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# A research on the relationship among crowd innovation space network embeddedness, user entrepreneurship modes and entrepreneurial performance

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***Abstract:*** *With the continuous development of Internet technology,the cost and threshold for people to realize their creativity and obtain resources are constantly reduced.More and more users are changing from receivers of product value to creators of product value,and user entrepreneurship occupies a place in the innovation and entrepreneurship market.However,existing literature on user entrepreneurship related fields still focuses on the user innovation stage,with only a few studies extending user innovation to the user entrepreneurship stage;There are many studies on the motivation and influencing factors of user entrepreneurship in existing literature,but there is relatively little focus on the research of user entrepreneurship process patterns and their performance mechanisms.This article conducts a literature review of existing research in the field of user innovation and entrepreneurship,summarizes the definitions of user entrepreneurship modes,user entrepreneurship performance and crowd innovation space network embeddedness,furthermore,constructs their impact mechanism models to enrich the research in the field of user entrepreneurship.*

***Keywords:*** *User Entrepreneurship; Entrepreneurial Performance; User Entrepreneurship Mode; Crowd Innovation Space Network Embeddedness*

## 1. Introduction

Entrepreneurship plays an important role in China's economic and social development,and is an important driving force to promote high-quality economic development and the process of Chinese path to modernization.In the past,people generally believed that entrepreneurship was dominated by producers. With the continuous development of Internet technology,users have gradually become an important source of innovation and entrepreneurship.The cost and threshold for users to participate in innovation and entrepreneurship are gradually decreasing.They are no longer just consumers of products or services,but participate in the innovation activities of products or services to meet their needs,and even further develop into user entrepreneurs.At present,cases of user entrepreneurship can be seen in multiple industries such as sports,scientific instruments,and professional software.User participation has greatly stimulated market vitality and received widespread attention from the academic community. At the same time,the national level also regards users as active agents of innovation and entrepreneurship,placing them in an important position to promote economic development and achieve common prosperity.For user entrepreneurs, carrying out entrepreneurial activities solely based on personal strength poses certain challenges. However, embedding in the crowd innovation space network can effectively help new startups enhance their internal capabilities,establish connections with more entities externally,and obtain various resources needed for the survival and development of the enterprise,thereby improving entrepreneurial performance. However, currently scholars' research on user entrepreneurship mostly stays at the stage of user innovation,with only a few studies extending research on user innovation to the stage of user entrepreneurship, and a lack of research on the mode and performance mechanisms of user entrepreneurship. Based on existing literature,this article analyzes and discusses the relationship between user entrepreneurship modes and user entrepreneurship performance,as well as the moderating effect of crowd innovation space network embeddedness,providing reference for how to improve the performance of user entrepreneurship enterprises.

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## 2. Research on Related Concepts

### *2.1 User Entrepreneurship*

User entrepreneurship originates from user innovation and is a commercial continuation of it.Not all user innovators will become user entrepreneurs,as factors such as self satisfaction,social relationships[27],and financial benefits[28]brought about by developing innovative solutions will all have an impact on them.The term "user entrepreneurship" was first proposed by Shah and Tripsas[1],referring to users discovering unmet needs in their daily use of products or services that are difficult to improve from manufacturers.Therefore,users develop their own innovative solutions to address these unique needs.After users spread their innovative products on platforms such as communities and social media,they realize the huge market potential of innovative products or services,identify the possibility of entrepreneurship, and ultimately commercialize innovative solutions.The difference between user entrepreneurship and the general entrepreneurial process is that they usually identify business opportunities by chance after spreading innovative solutions in the user community, and thus generate entrepreneurial ideas.Their original intention is usually only to improve their own lives or gain fun and learning experience from innovative projects, rather than to obtain high returns[2].

### *2.2 User Entrepreneurship Mode*

The entrepreneurial mode refers to the entrepreneurial approach and implementation methods adopted by entrepreneurs in their entrepreneurial activities.Entrepreneurs construct specific product, service, and information flow systems by choosing different corporate strategies,organizational forms, and entrepreneurial fields,forming different entrepreneurial modes[3]. According to the interactive relationship between entities,user entrepreneurship modes can be divided into vendor embedded entrepreneurship, user authorized entrepreneurship, user self entrepreneurship, and user vendor collaborative entrepreneurship[4][5]. From the perspective of user entrepreneurship entities,user entrepreneurship modes can be divided into professional user entrepreneurship[7], end user entrepreneurship, intermediate user entrepreneurship,and hybrid user entrepreneurship[6].Based on the path of transforming user innovation into user entrepreneurship,this article divides user entrepreneurship modes into collaborative entrepreneurship modes and autonomous entrepreneurship modes for research[28].

