The Impact of the Resource Base on the Construction of Entrepreneurial Networks for University Students

Exploratory Learning as a Mediating Variable

Boheng Zhao(✉) and Chao Wang

School of Management, Wuhan University of Technology, Wuhan, China
BohengZhao@outlook.com

Abstract. Entrepreneurial network is a strategic prerequisite for university student entrepreneurs to expand the survival space of their enterprises within the entrepreneurship process. In this paper, exploratory learning is used as a mediating variable to construct and verify the relationship between the resource base and entrepreneurial network construction, while the construction path for entrepreneurial networks for university student entrepreneurs is summarized and analyzed. Based on a literature review of the resource-based theory, the resource base of university students' entrepreneurial enterprises can be divided into external social capital and entrepreneurial opportunity identification. The research model is validated by empirical research using a sample that contained enterprises participating in university entrepreneurship competitions and those registered in university incubator parks. The results indicate that both external social capital and entrepreneurial opportunity identification can significantly improve the exploratory learning ability of entrepreneurs and facilitate the construction of entrepreneurial networks among university students, with exploratory learning mediating the relationship between the resource base and entrepreneurial networks. Finally, the findings suggest that when building entrepreneurial networks, university student entrepreneurs should improve their ability to access, interpret, and process entrepreneurial opportunities, utilize effectively the external social capital of their ventures, and use exploratory learning to continuously expand their new resources.

Keywords: Entrepreneurial Networks · Resource-based Theory · Dual Learning Theory · University Student Entrepreneurship

1 Introduction

Due to their limited experience and resources, university student entrepreneur groups generally suffer from low survival rates and difficulties in conducting business when performing entrepreneurial activities, which restrict the growth of their entrepreneurial enterprises [1]. According to the 2022 China Entrepreneurial Youth Development Report, the failure rate of entrepreneurial activities in the country is over 70%, while the rate for

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university students' entrepreneurship is higher still, exceeding 90%. The direct causes of entrepreneurship failure among young Chinese entrepreneurial groups are the lack of industry information and closed supply chain channels. The solution requires university student entrepreneurs to expand and integrate their existing resources and build entrepreneurial networks that can adapt to the dynamically changing market.

Entrepreneurial networks, which fall into the category of self-centered networks, focus on entrepreneurial ventures and are an essential element in the growth of entrepreneurial ventures [2]. Contemporary research on entrepreneurial networks can be divided into two main areas. Firstly, entrepreneurial networks are used as independent variables to explore how they impact the development of start-ups. Malewicki (2005) argued that external networks represent the sum of the resources that entrepreneurs have embedded in their external relationship networks, helping to facilitate the flow, sharing, and utilization of tacit knowledge, as well as improve the entrepreneurial capabilities of entrepreneurs [3]. Meanwhile, Gulati and Gargiulo (1999) stated that by building entrepreneurial networks, a firm can access information, market entry qualifications, capital, products, services, and other resources from different collaborators, all of which can contribute to the company's competitive advantage [4]. Zhao and Aram (1995) argued that accessing resources through networks is cost-effective and important for entrepreneurial activities [5]. Florin (2003) et al. concluded that through networks, start-ups can access multiple competitive resources more efficiently and accumulate multiple competitive resources at a greatly increased rate [6]. In summary, in the Chinese university student entrepreneurial environment, students can build relationships with external organizations by developing entrepreneurial networks to compensate for their own lack of credibility, financing difficulties, and limited customer resources [7].

In the second major research area, scholars have used entrepreneurial networks as a dependent variable to explore influencing factors that affect the success of entrepreneurial network construction. Focusing on the individual entrepreneur, Hoang and Antoncic argued that personal characteristics influence the social network formation process [8], while Kedel concluded through empirical research that personal entrepreneurial ability and spirit have important influences on the construction of entrepreneurial networks [9]. Meanwhile, from the perspective of factors external to the firm, Koka et al. argued that in the process of firm development, numerous elements in the external environment affect the development of entrepreneurial networks [10]. Through empirical research, Tang Yong found that the heterogeneous social capital associated with entrepreneurs and the differences in resource-matching relationships significantly affect social network composition [11]. The existing research appears to confirm that the construction of entrepreneurial networks is influenced by a combination of factors internal and external to the firm, such as institutional policies, market competition, individual entrepreneurial capabilities, and entrepreneurial spirit.

