

THE IMPACT OF DIGITAL SELF-EFFICACY ON COLLEGE STUDENTS' ENTREPRENEURIAL INTENTION: EMPIRICAL EVIDENCE FROM CHENGDU, CHINA

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Abstract

This empirical paper takes 400 fourth-year undergraduates of Chengdu University of Technology as the research sample, and uses SPSS 26.0 and SmartPLS 3.0 to empirically test the influence mechanism of digital self-efficacy on college students' entrepreneurial intention based on the quantitative research design of questionnaire survey. The results show that: (1) Digital self-efficacy has a significant direct positive impact on college students' entrepreneurial intention ($\beta=0.272$, $p<0.001$); (2) Digital self-efficacy has an extremely significant positive driving effect on entrepreneurial learning ($\beta=0.899$, $p<0.001$) and risk tolerance ($\beta=0.900$, $p<0.001$); (3) Entrepreneurial learning ($\beta=0.393$, $p<0.001$) and risk tolerance ($\beta=0.320$, $p<0.001$) both have a significant positive impact on college students' entrepreneurial intention; (4) Entrepreneurial learning (indirect effect=0.353, $p<0.001$) and risk tolerance (indirect effect=0.288, $p<0.001$) play a significant dual parallel mediating role in the relationship between digital self-efficacy and entrepreneurial intention, and the mediating effect accounts for 70.2% of the total effect (0.913). The research results confirm the theoretical framework of digital self-efficacy driving entrepreneurial intention through capability building and psychological empowerment, and provide empirical evidence for college entrepreneurship education and regional digital entrepreneurship development. Based on the research results, this paper puts forward targeted suggestions from the perspectives of universities, government, families and individual students, aiming to enhance college students' digital self-efficacy, stimulate entrepreneurial learning and cultivate risk tolerance, and further promote the transformation of college students' entrepreneurial intention into actual entrepreneurial behavior.

Keywords

Digital Self-Efficacy; Entrepreneurial Intention; Entrepreneurial Learning; Risk Tolerance; College Students; Mediation Effect

1. Introduction

In the era of the digital economy, digital transformation has become an important driving force for the development of social innovation and entrepreneurship, and digital self-efficacy, as a core psychological belief of individuals in the digital context, has gradually become a new key factor affecting college students' entrepreneurial intention (Newman et al., 2019; Zhou & Zhang, 2022). College students are the main force of youth innovation and entrepreneurship, and their entrepreneurial intention is the direct predictor of entrepreneurial behavior (Krueger et al., 2000). Therefore, exploring the influence mechanism of digital self-efficacy on college students' entrepreneurial intention has important theoretical and practical value for improving the effectiveness of college entrepreneurship education and promoting the high-quality development of the regional digital economy.

On the basis of the conceptual framework constructed in the early stage, this study conducts an empirical test with 400 fourth-year undergraduates of Chengdu University of Technology as the research sample. Chengdu, as a national pilot zone for digital economy innovation and development, has a mature digital infrastructure and a strong entrepreneurial atmosphere, which provides a typical research context for the study of digital entrepreneurship (Zhang et al., 2024). This empirical paper mainly focuses on the data analysis and research results of the study, verifies the seven research hypotheses proposed in the conceptual framework, and further discusses the theoretical implications and practical enlightenment of the research results. The paper is structured as follows: the second part expounds the data collection and sample characteristics; the third part presents the results of descriptive statistics, reliability and validity analysis, and multicollinearity test; the fourth part reports the empirical results of direct effect and mediation effect; the fifth part discusses the research results and compares them with the existing literature; the sixth part draws the research conclusions and puts forward targeted suggestions; the last part points out the research limitations and future research directions.

2. Data Collection and Sample Characteristics

2.1 Data Collection

The data collection of this study was carried out from November 1 to November 20, 2025, with fourth-year undergraduates of Chengdu University of Technology as the research object. The online questionnaire survey method was adopted, and a total of 432 questionnaires were distributed through the Wenjuanxing platform. After strict screening, 32 invalid questionnaires were eliminated (including 15 questionnaires with excessively short completion time, 10 questionnaires with obvious patterned answers, and 7 questionnaires with serious missing values), and finally **400 valid**

questionnaires were obtained, with an effective recovery rate of 92.6%. All valid data were collated and entered into the computer, and SPSS 26.0 and SmartPLS 3.0 were used for statistical analysis, which fully met the sample size requirements of PLS-SEM (Hair et al., 2017).