### *2.3 User Entrepreneurship Performance*

Entrepreneurial performance is an indicator system for measuring the effectiveness of entrepreneurial activities and the degree of goal achievement.It is a holistic and multidimensional concept for measuring the results of entrepreneurial activities.It is not only an objective reflection of the survival and development status of start-up enterprises,but also a social recognition of the level of entrepreneurial development of entrepreneurs.In terms of measuring entrepreneurial performance, James J.Chriman believes that new businesses can only provide performance if they have the ability to sustain operations and provide value to customers. He divides entrepreneurial performance into survival performance and growth performance[12]; Xie Yaping divides entrepreneurial performance into two dimensions:one is growth performance, which focuses on the survival and development of the enterprise after establishing itself in the market environment,reflecting the financial and market share of the enterprise; The second is innovation performance,which focuses on "innovation" and can be used to judge the actual effect of new technologies or products on entrepreneurial enterprises[13].This article divides user entrepreneurial performance into three dimensions: survival performance,growth performance,and innovation performance.

### *2.4 Crowd Innovation Space Network Embeddedness*

Network embedding describes the relationship between enterprises and communities, platforms, and spaces in the network. Specifically, it refers to enterprises taking themselves as the core and obtaining necessary resources for their survival and development through external connections. As an important carrier and service platform for implementing the requirements of innovation driven development, crowd innovation space carry the important mission of incubating innovative and entrepreneurial enterprises, promoting the transformation of scientific and technological achievements, and forming high-tech economic growth points. Crowd innovation space is similar to the innovation and entrepreneurship ecosystem in foreign countries.It is a new type of service platform aimed at the

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public,covering essential elements such as entrepreneurial resources, innovative ideas, and crowdsourcing concepts. The mutual communication,collaboration, and transmission of these elements promote the occurrence of crowdsourcing phenomena[19].

The embedding of the crowd innovation space network affects the entrepreneurial process through two dimensions: structural embedding and relational embedding[17], effectively expanding the channels for resource acquisition and resource utilization capabilities, and positively affecting entrepreneurial performance[18].Relationship embeddedness emphasizes the scale,strength,and density of links between entities, reflecting the level of trust and good relationship quality between entities[45],structural embeddedness reflects the position of entities in the network,including embedding centrality and embedding network density[30], and has a significant impact on the degree to which users acquire and utilize resources in the network.Crowd innovation space network embeddedness includes two parts:online and offline,mainly including four aspects:user innovation community network embeddedness,business platform network embeddedness,crowdfunding platform network embeddedness,and crowdsourcing platform network embeddedness[20][21][22][23][24].

## 3. The impact of different user entrepreneurial modes on user entrepreneurial performance

### *3.1 Collaborative user entrepreneurship mode improves the enterprise survival performance*

User entrepreneurship is the commercial continuation of user innovation,which can meet the practical needs of consumers in product innovation and has the potential to gain unique market share.Although user entrepreneurs usually have strong innovation capabilities and willingness,their knowledge background is mainly focused on creation and use,and they often lack the knowledge to organize and operate a business.Meanwhile,businesses founded by user entrepreneurs rarely have access to complementary assets,and due to the lack of complementary assets related to manufacturing and distribution channels,user startups often face strong barriers to entry[36].Therefore,some user entrepreneurs choose to collaborate with existing enterprises for entrepreneurship.Compared with autonomous user entrepreneurship enterprises,user entrepreneurs who choose collaborative entrepreneurship can establish cooperative relationships with mature enterprises, borrow complementary assets from collaborators,and more easily overcome the "new venture weakness" in the early stages of entrepreneurship[16].In cooperation with enterprises,user entrepreneurs can quickly develop and promote innovative products and services by leveraging the resources of mature enterprises such as funds,market channels,and brand influence.On the other hand,with the help of existing equipment,talent,and technological resources,they can reduce their own research and development and production costs,finally improve profitability[54].From this,it can be seen that user entrepreneurship enterprises that choose a collaborative entrepreneurial model can shorten the commercialization cycle of innovative products with sufficient resources,minor risks,and lower costs,promote business operations to enter the right track[31],and enhance the survival performance of new startups.