A number of studies have shown that the construction of entrepreneurial networks can expand the customer resources and sales channels of college entrepreneurs, but at present, college student entrepreneurs in China are relatively blind in the construction of entrepreneurial networks, and lack a sound theoretical framework and practical accumulation. At present, most of the research on entrepreneurial networks by domestic and foreign scholars focuses on concept interpretation, model construction, and strategic

actions. The research content is also limited to the influence mechanism of a specific factor, such as entrepreneurship and institutional environment, which largely ignores the comprehensive impact of multiple factors such as the opportunity identification ability and exploratory learning ability of college student entrepreneurs, as well as external social capital. To bridge the gap in the existing literature, based on the resource-based theory and the theory of dual learning, this paper mainly explores the influence mechanism of three factors: entrepreneurial opportunity identification, external social capital and exploratory learning on the construction of entrepreneurial network, and the mediating role of exploratory learning in the process of identifying entrepreneurial opportunities affecting the construction of entrepreneurial network and external social capital influencing the construction of entrepreneurial network. Through research and improvement, the combination of resource base theory and entrepreneurial network is improved, and it provides theoretical and practical reference for college student entrepreneurs and potential entrepreneurs with entrepreneurial intentions.

2 Theoretical Background and Hypothesis Development

2.1 Resource-Based Theory and Dimensional Division

Resources form the fundamental concept of the resource-based theory, which refers to "all the assets, capabilities, organizational processes, firm characteristics, information, knowledge, etc., controlled by the firm and used by the firm to create and implement its strategy in order to improve its efficiency and effectiveness." In 1984, the "resource-based theory of the firm" concept was introduced by Wernerfelt, who considered that a firm's resources comprise four characteristics: value, scarcity, inimitability, and irreplaceability [12]. Thus, the concept of resources entered the entrepreneurship field, and the resource-based view (RBV) of the firm became an important theory in the strategic firm management field. Grant(1991) argued that since environmental changes were dynamic and uncontrollable, the competitiveness of entrepreneurial enterprises depends largely on their existing advantages in terms of entry barriers, costs, vertical bargaining, and differentiation [13]. The resources of an enterprise can be tangible or intangible: the former include tools, raw materials, and financial reserves, while the latter include corporate reputation, technological resources, and human resources. Based on this classification, Barney (1991) refined the strategic resources necessary for entrepreneurial enterprises into three further categories: physical capital resources, human capital resources, and organizational capital resources [14]. Collins (1995) and other scholars pointed out that entrepreneurial enterprises are a collection of their existing, potential, and organizational capability resources, while the competitive advantage and profit sources of enterprises derive mainly from valuable, irreplaceable, and inimitable heterogeneous resources, emphasizing the importance of resource integration to the competitiveness of enterprises [15]. The findings in the existing literature reveal that in the resource-based theory, the fundamental elements determining the different performance levels of an enterprise are its resources and capabilities (in other words, its competitive advantage). For an enterprise, the profitability of its entrepreneurial activities and the maintenance of its long-term competitive advantage are affected primarily by the accumulation of enterprise resources [16].

Based on the way Collins (1995) divides the resource base, the resource base is divided into two dimensions: external social capital and internal opportunity identification.: In regard to enterprise capital, the external social capital of an enterprise is usually defined as an asset in terms of the company's social connections and network structure relationships [17]. Determined by a firm's external environment, external social capital has a positive impact on the entrepreneurial network structure, including the network size, span, and density [18]. Entrepreneurial opportunity identification refers to a three-stage value creation process at the economic and social level in a dynamic environmental context: acquiring, processing, and interpreting entrepreneurial opportunities [19]. The more profoundly an entrepreneur can interpret entrepreneurial opportunities, the more they will understand the resources needed in the entrepreneurial process and the greater their ability to secure new resources and transform them into entrepreneurial networks.

2.2 Resource-Based Theory and Entrepreneurial Network Construction

The resource-based theory suggests that start-ups need access to an extensive range of external resources if they are to survive infancy [20]. University student entrepreneurship involves relatively single networks since these enterprises initially have access to almost no government or inter-enterprise networks. Therefore, university students rely primarily on their personal networks at the beginning of their entrepreneurship, while the deeper integration of their entrepreneurial projects and the external support of schools and government agencies for their entrepreneurship gradually form more robust supportive networks [21]. In terms of its economic organization, an enterprise with greater resource availability and more network connections will develop a network larger in scale [22]. As a result, it has been suggested that resource base can promote a positive significance to the construction of entrepreneurial networks. Hence, it could be hypothesized that:

H1: The resource base positively influence the entrepreneurial network construction.

