneurial decision-making.

**Regional entrepreneurship spirit.** According to the 2017–2018 *Global Entrepreneurship Monitor (GEM) Report*, entrepreneurial awareness, opportunity perception, and entrepreneurial self-efficacy emerge as the three most influential factors in regional entrepreneurship spirit. The *GEM* introduces the Entrepreneurship Spirit Composite Index, where countries and regions with higher factor scores reflect elevated levels of the three underlying variables. This encompasses individuals and communities willing to take risks, pursue innovative ideas, and engage in business activities to drive local or regional economic growth and development. Researchers and experts have explored various factors such as local culture, social networks, educational institutions, and government policies that shape entrepreneurship spirit within specific regions (Yin et al., 2023). Although scholars have yet to provide a clear definition of the concept of regional entrepreneurship spirit, drawing on previous research discussions related to similar concepts (Gu et al., 2023), this paper suggests that regional entrepreneurship spirit represents the manifestation of individuals' value judgments, subjective norms, and attitudes toward entrepreneurship in a given region. It influences people's

attitudes toward entrepreneurial activities within that region. Regional entrepreneurship spirit is rooted in the unique social, cultural, economic, and institutional context of a specific area, signifying the overall entrepreneurial spirit of a region and differing from the narrow subjective mindset, attitudes, and personalities of individual entrepreneurs (Bort and Totterman, 2023).

Entrepreneurs have enhanced their social status and the public's perception of identity for entrepreneurial behavior by acquiring economic resources. Furthermore, entrepreneurial example strength and demonstration effect have increased their sense of self-efficacy in entrepreneurship, leading the public to form a positive value judgment on entrepreneurship, and thus deriving the regional entrepreneurial spirit. Regional entrepreneurship spirit is the embodiment of people's value judgments, subjective norms, and attitudes toward entrepreneurship, which affects people's attitudes toward entrepreneurial activities in the region. It is an important force and motivation influencing entrepreneurial decision-making (Su et al., 2020). The formation of regional entrepreneurship spirit is influenced by key factors such as the economy, society, and cultural and regional differences. A strong entrepreneurial example and a positive entrepreneurial atmosphere can stimulate entrepreneurs' enthusiasm for entrepreneurship, thereby affecting entrepreneurial decision-making (Su et al., 2020). When starting a business, entrepreneurs must identify opportunities, review available capabilities and resources, evaluate markets, and allocate resources to meet challenges (Noor and Isa, 2020). Other studies have explored how entrepreneurial experience (Baron and Ensley, 2006), failure experience (Behrens and Patzelt, 2018), and entrepreneurial self-efficacy (Stroe et al., 2018) affect entrepreneurs' decision-making strategies.

In conclusion, this research characterizes regional entrepreneurship spirit as the embodiment of individuals' value judgments, subjective norms, and attitudes toward entrepreneurship within a specific region. It plays a significant role in shaping people's perspectives on entrepreneurial activities in that area. According to the GEM Report, "entrepreneurial awareness, opportunity perception, and entrepreneurial self-efficacy are identified as the three most influential factors in fostering the regional innovation spirit". First, the "entrepreneurial awareness" of the GEM Entrepreneurship Index survey's respondents on whether they know someone who has started a business in the past year. Previous studies have examined the influence of parental role models on children's entrepreneurship (Zapkau et al., 2015) and the influence of entrepreneurial teachers on students' entrepreneurship (Li and Wu, 2019). This article refers to GEM to study indicators of entrepreneurial awareness from the perspective of classmates or friends. Second, entrepreneurial opportunity perception refers to whether respondents believe good entrepreneurial opportunities exist in their locality. Subjective perception and objective market conditions help obtain entrepreneurial opportunities. Although each entrepreneur has different perceptions and pursuits of entrepreneurial opportunities, entrepreneurship success is restricted by objective opportunities (Renko et al., 2012). This study examines the degree of entrepreneurial opportunities from the perspective of the respondents' provinces according to China's national conditions. Third, entrepreneurial self-efficacy refers to whether respondents believe they have the knowledge, skills, and experience to start a business. Entrepreneurial self-efficacy measures a person's ability to start an entrepreneurial enterprise (Mauer et al., 2017). This study improves this indicator, as respondents believe they have sufficient knowledge, skills, and experience to start a business.

Therefore, the second hypothesis seeks to confirm the role of regional entrepreneurship spirit in college students' entrepreneurial policies and decision-making.

**H2a:** Regional Entrepreneurship Spirit plays a positive mediating role in the relationship between supply-oriented policies and entrepreneurial decision-making.

**H2b:** Regional Entrepreneurship Spirit plays a positive mediating role in the relationship between demand-based policies and entrepreneurial decision-making.

**H2c:** Regional Entrepreneurship Spirit plays a positive mediating role in the relationship between environmental policy and entrepreneurial decision-making.

**Gender as a moderating factor in entrepreneurial decision-making.** Differences in gender socialization between men and women result in distinct roles and expectations as they mature, shaping their future social activities (Hägg et al., 2023). Rebellow and Suri (2019) highlight that gender plays a role in a person's inclination toward risk-taking, with men demonstrating a higher likelihood of decisive decision-making. Studies on the significance of gender in decision-making indicate that this process tends to be more time-intensive for women. Women often engage in meticulous environmental analysis and frequently gather more data than men during decision-making (Alsos and Ljunggren, 2017; Malmström et al., 2017). Prior studies have affirmed that women's decision-making processes are influenced by emotions, while men typically base their decisions on reliable and objective environmental factors (Melović et al., 2022). Therefore, we propose the following hypothesis:

**H3a:** Gender has a moderating effect on the relationship between college students' entrepreneurial policies and entrepreneurial decision-making; male college students' entrepreneurial policies greatly impact entrepreneurial decision-making.

**H3b:** The moderating effect of gender on college students' entrepreneurial policy and entrepreneurial decision-making is realized through the mediating effect of regional entrepreneurship spirit; regional entrepreneurship spirit has a profound influence on entrepreneurial decision-making for men.

Figure 1 shows the theoretical model used in this study (see Fig. 1).

## Data and methodology

The data for this study were obtained from a survey conducted by the author's research team on a national scale, targeting undergraduate and postgraduate students with entrepreneurial experience (excluding freshmen from the 2018 academic year). The survey collected a total of 35,340 questionnaires. After excluding 1680 invalid questionnaires owing to excessively short completion times or invalid school names, 33,660 valid questionnaires were retained, representing 95.25% of the total. Prior to hypothesis testing, comprehensive assessments were conducted, including tests for reliability and validity, common method bias, and multicollinearity. Subsequently, the hypotheses were examined through the testing of a moderated mediation model.