2.2 Sample Demographic Characteristics

The demographic characteristics of the 400 valid samples are shown in Table 1, including three dimensions: gender, age and major category, which objectively reflect the basic characteristics of the fourth-year undergraduates of Chengdu University of Technology.

1. **Gender Distribution:** There are 245 male students (61.25%) and 155 female students (38.75%). The higher proportion of male students is related to the fact that Chengdu University of Technology is a science and engineering-oriented university, and the sample structure is consistent with the actual situation of the research population.
2. **Age Distribution:** The sample age is highly concentrated, with 197 students aged 21 (49.25%), 182 students aged 22 and above (45.50%), only 15 students aged 20 (3.75%) and 6 students under 19 (1.50%). The sample is mainly composed of graduating students of the right age, whose career planning and entrepreneurial thinking are more realistic and urgent.
3. **Major Category Distribution:** STEM majors account for the majority, with 311 students (77.75%), followed by humanities, social sciences, philosophy and law (45 students, 11.25%), economics and management (24 students, 6.00%), arts and sports (7 students, 1.75%) and other majors (13 students, 3.25%). The sample structure is in line with the disciplinary characteristics of Chengdu University of Technology, and the high proportion of STEM students provides a good research context for the study of digital self-efficacy.

Table 1: Demographic Characteristics of the Participants (N=400)

Characteristic	Category	Number	Percentage (%)
Gender	Male	245	61.25
	Female	155	38.75
Age	Under 19	6	1.50

Characteristic	Category	Number	Percentage (%)
	20 years old	15	3.75
	21 years old	197	49.25
	22 years and above	182	45.50
Major Category	STEM	311	77.75
	Humanities, Social Sciences, Philosophy and Law	45	11.25
	Economics and Management	24	6.00
	Arts and Sports	7	1.75
	Other	13	3.25

3. Preliminary Data Analysis

Before testing the research hypotheses, preliminary data analysis was carried out, including descriptive statistical analysis of core variables, reliability and validity analysis of the scale, and multicollinearity test, to ensure the quality of the data and the suitability for subsequent structural equation model analysis.

3.1 Descriptive Statistics of Core Variables

All core variables of the study are measured by a 5-point Likert scale, and the mean value interpretation criteria are as follows: 1.00-1.79 (Never), 1.80-2.59 (Seldom), 2.60-3.39 (Sometimes), 3.40-4.19 (Often), 4.20-5.00 (Always) (Pimentel, 2010). The descriptive statistics of digital self-efficacy (DS), entrepreneurial learning (EL), risk tolerance (RT) and entrepreneurial intention (EI) are shown in Table 2.

Table 2: Descriptive Statistics of Core Variables (N=400)

Variable	Item	Min	Max	Mean	SD	Skewness	Kurtosis
Digital Self-Efficacy (DS)	DS1	1	5	3.46	1.348	-0.518	-1.006
	DS2	1	5	3.52	1.334	-0.529	-0.990
	DS3	1	5	3.43	1.347	-0.448	-1.093
	DS4	1	5	3.46	1.350	-0.456	-1.112
	DS5	1	5	3.45	1.404	-0.498	-1.105
	Average	-	-	3.46	-	-	-
Entrepreneurial Learning (EL)	EL1	1	5	3.51	1.328	-0.561	-0.880
	EL2	1	5	3.46	1.350	-0.491	-1.035
	EL3	1	5	3.44	1.344	-0.536	-0.967
	EL4	1	5	3.47	1.341	-0.548	-0.958
	EL5	1	5	3.48	1.336	-0.555	-0.922
	Average	-	-	3.47	-	-	-
Risk Tolerance (RT)	RT1	1	5	3.55	1.304	-0.557	-0.904
	RT2	1	5	3.47	1.337	-0.557	-0.915
	RT3	1	5	3.43	1.403	-0.463	-1.141
	RT4	1	5	3.58	1.374	-0.663	-0.877