External social capital is a direct source of entrepreneurial network building. To gain a competitive advantage, companies must obtain the necessary opportunities and resources from their social network, so their level of social capital is particularly important for their growth. Traditionally, China is a relationship-oriented society involving social associations between, for example, relatives, friends, classmates, and colleagues, as well as opportunity and resource providers, business partners, and customers. These various relationship networks form the unique social capital of Chinese companies in their business activities. Therefore, this form of capital is important in the entrepreneurial behavior and construction of entrepreneurial networks among Chinese companies. Social capital has become a key factor in the construction of entrepreneurial networks due to the unique social network resources it can provide. Thus, we propose the following hypothesis:

H1a: External social capital positively influence the entrepreneurial network construction.

Entrepreneurial opportunity identification refers to the process by which individuals acquire, process, and interpret entrepreneurial opportunities. Prior knowledge and experience, as well as the cognitive traits displayed in evaluating these opportunities,

can influence the different ways in which individuals identify entrepreneurial opportunities. The specific entrepreneurial opportunity and individual entrepreneurial differences are the key factors that affect entrepreneurial opportunity identification. This is directly reflected in an entrepreneur's ability to manage entrepreneurial network construction [23]. The more profoundly and clearly university student entrepreneurs can identify and interpret entrepreneurial opportunities, the more conducive these opportunities are to the construction of entrepreneurial networks. Thus, we propose the following hypothesis:

H1b: Entrepreneurial opportunity identification positively influence the entrepreneurial network construction.

2.3 Resource Base and Exploratory Learning

In Cao Yong's research on the relationship between resource patchwork and dual learning [24], he concluded that enterprise resources has a positive impact on dual learning. The resources provided by universities play a decisive role in the process of constructing entrepreneurial networks among university entrepreneurs [25]. The external social capital of college student entrepreneurs mainly comes from the policy subsidies and venue facilities provided by universities, and the opportunity identification ability mainly comes from the entrepreneurship education provided by universities. Different resource bases lead to different resource exploration capabilities of entrepreneurs. Therefore, the resource base of college student entrepreneurs has a positive impact on exploratory learning.

H2: The resource base positively influence the exploratory learning.

In regard to enterprise capital, the external social capital of an enterprise is usually defined as an asset in terms of the company's social connections and network structure relationships [17]. Determined by a firm's external environment, external social capital has a positive impact on the exploratory learning, including the information, resources and knowledge available to the enterprise [18] as for external social resources will affect college students' ability to identify entrepreneurial resources, Thus, we propose the following hypothesis:

H2a: External social capital positively influence the exploratory learning.

Entrepreneurial opportunity identification refers to a three-stage value creation process at the economic and social level in a dynamic environmental context: acquiring, processing, and interpreting entrepreneurial opportunities [26]. As a form of perception of and feedback to the external environment, the identification of entrepreneurial opportunities is not only influenced by the entrepreneur's perception of the external environment, but also related to their ability to navigate network relationships. The more profoundly an entrepreneur can interpret entrepreneurial opportunities, the more they will understand the resources needed in the entrepreneurial process and the greater their ability to secure new resources and transform them into entrepreneurial networks.

H2b: Entrepreneurial opportunity identification positively influence the exploratory learning.

2.4 Exploratory Learning and Entrepreneurial Network Construction

Student entrepreneurs have limited internal resources and must develop dual learning (learning by using and exploring) to expand their external resources. The term 'dual learning' is derived from the word 'ambidexter,' which is defined as "someone who can handle two different things at the same time." March first introduced this concept to the organizational learning field, referring to organizations that undertake both exploratory and exploitative learning as performing dual learning activities [27]. These two types of learning activities generally differ in terms of the learning process, learning style, cognitive orientation, and behavioral orientation, thus enabling a company to develop a cognitive system that aligns with its own characteristics and thus adapts to its survival environment. Alim proposed that exploratory learning refers to the process of exploring and absorbing new knowledge, and exploratory learning relies on the identification ability of enterprises. A company completes the learning process by identifying knowledge that differs from its own knowledge base and transferring it into and across the organization [28]. Pittaway L pointed out that exploitative learning is the premise of exploratory learning, and exploratory learning is the basis of exploitative learning [29]. During the start-up period, university student entrepreneurs generally adopt exploratory learning to expand their external resources and improve the organization's external network environment [30]. In terms of the real-world needs of university student start-ups, exploratory learning is concerned with scanning and absorbing external knowledge beyond organizational boundaries [31], so it is the most important aspect for university student entrepreneurs in the process of building entrepreneurial networks. Exploratory learning often requires start-ups to seek different sources of information, as well as integrate, assimilate, and transform knowledge from different fields. Exploratory learning facilitates the survival of student start-ups in their "gestation period" as it enables better access to diverse and heterogeneous resources. Central to building entrepreneurial networks is that student start-ups must have access to diverse and heterogeneous information and skills because these offer many corporate connections and links to diverse forms of information, thus enabling an organization to engage in exploratory learning that further enhances their network building [32]. Hence, it could be hypothesized that:

H3: Exploratory learning has a positive and significant impact on entrepreneurial network construction.