**Sample selection.** The research data were collected between 2017 and 2018 through a nationwide random questionnaire survey using the Star software. A total of 35,340 questionnaires were gathered, from which 1680 were deemed invalid owing to excessively short completion times or invalid school names. This left 33,660 valid questionnaires, constituting 95.25% of the total. The overall data quality was deemed satisfactory. The survey focused on 33,660 undergraduate college students (excluding first-year students in 2018) who had engaged in entrepreneurial practices during their college years. Table 1 provides an overview of the basic conditions. The evaluation mean values range from 3.09 to 3.89 on a 5-point scale questionnaire (with 1 as the minimum and 5 as the maximum). Notably, the mean value for the impact of entrepreneurial policies on increasing personal

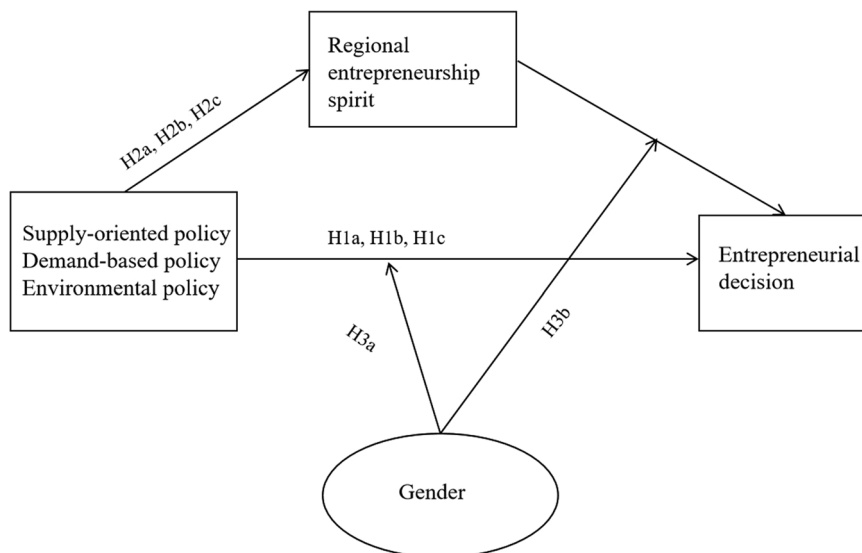


Fig. 1 The theoretical model.

Table 1 Basic sample information.

Factor	Item	Minimum	Maximum	Mean	Standard deviation
X1:Supply-oriented policy	X11: The college provides integrated entrepreneurial practice services	1	5	3.68	0.99
	X12: In terms of entrepreneurship practice, there is an independent college student pioneer park	1	5	3.77	1.005
	X13: In terms of entrepreneurship practice, there are special Outside-school Practice Bases	1	5	3.66	1.019
	X14: Entrepreneurial practice projects are highly integrated with professional learning	1	5	3.68	0.995
X2:Demand-based policy	X21: Entrepreneurship competitions are of great help to real entrepreneurship	1	5	3.81	0.945
	X22: Having tutors inside and outside the school in terms of entrepreneurship practice	1	5	3.79	0.961
	X23: Society provides free training to guide entrepreneurship	1	5	3.76	0.983
X3: Environmental policy	X31: The state reduces or exempts college students' self-employment enterprise tax	1	5	3.82	0.947
	X32: Local government simplifies business registration application process for university students	1	5	3.8	0.945
	X33: The school provides interest-free loans for start-up funds for entrepreneurship	1	5	3.76	0.981
M: Regional entrepreneurship spirit	M1: Students or friends you know have started a business in the past year	1	5	3.14	1.157
	M2: Entrepreneurship opportunities in your province are generally good	1	5	3.27	1.021
	M3: You believe you have sufficient knowledge, skills, and experience to start a business	1	5	3.09	1.031
Y: Entrepreneurial decision	Y1: Entrepreneurial policies can help increase the willingness of individuals to start a business	1	5	3.89	0.912
	Y2: Entrepreneurship policies have practical help in launching entrepreneurship	1	5	3.89	0.908

Data source: Compiled by the author.

entrepreneurial willingness is 3.89, indicating that students perceive it as significantly stimulating their entrepreneurial inclination. Similarly, the mean value for the overall impact of entrepreneurship policies is 3.89, suggesting that students consider these policies helpful for initiating entrepreneurial endeavors (see Table 1).

**Reliability and validity test.** The overall reliability and validity test results of the sample are as follows: the alpha ( $\alpha$ ) value is 0.928 (with  $\alpha \geq 0.7$  considered acceptable), and the Kaiser–Meyer–Olkin

(KMO) value is 0.957 (where  $KMO > 0.5$  is deemed suitable). These values indicate that the overall scale demonstrates good reliability and validity. Furthermore, the reliability and validity test results for each factor (see Table 2 for details) have successfully passed the internal consistency test ( $\alpha \geq 0.7$ ), affirming the good reliability of each factor scale. The KMO sample measure and Bartlett's test results demonstrate that all variables have passed Bartlett's test ( $KMO > 0.5$ ), meeting the criteria for factor analysis. The outcomes of the exploratory factor analysis revealed that the factor loading of each item, after rotation, exceeds 0.6. Additionally, the composite reliability (CR) for all factors surpasses 0.7, and

the average variance extracted (AVE) value for each factor is above 0.5. These findings indicate the scale’s robust convergent validity. To assess discriminant validity, the square root of the AVE values for each factor was calculated, along with the correlation coefficient (see Table 3 for details). The results demonstrate that each factor scale exhibits good discriminant validity. Referring to the suggestion of Wen Zhonglin et al. (2004), through confirmatory factor analysis, the over-stimulated statistics (root mean square error of approximation (RMSEA) = 0.072, comparative fit index (CFI) = 0.971, (goodness of fit index)GFI = 0.946, adjusted goodness of fit index (AGFI) = 0.919, incremental fit index (IFI) = 0.971, normed fit index (NFI) = 0.971) show a good degree of fit. Therefore, this study’s scale has good reliability and validity.

**Common method bias test and multicollinearity test.** This study employed Harman’s univariate test to address common method bias. The results, without rotation, indicate that the first factor explains 47.86% of the variance of all items. Importantly, this percentage was below 50%, signifying effective control of the common method bias in the data used (Hair, 2009). Moreover, the variance inflation factor (VIF) was consistently below 10, with the majority being <5, indicating the absence of a serious multicollinearity issue.

**Analysis of hypothesis testing outcomes**

*Descriptive statistics and correlation analysis of each variable.* The total average scores of supply-, demand- and environmentally oriented policies, regional entrepreneurship spirit, and entrepreneurial decision-making were analyzed. Table 3 shows that entrepreneurial decision-making is significantly and positively

related to supply-, demand-, and environmentally oriented policies, as well as regional entrepreneurship spirit. There is a significant positive correlation between regional entrepreneurship spirit and these three types of policies. Men scored higher than women in the relationship between such policies, regional entrepreneurship spirit, and entrepreneurial decision-making.

*Moderated mediation model testing.* SPSS software was used to analyze the data, referring. We refer to Wen Zhonglin and Ye Baojuan’s moderated mediation model testing method (2014). The three categories of policies were used as independent variables; regional entrepreneurship spirit as an intermediary variable; gender as a second-stage regulatory variable; entrepreneurial decision-making as the dependent variable; and permanent residence, family entrepreneurial experience, educational resources, and family entrepreneurial resources as control variables. The formula used is as follows:

$$M = a_{1Xi}Xi + e_{1i} \quad (i = 1, 2, 3) \tag{1}$$

$$Y = c'_{0Xi} + c'_{1Xi}Xi + c'_{2Xi}W + c'_{3Xi}WXi + b_{1Xi}M + b_{1Xi}MW + e_{2i} \quad (i = 1, 2, 3) \tag{2}$$

where Y represents the dependent variable entrepreneurial decision-making, X1, X2, and X3 represent the independent variables (policies), and environmental policy, respectively. M represents the intermediary variable, regional entrepreneurship spirit, and W represents the gender of the regulatory variable. The theoretical models proposed above were tested, and the mediated effect with regulation was tested using the bootstrap method. Tables 4–6 present the results. Figures 2–4 provide the final models based on quantitative analysis for supply-, demand-, and environmentally-oriented policies, respectively.