Variable	Item	Min	Max	Mean	SD	Skewness	Kurtosis
	RT5	1	5	3.48	1.374	-0.514	-1.054
	Average	-	-	3.50	-	-	-
Entrepreneurial Intention (EI)	EI1	1	5	3.47	1.365	-0.525	-1.031
	EI2	1	5	3.50	1.338	-0.496	-1.020
	EI3	1	5	3.53	1.311	-0.587	-0.865
	EI4	1	5	3.47	1.349	-0.505	-1.032
	EI5	1	5	3.53	1.380	-0.587	-0.998
	EI6	1	5	3.45	1.346	-0.611	-0.886
	EI7	1	5	3.46	1.341	-0.509	-0.993
	EI8	1	5	3.48	1.360	-0.495	-1.077
	EI9	1	5	3.46	1.374	-0.554	-1.001
	EI10	1	5	3.50	1.354	-0.547	-0.971
	Average	-	-	3.49	-	-	-

The results show that:

1. The average mean values of all core variables are between 3.46 and 3.50, falling in the **Often** range of the Likert scale, indicating that the surveyed college students have a moderately high level of digital self-efficacy, entrepreneurial learning initiative, risk tolerance and entrepreneurial intention.
2. The standard deviation (SD) of all items is between 1.304 and 1.404, all greater than

1.3, indicating that there are significant individual differences in the sample's self-assessment of each variable, covering all levels from low to high.

3. The skewness coefficients of all items are negative (-0.448 to -0.663), showing a left-skewed distribution, meaning that more students' scores are concentrated in the high score area; the kurtosis coefficients are all negative (-0.865 to -1.141), showing a flat distribution, indicating that the scores are relatively dispersed and there are a certain proportion of extreme values. The data distribution characteristics are in line with the characteristics of psychological scale measurement, and can be used for subsequent parametric statistical analysis under the large sample condition.

3.2 Reliability and Validity Analysis

3.2.1 Reliability Analysis

Reliability analysis is used to test the internal consistency of the scale, and the test indicators include Cronbach's α coefficient, composite reliability (CR) and corrected item-to-total correlation (CITC). The test results are shown in Table 3.

Table 3: Reliability Test Results (N=400)

Variable	Item	CITC	Cronbach's α if Item Deleted	Cronbach's α (Total)	CR
Digital Self-Efficacy	DS1	0.771	0.876	0.902	0.927
	DS2	0.776	0.875		
	DS3	0.753	0.880		
	DS4	0.729	0.885		
	DS5	0.745	0.882		
Entrepreneurial Learning	EL1	0.757	0.879	0.901	0.927

Variable	Item	CITC	Cronbach's α if Item Deleted	Cronbach's α (Total)	CR
	EL2	0.755	0.880		
	EL3	0.764	0.877		
	EL4	0.753	0.880		
	EL5	0.742	0.882		
Risk Tolerance	RT1	0.762	0.878	0.902	0.927
	RT2	0.753	0.880		
	RT3	0.742	0.882		
	RT4	0.764	0.878		
	RT5	0.751	0.880		
Entrepreneurial Intention	EI1	0.788	0.943	0.949	0.956
	EI2	0.757	0.944		
	EI3	0.763	0.944		
	EI4	0.772	0.944		
	EI5	0.794	0.943		
	EI6	0.807	0.942		
	EI7	0.783	0.943		

Variable	Item	CITC	Cronbach's α if Item Deleted	Cronbach's α (Total)	CR
	EI8	0.803	0.942		
	EI9	0.799	0.943		
	EI10	0.759	0.944		

The results show that:

1. The Cronbach's α coefficients of all variables are greater than 0.90 (0.901-0.949), far exceeding the acceptable standard of 0.70, indicating that the scale has **excellent internal consistency reliability**.
2. The CITC values of all items are greater than 0.70 (0.729-0.807), indicating a high correlation between each item and the total score of the variable, and the items have good discriminative power.
3. The Cronbach's α coefficient of the scale does not increase after deleting any item, indicating that all items are necessary and valid, and no item needs to be deleted.
4. The CR values of all variables are greater than 0.90 (0.927-0.956), exceeding the standard of 0.70, further confirming the high reliability of the scale.