2.5 The Mediating Role of Exploratory Learning in the Relationship Between Resource Base and Entrepreneurial Network Construction

In the entrepreneurial network-building process, external resource support and entrepreneurial opportunity identification must be mediated by entrepreneurial exploratory learning in the construction of effective entrepreneurial networks. Through empirical research, Geng Xin [33] proved that entrepreneurs need to exert exploratory learning ability while identifying opportunities, continuously absorb new resources based on existing resources, and achieve effective integration of resources. Peng Wei [34] confirmed that in the relationship between network embedding and entrepreneurial performance, entrepreneur binary learning has a mediating effect. Dou Hongbin [35] thought both network structure and relational embedding can affect firm growth through

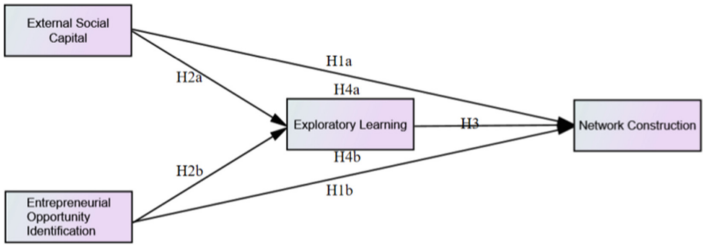

Fig. 1. Research Models

exploratory learning, while entrepreneurs can use entrepreneurial learning to access resources through their social networks, thereby reducing risk in the entrepreneurial process and improving firm growth [36]. Hence, it could be hypothesized that:

H4: Exploratory learning mediates the relationship between the resource base and the construction of entrepreneurial networks.
H4a: Exploratory learning mediates the relationship between the external social capital and the construction of entrepreneurial networks.
H4b: Exploratory learning mediates the relationship between the external social capital and the construction of entrepreneurial networks.

The theoretical framework is shown in Fig. 1

3 Research Design

3.1 Data Sources

The data in this paper were obtained from a questionnaire survey of entrepreneurs attending universities in Wuhan, Hubei Province, while the companies were selected from those in the undergraduate start-up category of the Eighth "Internet+ Student Innovation and Entrepreneurship Competition", start-ups in the 13th "Challenge Cup" China Student Entrepreneurship Plan Competition, and start-ups in the Student Business Incubation Park. The start-ups taking part in the survey came from an extensive range of industries, including service and manufacturing. The survey was conducted using online questionnaires, which were completed by those in charge of the business start-ups. A total of 372 questionnaires were obtained; after screening, 306 were deemed valid, with an efficiency rate of 78.3%.

Basic descriptive information about the sample is shown in Table 1. In the formal sample, 80.7% of the entrepreneurs were male and 19.3% were female; the majority had been educated to undergraduate level or above, with 64.8% being undergraduates and 27.6% being postgraduates. The majority of the entrepreneurs in the formal sample, 89.7%, had one period of entrepreneurial experience. In terms of history, the largest percentage of entrepreneurs had been in business for one to two years (74.4%), while 62.7% of the enterprises had between six and 15 employees, and most (65%) had an annual turnover of 500,000 to 2 million RMB.

Table 1. Sample feature distribution (N = 306)

Name	Options	Frequency	Percentage (%)
Gender	Male	89	35.31
	Female	163	64.69
Highest qualification	Specialties	112	44.44
	Undergraduate	140	55.56
	Postgraduate students	79	25.82
	PhD students	87	28.43
Entrepreneurial Experience	First Time Entrepreneurs	61	24.21
	Has a history of entrepreneurship	70	27.78
	Has had two entrepreneurial experiences	78	30.59
	Has a number of entrepreneurial experiences	43	17.06
Company founded	Less than 1 year	30	11.9
	1–2½ years	118	46.83
	2–3½ years	118	41.27
	More than 3.5 years	40	13.07
Number of employees	Up to 5 people	38	12.42
	6–15 people	67	21.90
	16–30 people	133	43.46
	Over 31 people	68	22.22
Annual turnover	Under 500,000	36	11.76
	500 − 2 million	129	42.16
	2–5 million	117	38.24
	5 million or more	24	7.84

3.2 Variable Design

In this paper, key variables were measured using established scales translated from foreign languages and adjusted to ensure that they would be understood by the respondents. All the variables in the questionnaire were measured using five-point Likert scales, except for the basic information about the respondents and companies.