Table 4 illustrates that X1, the supply-oriented policy, significantly and positively affects M, the regional entrepreneurship spirit ( $a_{1x1} = 0.2694$ , 95% CI = 0.2611–0.2776) (see Table 4).

Furthermore, the regional entrepreneurship spirit also significantly and positively impacts Y, entrepreneurial decision-making ( $b_{1x1} = 0.1520$ , 95% CI = 0.1265–0.1775). After incorporating the regional entrepreneurship spirit into the model, the supply-oriented policy continues to significantly and positively influence entrepreneurial decision-making ( $c'_{1x1} = 0.7769$ , 95% CI = 0.7521–0.8017). Therefore, the regional entrepreneurship spirit serves a partial intermediary role between the supply-oriented policy and entrepreneurial decision-making. Regarding regulatory effect, the interaction between the supply-oriented policy (X1) and gender (W) significantly negatively affects entrepreneurial decision-making (Y) ( $c'_{3x1} = -0.0407$ , 95% CI = -0.0564 to -0.0251). Similarly, the interaction between the regional entrepreneurship spirit (M) and gender also significantly negatively impacts entrepreneurial decision-making ( $b_{2x1} = -0.0272$ , 95% CI = -0.0430 to -0.0114). Concurrently, the

**Table 2 The reliability and validity of each factor.**

Factor	Measurement item	Factor loadings	Variance explained (%)	KMO	$\alpha$	CR
X1	X11	0.924	84.54	0.868	0.939	0.956
	X12	0.905				
	X13	0.927				
	X14	0.922				
X2	X21	0.904	79.86	0.728	0.873	0.922
	X22	0.912				
	X23	0.864				
X3	X31	0.945	88.29	0.763	0.933	0.958
	X32	0.946				
	X33	0.928				
M	M1	0.798	67.43	0.691	0.755	0.862
	M2	0.835				
	M3	0.831				
Y	Y1	0.966	93.25	0.500	0.928	0.965
	Y2	0.966				

**Table 3 Square root of factor AVE value and correlation coefficient matrix between factors.**

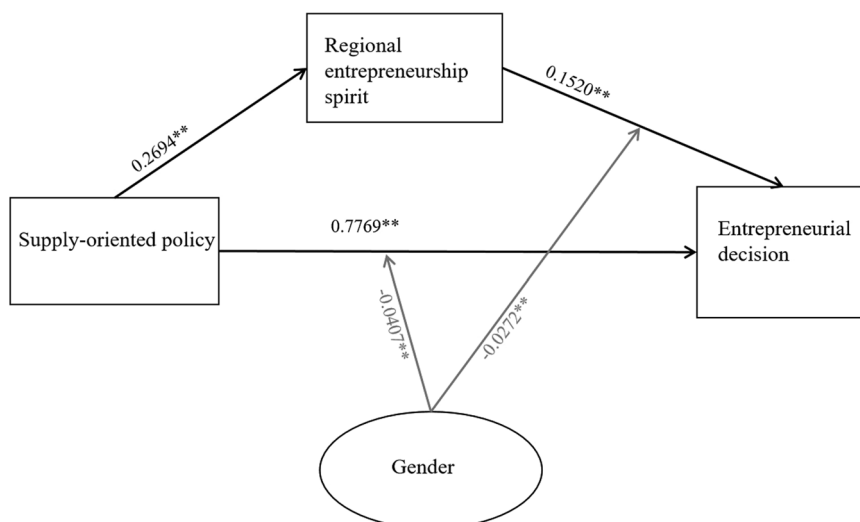
Variable	Mean	Standard deviation	W: Gender	X1: Supply-oriented policy	X2: Demand-based policy	X3: Environmental policy	M: Regional entrepreneurship spirit
W: Gender	1.520	0.500					
X1	3.697	0.921	-0.055**	0.920			
X2	3.785	0.860	-0.039**	0.860**	0.894		
X3	3.796	0.900	-0.046**	0.792**	0.849**	0.940	
M	3.167	0.878	-0.140**	0.437**	0.430**	0.401**	0.822
Y	3.887	0.879	-0.027**	0.748**	0.822**	0.827**	0.388**

The value shown on the diagonal line is the square root value of each factor AVE; \*\* Means  $P < 0.01$  between each factor. Data source: compiled by the author.

**Table 4 Moderated mediating effects with supply-oriented policy as the independent variable.**

	M: Regional entrepreneurship spirit			Y: Entrepreneurial decision		
	Coeff	Se	95%CI	Coeff	se	95%CI
Constant	-1.2631**	0.0215	-1.3053, -1.2209	0.0837**	0.0234	0.0378, 0.1295
X1	0.2694**	0.0042	0.2611, 0.2776	0.7769**	0.0127	0.7521, 0.8017
M				0.1520**	0.013	0.1265, 0.1775
W				0.0433**	0.0073	0.0290, 0.0575
X1*W				-0.0407**	0.008	-0.0564, -0.0251
M*W				-0.0272**	0.0081	-0.0430, -0.0114
Permanent residence	0.0094	0.0124	-0.0150, 0.0337	-0.0267*	0.0112	-0.0486, -0.0047
Family business experience	-0.0234**	0.009	-0.0410, -0.0057	-0.0114	0.0081	-0.0273, 0.0045
Educational resources	-0.1023**	0.0147	-0.1311, -0.0736	0.0356**	0.0132	0.0097, 0.0615
Home entrepreneurship Resources	0.4703**	0.0039	0.4627, 0.4779	-0.0478**	0.0042	-0.0561, -0.0396
R-sq	0.4673			0.5679		
F	5903.5253**			4913.1417**		
X1: Supply-oriented policy → M: Regional entrepreneurship spirit → Y: Entrepreneurial decision						
Index		Effect	BootSE	BootLLCI		BootULCI
eff1(male)		0.0336**	0.002	0.0296		0.0376
eff2(Female)		0.0263**	0.002	0.0224		0.0302
X1 *M *W		0.0151**	0.0015	0.0119		0.0179

Centralized values are used for each variable in the analysis; all coefficients are unstandardized values; \*\* means  $p < 0.01$ .  
Data source: compiled by the author.



**Fig. 2** The final model for supply-oriented policy.

bootstrap test reveals that the adjusted intermediary effect index is significant ( $a_1x_1b_2x_1 = 0.0151$ , 95% CI = 0.0119–0.0179), confirming the regulatory effect of gender. Specifically, the mediating effect is established distinctly for men (95% CI = 0.0296–0.0376), and women (95% CI = 0.0224–0.0302). Figure 2 illustrates the final model for the supply-oriented policy.

Table 5 illustrates that the X2 demand-oriented policy significantly and positively influences the M regional entrepreneurship spirit ( $a_1x_2 = 0.2747$ , 95% CI = 0.2666–0.2828).