### *3.2 Autonomous user entrepreneurship mode improves enterprise growth performance*

With the development of Internet information technology,people's access to information and resources has increased and the threshold has lowered.Innovation and entrepreneurship is no longer the exclusive domain of producers,and more and more users have become important participants in innovation and entrepreneurship.Some user entrepreneurs choose to start their own businesses.They usually have strong abilities in resource acquisition,innovation utilization,and management coordination, and hope to gain more "autonomy"[38],that is,to have more control over the enterprise, be able to make independent decisions,formulate business management policies and strategies,and thus obtain more economic benefits;At the same time,choosing to start one's own business can avoid disputes over resource allocation and strategy selection with collaborating enterprises,thus spending more time focusing on improving product quality.Although there may be challenges in the early stages of entrepreneurship such as the survival of the enterprise or the consumption of manpower and resources due to lack of experience and resources,if they can persist through the difficult period of entrepreneurship,user entrepreneurs can more accurately understand customer needs and market development trends through personal experience and practice.In the process of observing others,they can make up for the lack of knowledge and dynamic environmental changes[52],internalize knowledge and experience,and exercise stronger resource innovation,coordination and organizational abilities,and entrepreneurial resilience[55].This enables autonomous user entrepreneurs to more effectively identify and acquire external key resources,creatively transform and develop them,fill in the gaps of the

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enterprise, improve core competitiveness,and choose more effective response measures when encountering risks and difficulties,promoting the sustained and healthy growth of the enterprise[53].At the same time, compared to collaborative entrepreneurship,autonomous user entrepreneurs have more control over the enterprise,can update products and adjust strategies in a timely manner based on market and customer feedback,and do not need to spend time communicating with partners[28],thus occupying more market opportunities,improving the competitive advantage of the enterprise,and promoting its growth performance.

### *3.3 Collaborative and autonomous user entrepreneurship modes improve enterprise innovation performance*

Regardless of the entrepreneurial mode adopted by users,it is essentially based on their own actual situation and external environment to choose a more suitable way to commercialize innovative products. Compared to non-user innovation, user innovation has its unique advantages:existing companies' innovation is more about improving product performance according to established parameters, while user entrepreneurs focus on identifying and meeting practical needs that are not fully met by existing products based on their actual life experience;Different users use the product in different ways in different environments,which can provide a deeper understanding of the product's usage environment,while non-users find it difficult to empathize with the product and its usage environment[32]; After users innovate and transform the product,they will spread it on platforms such as user communities,continuously collect feedback information from users,and upgrade the product, thereby promoting the improvement of innovative ideas and product improvement[31]. From this,it can be seen that the innovative products or services launched by user entrepreneurship enterprises focus on a specific niche market, filling the substantive needs of consumers that are not fully met in their daily lives, rather than just attracting attention through superficial functional stacking,and have unique market competitiveness.In the literature of sociology of science,history, and innovation management, the importance of users as a source of innovative products has been well demonstrated: these user innovation cases cover fields such as automotive,chemical and petroleum processing, electronic components, scientific instruments, semiconductors,and sports equipment[25][26]. It can be seen that as entrepreneurs,users have a higher passion for innovation and more experience in using products,which enables innovative enterprises to quickly respond to market changes,understand customer needs, continuously update and upgrade innovative products efficiently and in line with actual needs,maintain the competitiveness of innovative products in the market,and thus achieve higher innovation performance.

In summary,user entrepreneurship mode can improve user entrepreneurship performance: collaborative user entrepreneurship improves survival performance, autonomous user entrepreneurship improves growth performance, and both user entrepreneurship modes improve innovation performance. The relationship diagram between the two is shown in Figure 1.

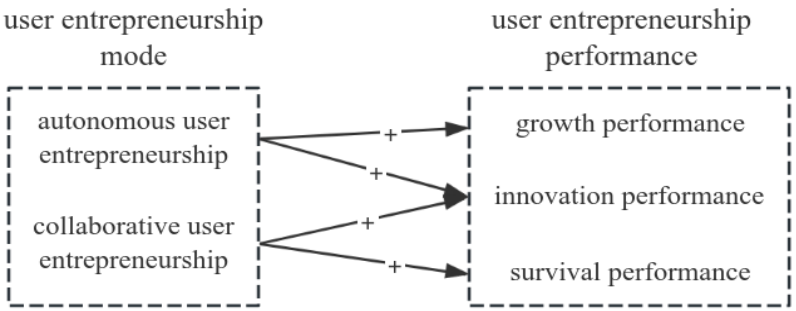


*Figure1: The relationship model between user entrepreneurship mode and user entrepreneurship performance*