Entrepreneurial network construction. The scale for entrepreneurial network construction was based on those developed by McEvily and Marcus and Liu Hongchen and Wang Xingyuan [37, 38]. Seven items were used: “Consistency in the development of network members’ relationships”, “Trust in network members’ relationships”, “Stability of network members’ relationships”, “Frequency of communication between

entrepreneurs and universities and research institutions", "Frequency of communication between entrepreneurs and industry associations", "Frequency of communication between entrepreneurs and intermediaries (accounting firms)", and "Frequency of communication between entrepreneurs and government agencies." The seven dimensions were "Network member relationship consistency", "Level of trust in network member relationships", "Network member relationship stability", "Frequency of interaction between entrepreneurs and universities and research institutions", "Frequency of interaction between entrepreneurs and industry associations", "Frequency of interaction between entrepreneurs and intermediaries (accounting firms)", and "Frequency of interaction between entrepreneurs and government agencies."

Exploratory learning. According to the dual learning theory, exploratory learning is concerned with the exploration of unknown resources and new knowledge, drawing on the scale developed by Yalcinkaya, Calantone, and Griffith (2007) for measuring exploratory learning, which was adapted for this paper. Five dimensions were used: "Our company values searching for strategic information about unproven projects with high market risk", "Our company is committed to acquiring knowledge that can lead us to new markets or new technologies", "Our company collects new information and ideas that exceed our current market and technology experience", "We collect unidentified strategic market needs for testing", and "In product or service development projects, our company is committed to collecting new information to enable us to learn new things."

Entrepreneurial opportunity identification. Based on the work of Baron and Tang (2011) [39], three dimensions were used in this study to measure the latent variable: "Rapid collection of information on entrepreneurial opportunities", "Rapid identification of the impact of new information," and "Mastery of novel information on entrepreneurial opportunities."

External social capital. This study drew on Pfeffer's (1994) [40]argument that the accessibility of external social capital for student entrepreneurs can be measured in terms of "access to the required amount of technology, finance and talent", "access to the required amount of information and knowledge", and "access to subsidies from schools and social policies." The three dimensions of accessibility used in this study were "Access to technology, capital and talent", "Access to information and knowledge", and "Access to subsidies from schools and social policies."

The specific measures of each variable are shown in Table 2.

3.3 Research Methodology

The questionnaire data were processed using SPSS and AMOS data analysis software. The former was used to analyze the questionnaires for descriptive statistics, questionnaire reliability, and validity, while the latter was used for structural equation modeling, determining the mediating effects, hypothesis testing, and drawing conclusions.

Table 2. Measurement indicators of variables

Latent variables	No.	Observed Variables	Average	Standard Deviation	Kurtosis	Skewness
Entrepreneurial Network Construction (NC)	NC1	Network member relationship stability	3.51	1.18	−0.88	−0.26
	NC2	Level of trust in network member relationships	3.50	1.16	−0.87	−0.22
	NC3	Network member relationship stability	3.58	1.13	−0.71	−0.29
	NC4	Frequency of interaction between entrepreneurs and universities and research institutions	3.55	1.07	−0.55	−0.22
	NC5	Frequency of interaction between entrepreneurs and industry associations	3.81	1.17	0.03	−0.89
	NC6	Frequency of interaction between entrepreneurs vand intermediaries (accounting firms)	3.59	1.10	−0.43	−0.45
	NC7	Frequency of interaction between entrepreneurs and government agencies	3.55	1.07	−0.86	−0.08

(*continued*)

Table 2. (*continued*)

Latent variables	No.	Observed Variables	Average	Standard Deviation	Kurtosis	Skewness
Identification of Entrepreneurial Opportunities (IO)	IO1	Ability to quickly gather information on business opportunities	3.49	1.18	−0.76	−0.34
	IO2	Ability to quickly identify the implications of new information	3.75	1.25	−0.49	−0.75
	IO3	Ability to access information on new and innovative business ovpportunities	3.44	1.21	−0.82	−0.30
Exploratory Learning (EL)	EL1	Focus on finding strategic information about unproven projects with hvigh market risk	3.59	1.09	−0.92	−0.18
	EL2	Committed to acquiring knowledge that will lead us to new markets or new technologies	3.66	1.13	−0.65	−0.44
	EL3	Gathering new information and ideas that exceed our current market and technical experience	3.59	1.09	−0.85	−0.21
	EL4	Collecting unidentified strategic market needs for testing	3.96	1.13	0.08	−0.98