Concurrently, the M regional entrepreneurship spirit can also significantly and positively affects Y entrepreneurial decision-making ( $b_1x_2 = 0.0931$ , 95% CI = 0.0710–0.1152). Furthermore, after incorporating the M regional entrepreneurship spirit into the model, the X2 demand-based policy continues to significantly and positively impact Y entrepreneurial decision-making ( $c_1x_2 = 0.8065$ , 95% CI = 0.7852–0.8278). Thus, the M regional entrepreneurship spirit partially mediates the relationship between the X2 demand-based policies and Y entrepreneurial decision-making. Regarding the moderating effect, although the interaction between the X2 demand-based policy and gender (W) does not significantly affect Y entrepreneurial decision-making

( $c_3x_1 = -0.0036$ , 95% CI = -0.0172–0.0099), the interaction between the M regional entrepreneurship spirit and gender significantly and negatively impacts Y entrepreneurial decision-making ( $b_2x_2 = -0.0195$ , 95% CI = -0.0332 to -0.0059). The bootstrap test further substantiates that the moderated mediating effect index is significant ( $a_1x_2b_2x_2 = 0.0122$ , 95% CI = 0.0092–0.0151), establishing the moderating effect of gender in the mediating effect. Specifically, the mediating effect has been confirmed for men (95% CI = 0.0168–0.0237) and women (95% CI = 0.0113–0.0183). Figure 3 shows the final model for demand-oriented policy.

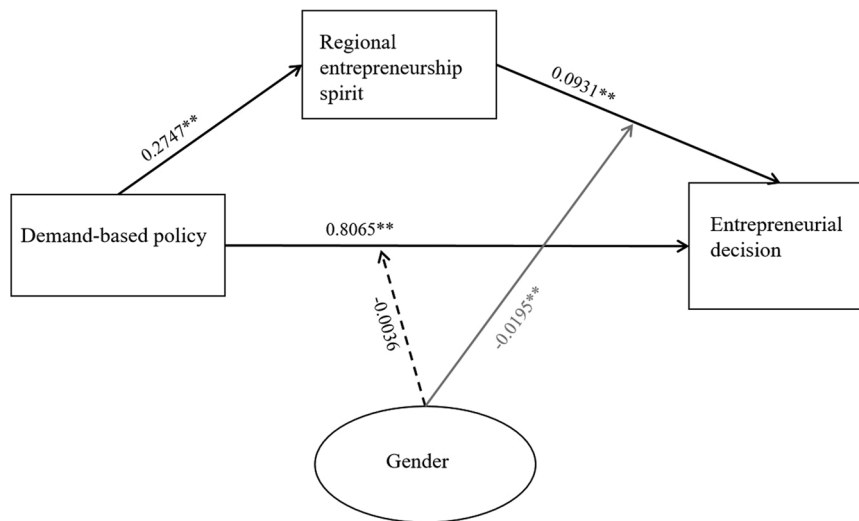
Table 6 presents the mediation effects of the X3 environmental policies. These policies significantly and positively influence M regional entrepreneurship spirit ( $a_1x_3 = 0.2500$ , 95% CI = 0.2419–0.2582).

Applying the formula  $M = a_1x_3X_3 + e_{13}$ , we concluded that for every one-unit increase in X3 environmental policy, there is a corresponding increase of 0.2500 units in the entrepreneurial spirit within the M region. Furthermore, the M regional entrepreneurship spirit significantly and positively impacts Y entrepreneurial decision-making ( $b_1x_3 = 0.1294$ , 95% CI = 0.1082–0.1507),

**Table 5 Moderated mediating effects with demand-oriented policies as independent variables.**

	M: Regional entrepreneurship spirit			Y: Entrepreneurial decision		
	Coeff	SE	95%CI	Coeff	SE	95%CI
Constant	-1.2779**	0.0214	-1.3198, -1.2359	0.0700**	0.0203	0.0303, 0.1097
X2	0.2747**	0.0041	0.2666, 0.2828	0.8065**	0.0109	0.7852, 0.8278
M				0.0931**	0.0113	0.0710, 0.1152
W				0.0185**	0.0063	0.0061, 0.0308
X2*W				-0.0036	0.0069	-0.0172, 0.0099
M*W				-0.0195**	0.007	-0.0332, -0.0059
Permanent residence	0.0173	0.0124	-0.0070, 0.0416	-0.0013	0.0097	-0.0203, 0.0177
Family business experience	-0.0234**	0.009	-0.0410, -0.0058	-0.0152*	0.007	-0.0290, -0.0015
Educational resources	-0.093**	0.0146	-0.1216, -0.0644	0.0490**	0.0114	0.0266, 0.0714
Home entrepreneurship resources	0.4750**	0.0038	0.4675, 0.4825	-0.0280**	0.0036	-0.0351, -0.0209
R-sq	0.4711			0.676		
F	5996.1290**			8776.4989**		
X2: Demand-based policy → M: Regional Entrepreneurship Spirit → Y: Entrepreneurial Decision						
Index		Effect	BootSE	BootLLCI	BootULCI	
eff1(male)		0.0202**	0.0018	0.0168	0.0237	
eff2(Female)		0.0148**	0.0018	0.0113	0.0183	
X2*M*W		0.0122**	0.0015	0.0092	0.0151	

Each variable adopts the center value in the analysis; each coefficient is an unstandardized value. \*\* Indicates  $P < 0.01$ , and \* indicates  $P < 0.05$ .  
Data Sources: Compiled by the author.



**Fig. 3** The final model for demand-based policy.

indicated by the formula  $Y = c'_{0x3} + c'_{1x3}X3 + c'_{2x3}W + c'_{3x3}WX3 + b_{1x3}M + b_{1x3}MW + e_{23}$ . We conclude that  $Y$  entrepreneurial decision-making increases by 0.1294 units for each unit increase in  $M$  regional entrepreneurship. After incorporating  $M$  entrepreneurship spirit into the model,  $X3$  environmental policies significantly and positively affect  $Y$  entrepreneurial decision-making ( $c'_{1x3} = 0.8273$ , 95% CI = 0.8067–0.8479). Therefore,  $M$  regional entrepreneurship spirit serves as a partial mediator between  $X3$  environmental policy and  $Y$  entrepreneurial decision. Regarding the moderating effect, the interaction between  $X3$  environmental policy and gender ( $W$ ) significantly negatively affects  $Y$  entrepreneurial decision-making ( $c'_{3x3} = -0.0190$ , 95% CI = -0.0320 to -0.0059). Similarly, the interaction between  $M$  regional entrepreneurship spirit and gender significantly negatively influences  $Y$  entrepreneurial decision-making ( $b_{2x3} = -0.0242$ , 95% CI = -0.0374 to -0.0111). Additionally, the bootstrap test confirms that the moderated mediating effect index is significant ( $a_{1x3}b_{2x3} = 0.0126$ , 95% CI = 0.0096–0.0155), thus establishing the moderating effect of gender on the mediating effect. Specifically, the mediating effect is affirmed for both men (95% CI = 0.0231–0.0295) and women (95% CI = 0.0172–0.0233). Figure 4 depicts the final model for environmental policy.

