A Research on the Innovation and Development of Micro and Small Sci-tech Enterprises

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Abstract: For micro and small sci-tech enterprises with insufficient resource endowment and management experience, it is of great significance to carry out innovation to improve their level of management. Based on resource-based theory and dynamic capability theory, the paper explores the influences from the angle of ecological entity, populations and communities. The internal influences include resources and capability, and the external influences include the population and development environment. Based on the above, the model of growth mechanism is suitable for technology-based small firms to show the developing process of technology-based small firms. In view of the development status of technology-based small firms, this paper researches on the growth mechanism of technology-based small firms to find the micro and macro issues for improvement. All the specific comments and suggestions can offer reference for the leaders to make decision.

1. Introduction
Micro and small enterprises are an indispensable part in China’s economy. They have created job opportunities for urban and rural residents and eased the employment pressure. Especially after Premier Li Keqiang issued the call for “mass entrepreneurship and innovation” at the Summer Davos Forum in September 2014, local governments immediately formulated preferential policies to facilitate the development of micro and small enterprises. Micro and small sci-tech enterprises have become a center of concern, because they are created by high-tech talents and have played a very important role in providing employment and enhancing local economic vitality and improving industrial structure. Studying the growth mechanism of micro and small sci-tech enterprises can help us in identifying the difficulties and obstacles of their development from different perspectives, deepen our understanding of the root causes of the obstacles, and put forward effective suggestions and countermeasures, thus providing decision-making reference for the development of micro and small sci-tech enterprises.

2. Related concepts and theoretical foundations
The definition of micro and small sci-tech enterprises varies from region to region. Here it is defined as those enterprises with core technology, less capital investment, high proportion of sales income from technical products, small number of employees but with high average educational level. In such enterprises, the ownership and management are usually not divided, so the owners are usually the managers. And as the name suggests, such enterprises are far from monopolizing the industry.

The theory of organizational ecology focuses on the relationship between organizational structure and its impact on the environment. Enterprises are compared to organic organisms, and are studied
from the angles of individual enterprises, enterprise populations and the external environment of enterprises. They can adapt to the changes of the environment through inheritance and innovation in operation mode. Correspondingly, the adaption of enterprises and the exchange of resources between enterprises will also have impact on the environment. The organic characteristics, population and community characteristics and growth environment of micro and small sci-tech enterprises conform to constructing the growth mechanism from the perspective of organizational ecology.

From the individual point of view, the ecological characteristics of micro and small sci-tech enterprises are as follows: a single organism composed of capital, technology and other elements; exchange and interaction with the external environment for purchasing and selling; a certain life cycle and organizational genes. From the point of view of the population of micro and small sci-tech enterprises, it is an organic entity composed of interconnected micro and small sci-tech enterprises, which has some similarities with the biological population.

Biological communities interact with each other through energy and material exchange to form an ecosystem. Similarly, micro and small sci-tech enterprise communities also interact through transaction and operation, thus constituting their organizational ecosystem. The individuals, populations, communities and external environment of micro and small sci-tech enterprises interact with each other to form their special ecosystem.

Organizational ecosystems are influenced not only by community relationships, but also by the surrounding environment, specifically, by resource limitations. Different types of enterprises result in different ecosystems, and micro and small sci-tech enterprise form their unique organizational ecosystems under the influence of individual, cluster and external environment.

The development of micro and small sci-tech enterprises follow the general law of life cycle, but the size of enterprises has a profound impact on the length of their life. Take the small and medium-sized enterprises in the United States as an example. The chance of survival within one year for small and micro enterprises is lower than that of large enterprises (250 people and above) by 23%, and is also lower than enterprises with 10 to 20 people by 8%. When the number of employees exceeds 20, the relationship between enterprise size and enterprise survival rate can be relatively stable, showing a positive correlation. According to the White Paper on Human Resource Management of SMEs in China, the life of SMEs in China is about 2.5 years, and the short life indirectly reflects the low survival rate.

3. An analysis of the growth of micro and small sci-tech enterprises from the perspectives of individuals, populations and environmental factors