(*continued*)

Table 2. (*continued*)

Latent variables	No.	Observed Variables	Average	Standard Deviation	Kurtosis	Skewness
	EL5	Work on product or servvice development projects to gather new information to motivate us to learn new things	3.61	1.04	−0.59	−0.37
External social capital (ES)	ES1	Access to the required amount of technology, finance, and talent	3.83	1.18	−0.08	−0.89
	ES2	Access to the required amount of information and knowledge	3.63	1.15	−0.49	−0.54
	ES3	Ability to receive subsidies from school and social policies	3.57	1.13	−0.83	−0.32

4 Research Results and Analysis

4.1 Reliability and Validity Tests

Reliability analysis is an indicator to evaluate the consistency and stability of measurement results. Validity analysis tests how close a measured value is to the actual value. In the adaptability analysis of structural equation model, only if the model measurement part is accurate, it is of practical significance to further study the relationship between latent variables, so the validity test of the index variable should be carried out first, and then the analysis of the structural part of the model should be carried out.

In this paper, the applicability of factor analysis is verified by the Bartlett spherical test and the KMO test. The results are shown in Table 3, and it is found that the KMO test value is 0.906 (>0.6), the significance probability of the statistical value of the Bartlett sphericity test is 0.000 (<0.05), and the Bartlett sphericity test is significant, indicating that it meets the criteria of factor analysis.

In this study, Cronbach's alpha coefficient was analyzed to determine whether the measurement scale had confidence, and whether there was internal agreement between the observed and latent variables by testing the combined reliability (CR).

The questionnaire reliability was tested using the Cronbach's alpha coefficient, for which a value of 0.8 indicates good reliability. In this paper, SPSS 26.0 was used to conduct the test. As shown in Table 4, the overall Cronbach's alpha coefficient was 0.906, indicating that the questionnaire met the reliability requirements.

Table 3. KMO and Bartlett spherical test

KMO sampling relevance measure		0.906
Bartlett Sphericity Test	Approximate Chi-square	3131.022
	Degree of Freedom	153
	Salience	0.000

Table 4. Values of Cronbach's alpha coefficient

Concept	Number of items	Cronbach's alpha coefficient	Overall Cronbach's alpha coefficient
NC	7	0.907	0.906
IO	3	0.861	
EL	5	0.883	
ES	3	0.869	

Table 5. Test for Model's Discriminatory Validity

The variable name	CR	AVE	NC	IO	EL	ES
NC	0.907	0.583	0.763			
IO	0.861	0.675	0.426***	0.821		
EL	0.883	0.602	0.405***	0.492***	0.776	
ES	0.869	0.689	0.401***	0.394***	0.484***	0.830

According to the differential validity table, the square root of AVE is greater than the correlation coefficient value with other factors, so the discriminant validity between the internal factors of each variable is good.

4.2 Structural Equation Model Testing

According to Table 5, all the model fitness indicators of CMIN/DF, NFI, IFI, TLI, CFI, GFI, RMSEA, and CFI met the criteria, so the model fitness was good. The structural equation model and standardized path coefficients are shown in Fig. 2

Path analysis was conducted using AMOS 24.0, and the structural model path coefficient results are shown in Table 6. Table 7 shows the structural relationships between latent variables and the estimation of their standardized path coefficients as a result of the hypothesis test. External social capital was found to have a significant positive influence on entrepreneurial network construction ($\beta = 0.215$, $p < 0.05$), so path 1 and hypothesis 1 were supported. Entrepreneurial opportunity identification was found to have a

Table 6. Model Suitability Metrics

CMIN	df	CMIN/DF	NFI	IFI	TLI	CFI	GFI	RMSEA
218.247	129.000	1.692	0.932	0.971	0.965	0.971	0.929	0.048
Suggested value		<3	>0.8	>0.9	>0.8	>0.9	>0.8	<0.08

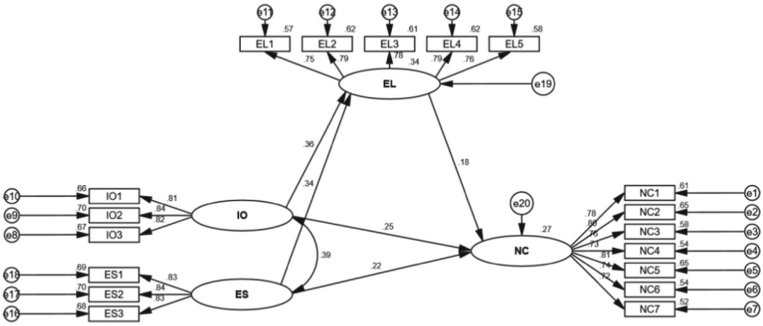

Fig. 2. Structural Equation Model

Table 7. Path Test results.