**Discussion**

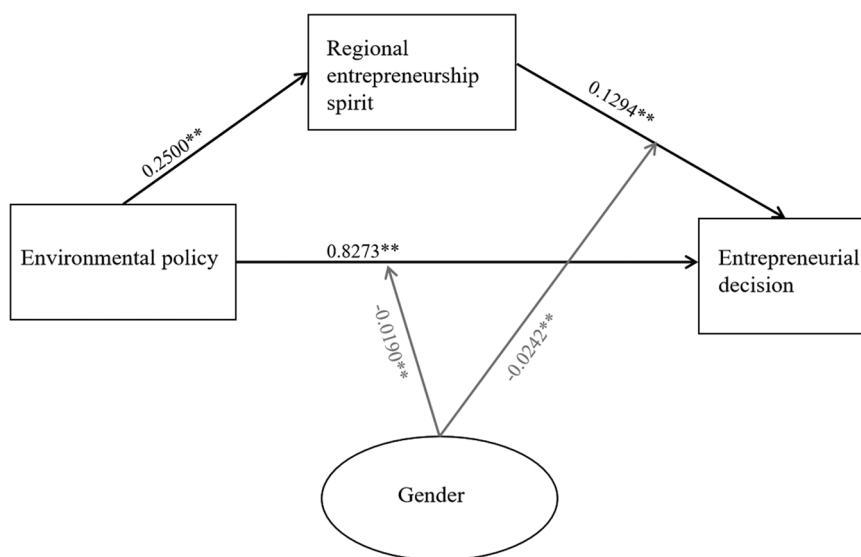
This study, based on a questionnaire survey involving 33,660 college students across the nation, investigates the diverse entrepreneurial policies affecting college students, particularly those with entrepreneurial experience. It explores the mediating role of regional entrepreneurship spirit in the context of these students' entrepreneurial policies and decision-making. This research introduced a mediated moderation model and validated the moderating role of gender within this framework. It demonstrates a positive correlation between entrepreneurial policies and decision-making among college students, aligning with the findings of Shepherd and Patzelt (2017). Notably, regional entrepreneurship spirit serves as an intermediary in this relationship, while gender moderates the interactions between regional entrepreneurship spirit and entrepreneurial decision-making, consistent with Melović et al. (2022). This emphasizes the critical role of embedding entrepreneurship within the distinctive social networks and informal institutional contexts of China. Additionally, the study finds that gender influences how supply- and environmentally oriented policies affect entrepreneurial decision-making, with a more pronounced impact on men. This moderating effect reveals a



**Table 6 Moderated mediating effects with environmental policies as independent variables.**

	M: Regional Entrepreneurship Spirit			Y: Entrepreneurial Decision		
	Coeff	SE	95%CI	Coeff	SE	95%CI
Constant	-1.3127**	0.0216	-1.3550, -1.2704	0.032	0.0198	-0.0069, 0.0709
X3	0.2500**	0.0042	0.2419, 0.2582	0.8273**	0.0105	0.8067, 0.8479
M				0.1294**	0.0109	0.1082, 0.1507
W				0.0369**	0.0062	0.0248, 0.0489
X3*W				-0.0190**	0.0067	-0.0320, -0.0059
M*W				-0.0242**	0.0067	-0.0374, -0.0111
Permanent residence	0.0107	0.0125	-0.0138, 0.0353	-0.0182	0.0095	-0.0368, 0.0004
Family business experience	-0.0182*	0.0091	-0.0360, -0.0004	-0.0012	0.0069	-0.0146, 0.0123
Educational resources	-0.1025**	0.0148	-0.1314, -0.0735	0.0163	0.0112	-0.0057, 0.0383
Home entrepreneurship resources	0.4850**	0.0039	0.4774, 0.4926	-0.0314**	0.0036	-0.0384, -0.0244
R-sq	0.4597			0.6891		
F	5727.1657**			8285.9592**		
X3: Environmental Policy ->M: Regional Entrepreneurship Spirit ->Y: Entrepreneurial Decision						
Index		Effect	BootSE	BootLLCI	BootULCI	
eff1(male)		0.0263**	0.0017	0.0231	0.0295	
eff2(Female)		0.0202**	0.0016	0.0172	0.0233	
X3 *Mt*W		0.0126**	0.0015	0.0096	0.0155	

Each variable adopts the center value in the analysis; each coefficient is an unstandardized value. \*\* indicates  $P < 0.01$ .  
Data sources: Compiled by the author



**Fig. 4** The final model for environmental policy.

“double-skin phenomenon,” indicating a misalignment between the entrepreneurship policies and the actual needs of the students. While gender does not moderate the impact of demand-based policies on decision-making, it plays a significant role in moderating the effects between regional entrepreneurship spirit and decision-making.

**Theoretical significance.** The study enhances existing literature on the relationship between entrepreneurial policies and decision-making by integrating factors such as regional entrepreneurship spirit and gender. Prior research has primarily focused on self-efficacy (Stroe et al., 2018), entrepreneurial risk (Rebellow and Suri, 2019), social culture (Wang et al., 2020), opportunity identification (Schmitt et al., 2018), emotional response (Shepherd et al., 2015), and entrepreneurial cognition (Narayanan et al., 2021), all known to influence entrepreneurial decision-

making. By utilizing the GEM and considering factors such as regional entrepreneurship spirit and gender, the study investigates the effects of various entrepreneurial policies (supply-oriented, demand-based, and environmental) on students’ entrepreneurial decision-making. This research integrates a comprehensive theoretical framework and develops and tests a gender-adjusted model titled *college student entrepreneurship policy—regional entrepreneurship spirit—entrepreneurial decision-making*. This model is instrumental in assessing the influence of Chinese college students’ entrepreneurial policies on their decision-making and career development. Additionally, the study provides significant theoretical insights for enhancing the entrepreneurial policies that concern both the Party Central Committee and the State Council.

Second, the conclusions of this study build on the work of Lucas et al. (2018) and Wright et al. (2022), who expressed skepticism regarding the efficacy of targeted entrepreneurship

policies. This research confirms that entrepreneurship policies create an institutional environment that significantly enhances entrepreneurial decision-making among college students, boosting various types of entrepreneurial activities. Previous research on the relationship between entrepreneurship policies and entrepreneurial decision-making has produced mixed results (Dai and Si, 2018). This study emphasizes the need for careful examination of how entrepreneurship policies impact entrepreneurial decision-making, rather than presuming a direct link between policies and decisions. Consequently, building on the clarification that entrepreneurship policies can positively influence college students' entrepreneurial choices, this study provides empirical evidence that entrepreneurship policies, when mediated by regional entrepreneurship spirit, positively affect entrepreneurial decision-making. However, Wright et al. (2022) note that the government's promotion of entrepreneurship has not fully considered the potential risks to students. Students lacking experience and resources are at a high risk of failure; thus, the government should encourage college graduates who have accrued 2–5 years of work experience and possess entrepreneurial resources and professional skills to start their own businesses.