## 4. The moderating role of crowd innovation space network embeddedness

Crowd innovation space is a new form of "mass entrepreneurship and innovation".According to the characteristics and needs of innovation and entrepreneurship in the context of the in-depth development of the Internet and its applications,and knowledge society innovation 2.0,it is a low-cost,convenient,all

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factor,and open new entrepreneurial public service built through market-oriented mechanisms.It is open to all public groups,provides rich resources,and provides entrepreneurs with a low-cost growth environment. Although user startups have enormous potential,it is difficult to avoid the "nascent weakness" faced by new startups.Joining a crowdsourcing space can help new user startups embed themselves into a rich entrepreneurial network,obtain various resources needed for growth,reduce the risks faced by new startups,and play an important role in improving the performance of user startups.

### *4.1 Dimension of crowd innovation space network embeddedness*

Granovetter divides network embeddedness into two dimensions:relationship embeddedness and structural embeddedness[42].Relational embeddedness typically reflects the quality of relationships between subjects, such as trust relationships,degree of information sharing, and frequency of interaction; And structural embeddedness involves the position of the subject in the social network and the structural characteristics of the network,such as the impact of network density,centrality,and diversity of connections on the subject.Subsequent scholars have further divided the dimensions of network embeddedness,with Nahapiet and Ghoshal adding cognitive embeddedness dimensions on the basis of relationship embeddedness and structural embeddedness[43]. Zang Shuwei et al.proposed that enterprises can embed innovation ecosystems through market embeddedness,technology embeddedness, institutional embeddedness,and other methods[44].These studies are further research and in-depth expansion of Granovetter embeddedness theory.Therefore,this article will continue to study the impact of crowd innovation space network embeddedness on user entrepreneurial performance from the classic dimensions of relationship embeddedness and structural embeddedness.

### *4.2 The moderating effect of crowd innovation space network embeddedness on collaborative user entrepreneurship mode and enterprise survival performance*

In the early stages of entrepreneurship,enterprises often face difficulties such as resource scarcity, lack of coordination and organizational capabilities,and market uncertainty.Some user entrepreneurs with strong resource acquisition abilities use various channels to showcase the value of innovative products and quickly find partners for collaborative entrepreneurship[28].However,the selection of partners is also a challenge. Collaborative user entrepreneurs should not only evaluate the economic benefits brought by cooperating with mature vendors,but also realize that one of the important factors for the other party to choose cooperation is the potential innovation return of user entrepreneurial enterprises[29], that is,the purpose of vendors providing resources is to obtain longer-term and richer resource returns.If collaborative user entrepreneurship enterprises rely too much on the cooperation resources of existing vendors and fail to continuously polish their own value advantages,they will gradually lose their voice and even be terminated from the cooperative relationship. Therefore, collaborative user entrepreneurship enterprises need to focus on their own growth,continuously accumulate resources,refine products,enhance their competitive advantages,and reduce the possibility of resources being imitated[40].

After collaborative entrepreneurial enterprises settle into the crowd innovation space,they will be embedded into a rich social network,forming connections and mutual influence with various incubating enterprises and partners (universities, suppliers)[30]. High structural embeddedness enables collaborative enterprises to access a variety of training resources and support services,receive government policy guidance,technical and talent support from universities, resource assistance from platforms[41],and obtain a rapidly growing platform to shape their own capabilities,maintain healthy and mutually beneficial cooperative relationships with collaborating vendors,and achieve more solid survival performance. The larger the scale of the crowd innovation space network embedded by user entrepreneurial enterprises,the more entrepreneurial resources they can access,make up for their own shortcomings, and explore more innovation gaps and carry out entrepreneurial activities.

High relationship embeddedness can help collaborative enterprises quickly understand market trends, customer feedback,and industry competition,and communicate and exchange information with other potential partners and upstream and downstream enterprises.Establishing good relationships with suppliers can provide higher quality raw materials and equipment,more comprehensive services,and lower prices, effectively reducing production costs and shortening delivery times;Establishing good relationships with customers can gain customer loyalty,receive timely customer feedback,and grasp market trends,thereby upgrading and iterating innovative products and occupying more market share;In communication with other entities,acquiring complementary skills and assets can help collaborative user startups continuously improve innovative products or services,and strengthen the value of products

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or services. Therefore,crowd innovation space network embeddedness plays a positive moderating role in the impact of collaborative user entrepreneurship mode on the survival performance of enterprises.