Paths	Relationship paths between variables			Standardized regression coefficients	Standard error	T-value	P	Path test results
Path 1	Entrepreneurial Network Construction	< --	External Social Capital	0.215	0.066	3.075	0.002	Supported
Path 2	Entrepreneurial Network Construction	< --	Entrepreneurial Opportunity Identification	0.255	0.069	3.566	***	Supported
Path 3	Entrepreneurial Network Construction	< --	Exploratory Learning	0.176	0.083	2.370	0.018	Supported

significant positive influence on resource collocation ($\beta = 0.255$, $p < 0.05$), so path 2 and hypothesis 2 were supported. Exploratory learning was found to have a significant positive mediating effect on entrepreneurial network construction ($\beta = 0.176$, $p < 0.05$), so path 3 and hypothesis 3 were supported.

4.3 Testing for Mediating Effects

Each intermediary path of the model was analyzed, and the bias-corrected confidence interval and significance of the indirect effect for each path are shown above in Table 8, The bias correction CI of the mediation effect based on exploratory learning is [0.013,0.125], and the interval does not contain 0., and the significant p-value is less

Table 8. Intermediate Effect Test

Paths	Intermediate variables	Indirect effects		
		Boot CI cap	Boot CI lower limit	Significance
External Social Capital - → Exploratory Learning - → Entrepreneurial Network Construction	Exploratory Learning	0.013	0.125	0.012
Entrepreneurial Opportunity Identification - → Exploratory Learning - → Entrepreneurial Network Construction	Exploratory Learning	0.015	0.125	0.011

than 0.05, so the indirect effect of the path was significant and a mediating effect was identified. For the path "entrepreneurial opportunity identification → exploratory learning → entrepreneurial network construction," the deviation correction value CI of the mediating effect based on utilization learning is [0.015 → 0.125], the interval does not contain 0, and the significant p-value is less than 0.05, so the indirect effect of the path was found to be significant and a mediating effect was identified.

By calculating the proportion of the mediating effect(See Table 9), for the path "external social capital → exploratory learning → entrepreneurial network construction," the effect value of the direct effect is 0.276, which accounts for 77.90% of the total effect. Meanwhile, the effect value of the mediating effect is 0.060, which accounts for 21.74% of the total effect. This indicates that external social capital could predict entrepreneurial network construction not only directly but also through the mediating role of exploratory learning. For the path "entrepreneurial opportunity identification → exploratory learning → entrepreneurial network construction," the value of the direct effect is 0.255, and the direct effect accounts for 80.44% of the total effect. The effect value of the direct effect was 0.255, accounting for 80.44% of the total effect, and the effect value of the mediating effect was 0.063, accounting for 19.87% of the total effect. This indicates that the identification of entrepreneurial opportunities could predict entrepreneurial network construction not only directly but also through the mediating role of exploratory learning.

5 Conclusions and Insights

5.1 Research Findings

This paper explains the role of the resource base and exploratory learning in the construction of entrepreneurial networks by Chinese university student entrepreneurs, with the findings providing an effective foundation that enriches the practice of entrepreneurial

Table 9. Proportion of Mediation Effect

Paths	Effect	Effect value	Relative effect values
External Social Capital → Exploratory learning → Entrepreneurial Network Building	Total effect	0.276	
	Direct effects	0.215	77.90%
	Intermediary effect	0.060	21.74%
Entrepreneurial Opportunity Identification → Exploratory Learning → Entrepreneurial Network Construction	Total effect	0.317	
	Direct effects	0.255	80.44%
	Intermediary effect	0.063	19.87%

network localization. More specifically, the paper explores the mechanisms of external social capital, entrepreneurial opportunity identification, and exploratory learning on entrepreneurial network construction. Furthermore, the direct effect of the resource base and the mediating effect of exploratory learning were empirically investigated, based on research data obtained from a sample of university business incubator enterprises and entrepreneurship competition participants.

(1) The resource base has a significant positive effect on entrepreneurial network construction.