Finally, this model includes adjustments for gender. The findings reveal that gender moderates the effects of supply-oriented and environmentally oriented policies on entrepreneurial decision-making, whereas the influence of demand-based policies is less pronounced. This indicates that men and women may respond differently to various policy stimuli. The results affirm the role of gender in the dynamics between college students' entrepreneurial policies, regional entrepreneurship spirit, and entrepreneurial decision-making, and they open new avenues for further research. This not only deepens the understanding of how gender influences the entrepreneurial landscape but also provides a scientific foundation for developing more inclusive and effective entrepreneurial policies. This research framework not only advances academic knowledge of gender differences but also offers practical insights for policy formulation.

### Practical significance

*Support for entrepreneurial policies by universities, government, and society.* This study demonstrates a positive relationship between college students' entrepreneurial policies and their decision-making. Consequently, it is recommended that universities, government agencies, and societal entities implement more targeted and effective strategies to support these policies. Primarily, there should be an enhancement of policies that facilitate college students' business initiatives, integrating precision, integrity, and policy coordination with digital technology advancements. Moreover, efforts should focus on promoting entrepreneurship through the deliberate introduction and implementation of supportive measures, which address both male and female entrepreneurial engagement and simplify various entrepreneurial approval processes. For example, local government initiatives like simplifying the application processes for university student enterprise registration and providing interest-free loans for startup funds are essential. Additionally, the evaluation of these entrepreneurial policies should be strengthened to include both process and impact assessments, ensuring timely adjustments that enhance their effectiveness. Continuous support should also be extended to supply-oriented and demand-oriented policies, such as enhancing open platforms for scientific and technological resources and supporting industry demands tailored to college students' entrepreneurial projects.

*Enhancing entrepreneurial policy support for female college students.* According to the *GEM Report 2019–2020*, there is an

increasing global trend in the number and proportion of female entrepreneurs, with 231 million women engaged in enterprise activities across 59 economies. This dynamic marks them as a burgeoning force in China's widespread entrepreneurship and innovation drive. The study highlights that gender significantly moderates the relationship between entrepreneurship policy, regional entrepreneurship spirit, and entrepreneurial decision-making. Given the traditional gender roles prevalent in Chinese culture, where men are typically viewed as breadwinners and women as homemakers, female college students often exhibit lower entrepreneurial engagement than their male counterparts. Consequently, it is imperative for governmental bodies to accord special attention to female college students when devising entrepreneurial policies. If necessary, protective measures and an entrepreneurship risk-relief mechanism should be established to alleviate the concerns female students might have about entrepreneurship. Moreover, there is an urgent need for colleges and universities to enrich entrepreneurship education targeted at female students. Initiatives can include establishing a Women's Entrepreneurship College, organizing innovation and entrepreneurship competitions specifically for female students, and supporting their employment and entrepreneurial activities. Exemplary initiatives already exist in some provinces and universities in China, such as the collaborative efforts between the Women's Federation of Wenzhou and Wenzhou University of Technology to establish the Wenzhou Women's Entrepreneurship College. Similarly, the Women's Federation of Jiaying, along with regional partners, has organized the Yangtze River Delta Female College Students' Innovation and Entrepreneurship Competition. Additionally, entities such as the Women's Federation of Zhengzhou and the Women Entrepreneurs Association have initiated supportive actions for female university students' employment and entrepreneurship. The Women's Federation of Hangzhou and Westlake University, in collaboration with the Women Entrepreneurs Association and the Women Scientists Association, organized activities to support employment and entrepreneurship on campuses. These events mobilized women entrepreneurs, female scientists, and seasoned human resources experts to offer career planning guidance.

*Harnessing the power of case studies to bolster regional entrepreneurial spirit and foster a supportive entrepreneurial atmosphere.* This study also discovered that regional entrepreneurship spirit plays a mediating role in the relationship between college students' entrepreneurial policies and their entrepreneurial decision-making. Consequently, governments, the media, and societal institutions should promote successful case studies of college student entrepreneurs. Governments can support these entrepreneurs by establishing incentive mechanisms, providing startup funds, and crafting policies that foster innovation and entrepreneurship. Highlighting successful cases by showcasing the journeys and achievements of these individuals can inspire a broader audience to pursue entrepreneurial aspirations. The media should focus on successful entrepreneurs and college students, emphasizing their innovative approaches, persistent efforts, and achievements. This coverage can help spark a broader enthusiasm for entrepreneurship and increase societal respect and recognition for entrepreneurs. Additionally, identifying and promoting exemplary models of innovation and entrepreneurship among college students, particularly emphasizing the influential role of peers (such as classmates and friends), can cultivate a positive social atmosphere. Success stories within peer groups can create powerful role-model effects, making it easier for individuals of similar ages to share experiences, establish collaborative relationships, and form robust

entrepreneurial teams. By creating a well-rounded regional innovation and entrepreneurship ecosystem, college students can strengthen their identification with entrepreneurial roles, actively engage in entrepreneurial activities, and achieve higher-quality employment, thereby deepening the impact of widespread entrepreneurship and innovation.

**Research limitations and future research prospects.** This study has some limitations. First, it utilized a cross-sectional design, and the data only reflected the status of college students' entrepreneurship policies at a specific point in time. Second, most of the research variables were based on subjective evaluations, which makes it challenging to completely eliminate bias stemming from personal opinions.

Future research should broaden the sample to encompass more diverse policies and explore the dynamics between various introduced variables over different time points. It should also differentiate the studies by gender and enhance the research on optimizing entrepreneurship policies for college students.

### Data availability

Due to the sensitive nature of the data involved, which includes personal and confidential information of participants, we are unable to share the dataset publicly. Sharing this data could potentially breach the confidentiality assurances given to participants. However, all private information has been anonymized. Therefore, data may be made available upon reasonable request to the corresponding author, provided that the request meets ethical and privacy standards.