### *4.3 The moderating effect of crowd innovation space network embeddedness on autonomous user entrepreneurship mode and enterprise growth performance*

Autonomous user entrepreneurship often faces higher risks and more difficult challenges than collaborative user entrepreneurship. Some user entrepreneurs choose to start their own businesses because they want to have more control over the enterprise and not be constrained by others when making decisions and formulating policies; Another group of user entrepreneurs have had the idea of seeking cooperation with mature enterprises,but almost no enterprises appreciate their innovative product potential or provide rewards that they believe match the product value.Therefore,these user entrepreneurs choose to commercialize their innovative products or services independently[5]. Regardless of the reasons that prompt user entrepreneurs to choose to establish their own businesses, independent user startups often face the problem of resource scarcity first.One of the main reasons why user entrepreneurs find it difficult to support independent entrepreneurship is the lack of financial support and resources to produce innovative products,as well as the inability to bear the cost of intellectual property protection[5]. This alone is not enough,and necessary resources must be obtained from the external environment to maintain their survival and development[16].

As an important carrier and service platform for implementing the requirements of innovation driven development,crowd innovation space carry the important mission of incubating innovative and entrepreneurial enterprises and promoting the transformation of scientific and technological achievements. The structural embeddedness of autonomous entrepreneurial enterprises in the crowd innovation space can broaden the channels for resource acquisition,and conveniently and efficiently obtain complementary and high-quality resources.Through the network embeddedness of crowdfunding platforms,investors can measure the commercialization potential of innovative products,while user entrepreneurs also have a platform to showcase the value of their products and obtain financing funds. Compared to other entrepreneurs,investors believe that user entrepreneurs represent higher quality innovative products that can bring higher crowdfunding performance.User entrepreneurs often raise more funds[21], which allows user innovators who do not want to "give up" their innovative achievements to have the opportunity to establish their own companies[39].

Entrepreneurial enterprises with independent users can enter the crowd innovation space and easily obtain information,knowledge,and connections at a lower cost through relationship embeddedness[28], which includes many scarce resources.The higher the degree of relationship embeddedness in the crowd innovation space,the closer the interaction and connection between user entrepreneurial enterprises and network members,gradually forming "emotional relationships"[16][30]. User entrepreneurial enterprises with strong relationship embeddedness can obtain more complementary resources, channels for information exchange,accumulate knowledge and abilities (especially tacit knowledge), and thus transform them into enterprise growth performance. Therefore, crowd innovation space network embeddedness plays a positive moderating role in the impact of autonomous user entrepreneurship on the growth performance of enterprises.

### *4.4 The moderating effect of crowd innovation space network embeddedness on two types of user entrepreneurship modes and enterprise innovation performance*

The mainstream view on innovation has always been that innovation originates from producers and is provided to consumers through the sale of goods and services.However,many literature and practices indicate that innovation and entrepreneurship are no longer the exclusive domain of producers,and an increasing number of users have become important participants in innovation and entrepreneurship. User innovators recognize the enormous market potential of innovative products or services,identify the possibility of entrepreneurship,and thus develop the idea of starting a business and gaining profits. However, starting a business is a complex and challenging process,especially for user entrepreneurs who lack relevant knowledge.Regardless of which entrepreneurial model is chosen,user entrepreneurs need to complete a complete process of innovation value creation,that is,successfully promoting innovative products or services to consumers,gaining unique competitive advantages in the market,and achieving certain innovation performance.

Crowd innovation space is an ecosystem that provides technology, talent, market, funding, resources, and other support for innovation and entrepreneurship.When user entrepreneurial enterprises

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settle in a crowd innovation space,they are embedded in a rich network of crowd innovation space, which can effectively improve innovation performance.Crowd innovation space network embeddedness includes structural embeddedness and relational embeddedness.Relationship embeddedness enhances communication and cooperation between subjects,further promoting mutual benefit and sharing of knowledge and technology; With a close emotional foundation between user entrepreneurship enterprises and other entities,and a smooth channel for information exchange, important information can be quickly obtained in the cluttered and rich information of the crowd innovation space,and the direction for upgrading and iterating innovative products can be explored[46]. Establishing good relationships with peers and competitors can provide a foundation for cooperation, share complementary resources,and jointly confront technological challenges[49][50]; Establishing industry university research cooperation with universities,research institutions,can promote the flow and integration of heterogeneous resources,which is conducive to the innovation,product service updates,and core technology research and development of enterprises, forming a sustainable competitive advantage[51].