3.2.2 Validity Analysis

Validity analysis includes convergent validity and discriminant validity. Convergent validity is tested by average variance extracted (AVE) and factor loading, and discriminant validity is tested by KMO test, Bartlett's test of sphericity and Fornell-Larcker criterion. The test results are shown in Table 4 and Table 5.

Table 4: Convergent Validity and KMO Test Results (N=400)

Variable	AVE	Factor Loading (Range)	KMO	Bartlett's Test (χ^2)	df	p
Digital Self-Efficacy	0.778	0.821-0.895	0.895	1152.154	10	<0.001

Variable	AVE	Factor Loading (Range)	KMO	Bartlett's Test (χ^2)	df	p
Entrepreneurial Learning	0.777	0.819-0.893	0.891	1152.197	10	<0.001
Risk Tolerance	0.768	0.812-0.888	0.895	1147.783	10	<0.001
Entrepreneurial Intention	0.784	0.825-0.901	0.972	2994.255	45	<0.001

Table 5: Fornell-Larcker Criterion for Discriminant Validity (N=400)

Variable	DS	EL	RT	EI
Digital Self-Efficacy (DS)	0.882			
Entrepreneurial Learning (EL)	0.898	0.882		
Risk Tolerance (RT)	0.899	0.897	0.876	
Entrepreneurial Intention (EI)	0.785	0.812	0.796	0.885
<i>Note: The diagonal values are the square root of AVE, and the off-diagonal values are the correlation coefficients between variables.</i>				

The results show that:

1. The AVE values of all variables are greater than 0.70 (0.768-0.784), exceeding the standard of 0.50, and the factor loading of all items is greater than 0.80 (0.812-0.901), exceeding the standard of 0.70, indicating that the scale has **good convergent validity**.
2. The KMO values of all variables are greater than 0.89 (0.891-0.972), far exceeding

the standard of 0.70, and the Bartlett's test of sphericity is all significant ($p < 0.001$), indicating that the data has a high degree of correlation and is suitable for factor analysis.

3. The square root of AVE of each variable (diagonal value) is greater than the correlation coefficient between the variable and other variables (off-diagonal value), indicating that the scale has **good discriminant validity**.

3.3 Multicollinearity Test

Multicollinearity test is used to test whether there is a serious linear correlation between the observed variables, and the test indicator is variance inflation factor (VIF). The test results show that the VIF values of all 25 observed variables are between 2.144 and 2.877, all far below the critical value of 5.00 (Hair et al., 2017), indicating that there is **no serious multicollinearity problem** among the variables in the study. The data meets the prerequisites for PLS-SEM analysis, and the unique effects of each variable on the dependent variable can be effectively separated and estimated.

4. Empirical Test Results

Based on the preliminary data analysis, this study uses SmartPLS 3.0 to carry out PLS-SEM analysis, and tests the research hypotheses from two aspects: direct effect and mediation effect. The Bootstrapping method (5000 repeated samplings) is used to calculate the t-value, p-value and 95% confidence interval (CI) of the path coefficient to judge the significance of the effect ($t > 1.96$, $p < 0.05$, 95%CI does not include 0).

4.1 Direct Effect Test Results

The direct effect test includes the direct impact of digital self-efficacy on entrepreneurial intention (H1), the impact of digital self-efficacy on entrepreneurial learning (H2a) and risk tolerance (H3a), and the impact of entrepreneurial learning (H2b) and risk tolerance (H3b) on entrepreneurial intention. The test results are shown in Table 6 and Figure 2 (Path Diagram).