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### References

- Albahri OS, Alamoodi AH, Deveci M, Albahri AS, Mahmoud MA, Sharaf IM, Coffman DM (2023) Multi-perspective evaluation of integrated active cooling systems using fuzzy decision making model. *Energy Policy* 182:113775. <https://doi.org/10.1016/j.enpol.2023.113775>
- Alsos GA, Ljunggren E (2017) The role of gender in entrepreneur–investor relationships: a signaling theory approach. *Entrep Theory Pract* 41(4):567–590. <https://doi.org/10.1111/etp.12226>
- Barboza G, Capocchi A (2020) Innovative startups in Italy. Managerial challenges of knowledge spillovers effects on employment generation. *J Knowl Manag* 24(10):2573–2596. <https://doi.org/10.1108/JKM-08-2019-0436>
- Baron RA, Ensley MD (2006) Opportunity recognition as the detection of meaningful patterns: evidence from comparisons of novice and experienced entrepreneurs. *Manag Sci* 52(9):1331–1344. <https://doi.org/10.1287/mnsc.1060.0538>
- Behrens J, Patzelt H (2018) Incentives, resources and combinations of innovation radicalness and innovation speed. *Br J Manag* 29(4):691–711. <https://doi.org/10.1111/1467-8551.12265>
- Bort J, Totterman H (2023) The growth aspirations of underdog entrepreneurs. *J Bus Res* 165:114055. <https://doi.org/10.1016/j.jbusres.2023.114055>
- Caputo A, Pellegrini M (2019) The anatomy of entrepreneurial decisions past, present and future research directions. In Caputo A, Pellegrini M (eds) *Contributions to management science*. Springer Nature Switzerland AG, Cham
- Collins J (2003) Cultural diversity and entrepreneurship: policy responses to immigrant entrepreneurs in Australia. *Entrep Reg Dev* 15(2):137–149. <https://doi.org/10.1080/0898562032000075168>
- Dai W, Si S (2018) Government policies and firms' entrepreneurial orientation: strategic choice and institutional perspectives. *J Bus Res* 93:23–36. <https://doi.org/10.1016/j.jbusres.2018.08.026>
- De Winnaar K, Scholtz F (2019) Entrepreneurial decision-making: new conceptual perspectives. *Manag Decision*. <https://doi.org/10.1108/MD-11-2017-1152>
- Egan EJ (2022) A framework for assessing municipal high-growth high-technology entrepreneurship policy. *Res Policy* 51(9):104292. <https://doi.org/10.1016/j.respol.2021.104292>
- Gabrielsson M, Raatikainen M, Julkunen S (2022) Accelerated internationalization among inexperienced digital entrepreneurs: toward a holistic entrepreneurial decision-making model. *Manag Int Rev* 1–32. <https://doi.org/10.1007/s11575-022-00469-y>
- Gu J, Zhang F, Xu X, Xue C (2023) Stay or switch? The impact of venture capitalists' movement across network communities on enterprises' innovation performance. *Technovation* 125:102770. <https://doi.org/10.1016/j.technovation.2023.102770>
- Guerrero M, Urbano D, Gajón E (2020) Entrepreneurial university ecosystems and graduates' career patterns: do entrepreneurship education programmes and university business incubators matter? *J Manag Dev* 39(5):753–775. <https://doi.org/10.1108/JMD-10-2019-0439>
- Hair JF (2009) *Multivariate data analysis*. Prentice Hall
- Heredia W, Lecuna A, Heredia J, Geldes C, Flores A (2023) Effect of corruption and crime on growth-oriented informal firms. *Int Entrep Manag J* 1–27. <https://doi.org/10.1007/s11365-023-00884-z>
- Huang Y, Li S, Xiang X, Bu Y, Guo Y (2022) How can the combination of entrepreneurship policies activate regional innovation capability? A comparative study of Chinese provinces based on fsQCA. *J Innov Knowl* 7(3):100227
- Huang ZX, Huang YJ (2019) The quality evaluation of innovation and entrepreneurship education—an empirical study from 1231 colleges and universities in China. *Educ Res* 7:91–101
- Hägg G, Politis D, Alsos GA (2023) Does gender balance in entrepreneurship education make a difference to prospective start-up behaviour? *Educ+Train* 65(4):630–653. <https://doi.org/10.1108/ET-06-2021-0204>
- Jena RK (2020) Measuring the impact of business management Student's attitude towards entrepreneurship education on entrepreneurial intention: a case study. *Comput Hum Behav* 107:106275. <https://doi.org/10.1016/j.chb.2020.106275>
- Jessop B (2005) The entrepreneurial city: re-imagining localities, redesigning economic governance, or restructuring capital? In: Jessop B (ed.) *Transforming cities*. Routledge, pp 28–41
- Kalleberg AL, Leicht KT (1991) Gender and organizational performance: determinants of small business survival and success. *Acad Manag J* 34(1):136–161. <https://doi.org/10.2307/256305>
- Karami M, Ojala A, Saarenketo S (2023) Entrepreneurial orientation and international opportunity development by SMEs: the mediating role of decision-making logic. *J Small Bus Manag* 61(2):994–1022. <https://doi.org/10.1080/00472778.2020.1824529>
- Kirschning R, Mroźewski M (2023) The role of entrepreneurial absorptive capacity for knowledge spillover entrepreneurship. *Small Bus Econ* 60(1):105–120. <https://doi.org/10.1007/s11187-022-00639-0>
- Klofsten M, Fayolle A, Guerrero M, Mian S, Urbano D, Wright M (2019) The entrepreneurial university as driver for economic growth and social change—key strategic challenges. *Technol Forecast Soc Change* 141:149–158. <https://doi.org/10.1016/j.techfore.2018.12.004>
- Kostetska K, Khumarova N, Umanska Y, Shmygol N, Koval V (2020) Institutional qualities of inclusive environmental management in sustainable economic development. *Manag Syst Prod Eng*. <https://doi.org/10.2478/mspe-2020-0003>
- Krueger Norris F (2017) Entrepreneurial intentions are dead: long live entrepreneurial intentions. In: Krueger Norris F (ed.) *Revisiting the entrepreneurial mind*. Springer, Cham, pp 13–34
- Li G, Long Z, Jiang Y, Huang Y, Wang P, Huang Z (2023) Entrepreneurship education, entrepreneurship policy and entrepreneurial competence: Mediating effect of entrepreneurship competition in China. *Educ+Train* 65(4):607–629
- Li L, Wu D (2019) Entrepreneurial education and students' entrepreneurial intention: does team cooperation matter? *J Glob Entrep Res* 9(1):1–13. <https://doi.org/10.1186/s40497-019-0157-3>
- Liang L, Li Y (2023) How does government support promote digital economy development in China? The mediating role of regional innovation ecosystem resilience. *Technol Forecast Soc Change* 188:122328. <https://doi.org/10.1016/j.techfore.2023.122328>
- Lucas DS, Fuller CS, Piano EE, Coyne CJ (2018) Visions of entrepreneurship policy. *J Entrep Public Policy*. <https://doi.org/10.1108/JEPP-D-18-00034>
- Lu G, Song Y, Pan B (2021) How university entrepreneurship support affects college students' entrepreneurial intentions: an empirical analysis from China. *Sustainability* 13(6):3224. <https://doi.org/10.3390/su13063224>
- Malmström M, Johansson J, Wincent J (2017) Gender stereotypes and venture support decisions: how governmental venture capitalists socially construct entrepreneurs' potential. *Entrep Theory Pract* 41(5):833–860. <https://doi.org/10.1111/etap.12275>
- Mauer R, Neergaard H, Linstad AK (2017) Self-efficacy: conditioning the entrepreneurial mindset. In: Mauer R, Neergaard H, Linstad AK (eds) *Revisiting the entrepreneurial mind*. Springer, Cham, pp 293–317
- Mei W, Symaco L (2022) University-wide entrepreneurship education in China's higher education institutions: issues and challenges. *Stud High Educ* 47(1):177–193. <https://doi.org/10.1080/03075079.2020.1735330>
- Melović B, Veljković SM, Cirović D, Vulčić TB, Dabić M (2022) Entrepreneurial decision-making perspectives in transition economies—tendencies towards risky/rational decision-making. *Int Entrep Manag J*. <https://doi.org/10.1007/s11365-021-00766-2>
- Minniti M (2004) Entrepreneurial alertness and asymmetric information in a spin-glass model. *J Bus Ventur* 19(5):637–658. <https://doi.org/10.1016/j.jbusvent.2003.09.003>