Through structural embeddedness,user entrepreneurial enterprises can establish connections with other entities,obtain more heterogeneous resources,and have opportunities for communication and cooperation with upstream and downstream enterprises[46], thereby maintaining the vitality and competitiveness of the enterprise.Structural embeddedness reflects the position of the subject in the network,including embedding centrality and embedding network density [30]. Enterprises with higher centrality have more convenient and close communication with other partners,and can obtain richer resource acquisition channels.Entrepreneurs who join the crowd innovation space can embed themselves in larger user communities,interact and communicate with more entities,and generate more innovative ideas through collective wisdom collision.This collects iterative feedback, support, suggestions and guidance for the subsequent improvement of innovative products, so that innovative products can be adjusted to the best state before the establishment of the company. At the same time, through the encouragement and dissemination of more community members,potential markets or new niche markets can be created[5]. Therefore,crowd innovation space network embeddedness plays a positive moderating role in the impact of two types of user entrepreneurship on enterprise innovation performance.

In summary, crowd innovation space network embeddedness plays a positive moderating role in the relationship between different user entrepreneurial modes and user entrepreneurial performance, as shown in Figure 2.

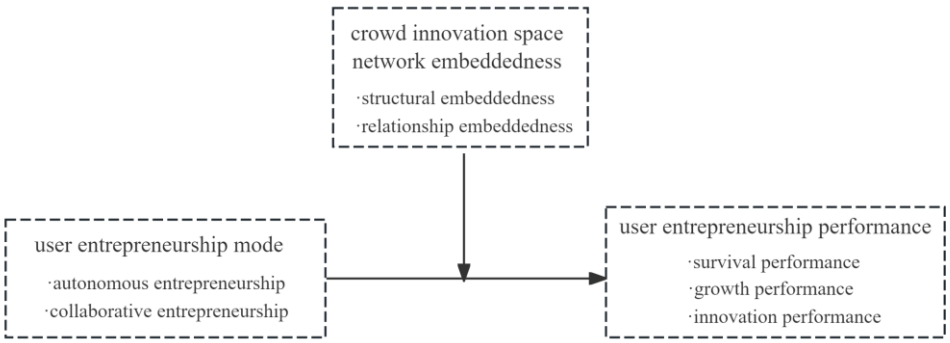


*Figure 2: The relationship model between crowd innovation space network embeddedness,user entrepreneurial mode and performance*

## 5. Conclusion and future research

This article analyzes two types of user entrepreneurship modes,three dimensions of user entrepreneurship performance, and two dimensions of crowd innovation space network embeddedness through a review of previous literature.Based on this,the relationship between user entrepreneurship modes, user entrepreneurship performance,and crowd innovation space network embeddedness is studied. The conclusion drawn from this article is that collaborative user entrepreneurship improves the survival performance of enterprises,while autonomous user entrepreneurship improves the growth performance of enterprises.Both user entrepreneurship modes improve the innovation performance of

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enterprises; Crowd innovation space network embeddedness plays a moderating role in the impact of different user entrepreneurship modes on entrepreneurial performance,that is,after embedding user entrepreneurship enterprises of different modes into the crowd innovation space,they can promote entrepreneurial performance through structural embeddedness and relational embeddedness.

At present,there are relevant discussions in domestic and foreign literature on the concept, classification, process, motivation,influencing factors,field selection,time selection,and performance of user entrepreneurship.However,there is a lack of comprehensive consideration of internal and external factors such as user innovation ability,entrepreneurial willingness,entrepreneurial mode,and crowd innovation space network embeddedness,and systematic research on the process mode and performance mechanism of user entrepreneurship.In recent years,there has been some literature on the dynamic evolution and matching mechanism of user entrepreneurial willingness, user innovation ability,crowd innovation space network embeddedness,user entrepreneurial mode,and user entrepreneurial performance. A matching relationship model between different user innovation abilities,entrepreneurial modes, and innovation performance has been constructed,and the relationship between user entrepreneurial learning,user entrepreneurial ability,and user entrepreneurial performance has been explored. However,these studies are still far from sufficient.

The performance of user entrepreneurship,as a key research issue in the field of user entrepreneurship, is highly flexible and complex in its impact mechanism on different user entrepreneurship modes and crowd innovation space network embeddedness. Although this article reviews existing literature and analyzes the relationship model between the three, it lacks quantitative research data support and empirical testing of the model.In the next step of research,it is necessary to collect real data to empirically test the model,and thus combine qualitative and quantitative methods to deeply reveal the relationship between user entrepreneurship modes,user entrepreneurship performance, and crowd innovation space network embeddedness.

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