The results of this study reveal that the resource base has a significant impact on the construction of entrepreneurial networks since it is an important factor in this type of network construction. Previous entrepreneurial network studies have emphasized the impact of entrepreneurial networks on enterprises, but insufficient research has been undertaken on the mechanism of the entrepreneurial network formation stage. These new results indicate that, based on the resource base of enterprises, university student entrepreneurs and entrepreneurial enterprises could utilize both internal and external resources to facilitate the sharing and transfer of knowledge and information, enabling them to build strong entrepreneurial networks. The impact of entrepreneurial opportunity identification on entrepreneurial network construction was found to be greater than the impact of external social capital, indicating that personal interpretation and processing of entrepreneurial opportunities are crucial to the entrepreneurial network construction process followed by university student entrepreneurs. Moreover, among such entrepreneurs, possessing a deeper capacity to interpret and understand entrepreneurial opportunities is more conducive to the effective construction of entrepreneurial networks.

(2) Exploratory learning has a significant positive effect on entrepreneurial network construction.

In recent years, dual learning theory has become a major focus area in organizational learning research, having been applied mainly to the study of enterprise performance and the sustainable development of enterprises. This paper is innovative in introducing exploratory learning into the entrepreneurial network research scope, with the findings

suggesting that exploratory learning among university student entrepreneurs would be conducive to enhanced resource integration and entrepreneurial network construction.

(3) Exploratory learning mediates the relationship between the resource base and the construction of entrepreneurial networks.

Research has indicated that exploratory learning plays a mediating role in the association between the resource base and entrepreneurial network construction. In previous entrepreneurship research, dual learning has been linked primarily to the performance of entrepreneurial teams. Yun Jiang et al. conducted an empirical study on the impact of dual learning on team performance [41], while Zhao Hongdan et al. used dual learning as a mediating variable to explore the relationship between coaching leadership and team creativity [42]. This paper makes the innovative proposal that exploratory learning mediates the relationship between the resource base and entrepreneurial network construction, with the mechanism of this mediating effect having been verified through empirical research. College student entrepreneurs are influenced by various factors when constructing entrepreneurial networks. Nevertheless, on the theoretical level and considering the current poor survival rate of college student entrepreneurial enterprises in China, if entrepreneurs exert their subjective initiative to explore external resources such as information and services, this could provide more stable and reliable network nodes, as well as a broader network development space for the construction of entrepreneurial networks, thus creating the resource base for these entrepreneurs. This would be hugely significant in promoting the construction of entrepreneurial networks.

5.2 Theoretical Insights

This paper offers several theoretical insights: firstly, the application of the resource-based theory to the entrepreneurial network field expands the scope of the application of this theory, as well as enriching the research related to both the theory and entrepreneurial networks. In this paper, the university student entrepreneurs' characteristics were combined, initially from two internal and external dimensions (external social capital and entrepreneurial opportunity identification). The weights of the influences of both internal and external resources were analyzed from a macro perspective, providing a reference for future entrepreneurial network-related researchers. Secondly, this paper focuses on an entrepreneurial group of university students. Previous entrepreneurship researchers have rarely explored the identity of entrepreneurs and generally lacked knowledge about the special characteristics of the entrepreneurial process employed by university students. In contrast, this paper is presented from the perspective of university student entrepreneurs, thus enriching entrepreneurial network research overall. Thirdly, while researchers generally agree that the resource base facilitates entrepreneurial performance, this study takes entrepreneurial networks as a starting point and embeds entrepreneurial networks into the "resource- → performance" transmission path, thus creating a new perspective on the relationship between the resource base and entrepreneurial firm performance.

5.3 Practical Insights

This paper also offers several practical insights. Firstly, as university students' entrepreneurial enterprises face greater perceived risks and resource disadvantages, students should improve their capacity to identify entrepreneurial opportunities when performing entrepreneurial activities, fully ascertain the internal and external resources required for entrepreneurship, expand their entrepreneurial resources in an "exploratory" manner, and maximize their use of the advantages enabled by external social capital. On this basis, an independent and sustainable development process can gradually be created through the construction of entrepreneurial networks, resolving the disadvantages of insufficient innovation capacity and channels. Secondly, for university student start-ups, network construction represents an important foundation for obtaining a sustainable competitive advantage. The findings of this paper suggest that university student start-ups should focus on the respective industry when building their entrepreneurial networks; constantly expand their links with government agencies and enterprises in their industry; and build entrepreneurial networks centered on their core products and multi-channel resource integration. They should also constantly expand their business channels, achieve a sustainable turnover in terms of their entrepreneurial network, and enhance their core competitiveness.

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