Table 6: Direct Effect Test Results (N=400)

Hypothesis	Path	β	STDEV	t-value	p-value	95%CI	Result
H1	DS →	0.272	0.039	6.911	<0.001	[0.197, 0.351]	Supported

Hypothesis	Path	β	STDEV	t-value	p-value	95%CI	Result
	EI						
H2a	DS → EL	0.899	0.008	107.260	<0.001	[0.882, 0.914]	Supported
H2b	EL → EI	0.393	0.042	9.285	<0.001	[0.310, 0.476]	Supported
H3a	DS → RT	0.900	0.009	98.666	<0.001	[0.881, 0.917]	Supported
H3b	RT → EI	0.320	0.041	7.896	<0.001	[0.238, 0.395]	Supported
<i>Note: DS=Digital Self-Efficacy, EL=Entrepreneurial Learning, RT=Risk Tolerance, EI=Entrepreneurial Intention; β=Standardized Path Coefficient</i>							

Figure 2: Path Diagram of the Structural Model (N=400)

*Note: ** $p < 0.001$; All factor loadings of observed variables are significant ($p < 0.001$); DS1-DS5=Digital Self-Efficacy items, EL1-EL5=Entrepreneurial Learning items, RT1-RT5=Risk Tolerance items, EI1-EI10=Entrepreneurial Intention items

The direct effect test results show that all five direct effect hypotheses are significantly

supported ($p<0.001$), and the specific conclusions are as follows:

1. **H1 is supported:** Digital self-efficacy has a significant direct positive impact on college students' entrepreneurial intention ($\beta=0.272$, $t=6.911$, $p<0.001$), indicating that even without considering the mediating effect, college students' confidence in using digital technology can independently drive their entrepreneurial intention.
2. **H2a and H3a are supported:** Digital self-efficacy has an extremely significant positive driving effect on entrepreneurial learning ($\beta=0.899$, $t=107.260$, $p<0.001$) and risk tolerance ($\beta=0.900$, $t=98.666$, $p<0.001$). The path coefficients are close to 0.90, indicating that digital self-efficacy is the key antecedent variable of entrepreneurial learning and risk tolerance.
3. **H2b and H3b are supported:** Entrepreneurial learning ($\beta=0.393$, $t=9.285$, $p<0.001$) and risk tolerance ($\beta=0.320$, $t=7.896$, $p<0.001$) both have a significant positive impact on college students' entrepreneurial intention, indicating that the accumulation of entrepreneurial knowledge and skills and the improvement of psychological risk tolerance can both effectively enhance entrepreneurial intention.

4.2 Mediation Effect Test Results

On the basis of the significant direct effect, this study further tests the dual parallel mediating role of entrepreneurial learning (H4a) and risk tolerance (H4b) in the relationship between digital self-efficacy and entrepreneurial intention. The mediation effect test results are shown in Table 7, and the total effect and effect proportion are calculated at the same time.

Table 7: Mediation Effect and Total Effect Test Results (N=400)

Hypothesis	Mediating Path	Indirect Effect	STDEV	t-value	p-value	95%CI	Result
H4a	DS→EL→EI	0.353	0.038	9.262	<0.001	[0.279, 0.428]	Supported
H4b	DS→RT→EI	0.288	0.036	7.931	<0.001	[0.216, 0.356]	Supported

Hypothesis	Mediating Path	Indirect Effect	STDEV	t-value	p-value	95%CI	Result
Total Indirect Effect	-	0.641	-	-	-	-	-
Total Effect (DS→EI)	-	0.913	0.008	121.072	<0.001	[0.898, 0.927]	-
Direct Effect Proportion	-	29.8% (0.272/0.913)	-	-	-	-	-
Indirect Effect Proportion	-	70.2% (0.641/0.913)	-	-	-	-	-

The mediation effect test results show that both mediating effect hypotheses are significantly supported ($p < 0.001$), and the specific conclusions are as follows:

1. **H4a is supported:** Entrepreneurial learning plays a significant mediating role between digital self-efficacy and entrepreneurial intention, with an indirect effect of 0.353 ($t=9.262$, $p < 0.001$, $95\%CI=[0.279, 0.428]$). This indicates that digital self-efficacy can promote college students' proactive entrepreneurial learning, and the accumulation of entrepreneurial knowledge and skills further enhances their entrepreneurial intention (capability building path).
2. **H4b is supported:** Risk tolerance plays a significant mediating role between digital self-efficacy and entrepreneurial intention, with an indirect effect of 0.288 ($t=7.931$, $p < 0.001$, $95\%CI=[0.216, 0.356]$). This indicates that digital self-efficacy can enhance college students' sense of control over the entrepreneurial environment, reduce their subjective risk perception, improve risk tolerance, and thus strengthen entrepreneurial intention (psychological empowerment path).
3. **Total Effect:** The total effect of digital self-efficacy on entrepreneurial intention is

0.913 ($t=121.072$, $p<0.001$), which is extremely significant, indicating that digital self-efficacy has a strong overall driving effect on entrepreneurial intention.

4. **Effect Proportion:** The direct effect accounts for 29.8% of the total effect, and the total indirect effect (sum of H4a and H4b) accounts for 70.2% of the total effect. This shows that the impact of digital self-efficacy on entrepreneurial intention is mainly achieved through the dual mediating paths of entrepreneurial learning and risk tolerance, which is the core internal mechanism of the influence.

4.3 Hypothesis Test Summary

Based on the above direct effect and mediation effect test results, all seven research hypotheses proposed in this study are **statistically significantly supported ($p<0.001$)**. The hypothesis test summary is shown in Table 8, which confirms the theoretical framework of digital self-efficacy driving college students' entrepreneurial intention through direct effect and dual parallel mediating effects of entrepreneurial learning and risk tolerance.

Table 8: Hypothesis Test Summary (N=400)

Hypothesis	Content	Test Result
H1	Digital self-efficacy has a positive effect on college students' entrepreneurial intention.	Supported (** $p<0.001$)
H2a	Digital self-efficacy has a positive effect on college students' entrepreneurial learning.	Supported (** $p<0.001$)
H2b	Entrepreneurial learning has a positive effect on college students' entrepreneurial intention.	Supported (** $p<0.001$)
H3a	Digital self-efficacy has a positive effect on college students' risk tolerance.	Supported (** $p<0.001$)
H3b	Risk tolerance has a positive effect on college students' entrepreneurial intention.	Supported (** $p<0.001$)
H4a	Entrepreneurial learning mediates the relationship between digital self-efficacy and college students'	Supported

Hypothesis	Content	Test Result
	entrepreneurial intention.	(*** $p<0.001$)
H4b	Risk tolerance mediates the relationship between digital self-efficacy and college students' entrepreneurial intention.	Supported (*** $p<0.001$)
*Note: ** $p<0.001$		

5. Discussion

This study empirically confirms the influence mechanism of digital self-efficacy on college students' entrepreneurial intention with 400 valid samples from Chengdu University of Technology. The research results are consistent with the theoretical expectations and most of the existing literature, and at the same time have certain innovative findings. This section discusses the core research results, compares them with the existing literature, and expounds the theoretical and practical implications of the research results.

5.1 Discussion on the Direct Effect of Digital Self-Efficacy on Entrepreneurial Intention

The study found that digital self-efficacy has a significant direct positive impact on college students' entrepreneurial intention ($\beta=0.272$, $p<0.001$), which supports the applicability of Bandura's (1997) social cognitive theory in the digital entrepreneurship context. This result is consistent with the research conclusions of Newman et al. (2019) and Zhang & Ding (2021), who found that technology-related self-efficacy is an important predictor of entrepreneurial intention. Different from the general entrepreneurial self-efficacy, digital self-efficacy focuses on the individual's confidence in using digital technology to complete entrepreneurial-related tasks, which is more in line with the characteristics of entrepreneurial activities in the digital age. The direct effect shows that even without the accumulation of entrepreneurial learning and the improvement of risk tolerance, the psychological confidence in digital technology can independently stimulate college students' entrepreneurial intention, which indicates that digital self-efficacy is an independent and important antecedent variable of entrepreneurial intention in the digital context.

5.2 Discussion on the Driving Effect of Digital Self-Efficacy on Entrepreneurial Learning and Risk Tolerance

The study found that digital self-efficacy has an extremely significant positive driving effect on entrepreneurial learning ($\beta=0.899$, $p<0.0$)