- Mok KH, Welch A, Kang Y (2020) Government innovation policy and higher education: the case of Shenzhen, China. *J High Educ Policy Manag* 42(2):194–212. <https://doi.org/10.1080/1360080X.2019.1701851>
- Narayanan VK, Zane LJ, Liguori E (2021) Critical methodological considerations for entrepreneurial cognition research. *J Small Bus Manag* 59(4):756–793. <https://doi.org/10.1080/00472778.2020.1799634>
- Noor S, Isa FM (2020) Contributing factors of women entrepreneurs' business growth and failure in Pakistan. *Int J Bus Glob* 25(4):503. <https://doi.org/10.1504/ijbg.2020.109115>
- Peters K, Jetten J (2023) How living in economically unequal societies shapes our minds and our social lives. *Br J Psychol* 114(2):515–531
- Rebellow AM, Suri P (2019) Role of demographic factors on decision-making styles of Indian corporate executives-public and private sectors. *J Manag Inf Decis Sci* 22(3):308–321. <https://doi.org/10.1108/JEED-03-2021-0099>
- Renko M, Shrader RC, Simon M (2012) Perception of entrepreneurial opportunity: a general framework. *Manag Decision*. <https://doi.org/10.1108/00251741211246987>
- Rothwell R, Zegveld W (1981) *Industrial innovation and public policy: preparing for the 1980s and the 1990s*. Greenwood Publishing Group, London
- Schmitt A, Rosing K, Zhang SX, Leatherbee M (2018) A dynamic model of entrepreneurial uncertainty and business opportunity identification: exploration as a mediator and entrepreneurial self-efficacy as a moderator. *Entrep Theory Pract* 42(6):835–859. <https://doi.org/10.1177/1042258717721482>
- Shepherd DA, Patzelt H (2017) *Researching entrepreneurial decision making*. In: *Trailblazing in entrepreneurship*. Palgrave Macmillan, Cham, pp. 257–285
- Shepherd DA, Williams TA, Patzelt H (2015) Thinking about entrepreneurial decision making: review and research agenda. *J Manag* 41(1):11–46. <https://doi.org/10.1177/0149206314541153>
- Si S, Hall J, Suddaby R, Ahlstrom D, Wei J (2023) Technology, entrepreneurship, innovation and social change in digital economics. *Technovation* 119:102484. <https://doi.org/10.1016/j.technovation.2022.102484>
- Sreenivasan A, Suresh M, Tuesta Panduro JA (2023) Modelling the resilience of start-ups during COVID-19 pandemic. *Benchmarking* 30(6):2085–2109. <https://doi.org/10.1108/BIJ-09-2021-0530>
- Stroe S, Parida V, Wincent J (2018) Effectuation or causation: an fsQCA analysis of entrepreneurial passion, risk perception, and self-efficacy. *J Bus Res* 89:265–272. <https://doi.org/10.1016/j.jbusres.2018.01.035>
- State Administration of Taxation of People's Republic of China (2023) Guidelines on preferential tax policies to support the employment and entrepreneurship of young people including college graduates. <https://www.gov.cn/zhengce/202307/P020230703504455975650.pdf>
- Su X, Liu S, Zhang S, Liu L (2020) To be happy: a case study of entrepreneurial motivation and entrepreneurial process from the perspective of positive psychology. *Sustainability* 12(2):584. <https://doi.org/10.3390/su12020584>
- The State Council of People's Republic of China (2021) Guiding opinions of the General Office of the State Council on further supporting innovation and entrepreneurship of college students. [http://www.gov.cn/zhengce/content/2021-10/12/content\\_5642037.htm](http://www.gov.cn/zhengce/content/2021-10/12/content_5642037.htm)
- Verheul I, Uhlaner L, Thurik R (2005) Business accomplishments, gender and entrepreneurial self-image. *J Bus Ventur* 20(4):483–518. <https://doi.org/10.1016/j.jbusvent.2004.03.002>
- Wang C, Flamini G, Wang K, Pei R, Chen C (2020) Entrepreneurial decision-making and family social capital. *Manag Decision*. <https://doi.org/10.1108/MD-10-2019-1414>
- Wang L, Shao J (2023) Digital economy, entrepreneurship and energy efficiency. *Energy* 269:126801. <https://doi.org/10.1016/j.energy.2023.126801>
- Wang J, Ma X, Zhao Y, Zhao J, Heydari M (2022) Impact of scientific and technological innovation policies on innovation efficiency of high-technology industrial parks—a dual analysis with linear regression and qca. *Int J Innov Stud*. 6(3):169–182. <https://doi.org/10.1016/j.ijis.2022.06.001>
- Wen Z, Ye B (2014) Different methods for testing moderated mediation models: competitors or backups? *Acta Psychol Sin*
- Wright E, Feng S, Zheng Y (2022) Unemployed graduate to the next Jack Ma? A counter-narrative to the entrepreneurship movement in higher education. *High Educ* 83(4):863–880. <https://doi.org/10.1007/S10734-021-00709-4>
- Xu X, Wang G, Fang R, Xu S (2023) Blue carbon governance for carbon neutrality in China: policy evaluation and perspectives. *Heliyon* 9(10). <https://doi.org/10.1016/j.heliyon.2023.e20782>
- Yang K (2004) Institutional holes and entrepreneurship in China. *Social Rev* 52(3):371–389. <https://doi.org/10.1111/j.1467-954X.2004.00485.x>
- Yang Q, Chen J, Yang L, Liu Z (2021) How to develop entrepreneurial talent more effectively? A comparison of different entrepreneurship educational methods. *Front Psychol*. 12:644113. <https://doi.org/10.3389/fpsyg.2021.644113>
- Yin X, Qi L, Ji J, Zhou J (2023) How does innovation spirit affect R&D investment and innovation performance? The moderating role of business environment. *J Innov Knowl* 8(3):100398. <https://doi.org/10.1016/j.jik.2023.100398>
- Zapkau FB, Schwens C, Steinmetz H, Kabst R (2015) Disentangling the effect of prior entrepreneurial exposure on entrepreneurial intention. *J Bus Res* 68(3):639–653. <https://doi.org/10.1016/j.jbusres.2014.08.007>
- Zayadin R, Zucchella A, Anand A, Jones P, Ameen N (2023) Entrepreneurs' decisions in perceived environmental uncertainty. *Br J Manag* 34(2):831–848. <https://doi.org/10.1111/1467-8551.12612>
- Zhonglin W, Lei C, Kit-Tai H & Hongyun L (2004) Testing and application of the mediating effects. *Acta Psychologica Sinica* 36(5):614–620

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## Author contributions

Yangjie Huang: Acquired funding, administrated project, and supervised process and wrote the paper. Jiali Zhang: Clarified the conceptual logic, wrote the paper and further content supplementation, modification, and language refinement for the paper. Ying Xu and Shuanglei Sun: Data analysis and language refinement for the paper. Sihui Li, Yajing Bu and Yingying Chen: Draft the initial version.

## Ethical statement

The survey process and procedures used in this study adhere to the tenets of the Declaration of Helsinki. Ethics approval was obtained from the Professor Committee at the Institute of China innovation and entrepreneurship education, Hangzhou Normal University, Hangzhou, China. The ethical approval protocol number 2018-01.

## Informed consent

The data collection process was conducted with strict adherence to ethical considerations. Informed consent was given to all respondents, and respondents were assured that data would be treated confidentially and used only for research purposes. They were also informed that all private information, including their names, would be anonymized in the study results.

## Competing interests

The authors declare no competing interests.

## Additional information

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