3.1 Individual factors
According to the endogenous growth theory, the individual factors of the growth of micro and small sci-tech enterprises can be divided into two groups: resources and capabilities. Resources play an important role in the survival and development of micro and small sci-tech enterprises. (1) capital, as the lifeblood of an enterprise, supports all business operations of an enterprise. (2) Human resources are the most indispensable force for the development of enterprises, especially in micro and small sci-tech enterprises where the number of employees is small, and the technical level, R&D capability and teamwork of employees are highly demanded. (3) Technologies are the first and foremost condition to set up micro and small sci-tech enterprises, and technological innovation ability is an important factor affecting the long-term development of enterprises. Technology not only needs to be transformed into productivity, but also needs continuous improvement to meet the growing needs of customers. The failure of most micro and small enterprises is due to incompatibility between technology and market demand, which makes it difficult to achieve effective application. (4) Before and after the start-up of micro and small sci-tech enterprises, it is necessary to have comprehensive relevant information regarding supply and demand situation, competition degree, government policies and regulations, etc. Only by expanding the sources of information and grasping the latest information can they win in the competition.
Micro and small sci-tech enterprises are mostly led and managed by the founders, so the founders’ ability play an important role in the growth and development of enterprises, mainly in the following aspects: (1) Comprehensive management ability. The growth and development of enterprises require leaders to have the ability not only to make full use of resources, but also to integrate and allocate resources. (2) Marketing ability. China’s micro and small sci-tech enterprises mostly rely on the market niche for further development. If mistakes are made in the judgment on the market, then the goods will not find any ready market. (3) Human resource management ability. How to recruit, train and employ talents is one of the important strategies related to the development of enterprises. The work efficiency, mobility and incentive policies of technical backbones are especially crucial. (4) Learning ability. It refers to the timely grasp and feedback of market information and new technology. The exchange of technological information between micro and small sci-tech enterprises can give full play to the advantages of clusters and enhance their overall competitiveness.

3.2 Population factors
The growth of organisms is not only influenced by themselves, but also influenced by their relationship with other organisms and the environment in which they live. Similar to the social agglomeration of organisms, there exists a relationship of competition and cooperation between micro and small sci-tech enterprises in the same region, thus forming a population. The population of micro and small sci-tech enterprises and their suppliers, distributors and other surrounding populations constitute the organizational community of the region. Micro and small sci-tech enterprises do not hold a dominant position in the market, the probability of survival alone is very low. Only by effectively integrating into the population and community and being aided by the advantages of the cluster can they achieve mutual cooperation and development. Micro and small sci-tech enterprises compete with each other to for market shares, but they also need to cooperate with each other to reach a win-win situation. In the process of cooperation and competition, they may find the opportunity to expand, but also may face the risk of being eliminated. Generally speaking, the population factors of micro and small sci-tech enterprises are similar to the family environment of organisms. They are crucial to the growth and development of enterprises. Without them, enterprises are hard to survive.

Micro and small sci-tech enterprise clusters are mostly populations networks intertwined by related or supportive industries because of the production-marketing relationship and sharing of public facilities and equipment and others. They strive to secure more sensitive, more clustered, more affordable factors of production, shorten the time to obtain market information, and enjoy a higher level of social service system. Compared with the independent development of micro and small sci-tech enterprises, the population can inject more vitality into the enterprises within the population and improve the survival rate.

3.3 Environmental factors
In the ecosystem, the survival of organisms is affected by the natural environment; similarly, the growth of micro and small sci-tech enterprises is also affected by the environment. The environment here refers to policy environment, market environment, cultural environment and so on.

In this paper, the environmental factors in the growth of micro and small sci-tech enterprises are divided into four aspects. (1) The impact of the market environment. One aspect of the market environment is the external market environment, including supply and demand, access threshold, competition, etc. It provides an important reference for enterprises to make decisions concerning production and sales. The market environment plays a decisive role for micro and small sci-tech enterprises to stand firm and seek development in the competition. The other aspect is financing environment. Developed capital market has a relatively perfect investment and financing system, which can provide a good trading platform for enterprises to obtain capital support. (2) The impact of government policy and legal environment. The tendency of relevant government policies and regulations, the implementation of relevant supportive policies, the market access mechanism, the stability and fairness of relevant laws and regulations play an important guiding role in the
development of micro and small sci-tech enterprises. (3) Social services and infrastructure construction, including related conditions for enterprise clusters, such as infrastructure, logistics level, innovation environment, degree of sharing and intellectual support. A good social service environment is conducive to the sound growth of enterprise clusters. (4) Cultural environment, including the concept of family business and the mainstream values of society. Many micro and small sci-tech enterprises are family businesses. They attach great importance to kinship but neglect the importance of contract. It is easy to bring credit risk because of inbreeding. Under this value background, the management and reform of micro and small sci-tech enterprises will be hindered correspondingly. Combining with the mainstream values of society, flexible, innovative, open and inclusive corporate culture is more conducive to the growth and long-term development of micro and small sci-tech enterprises.

4. Conclusions and recommendations
At present, the growth of micro and small sci-tech enterprises in China is still facing internal difficulties, such as obsolete technology and equipment, unreasonable management, financing difficulties, lack of talents and external obstacles, such as inadequate national policies and laws, imperfect social service system and so on. It is necessary to further overcome the internal and external problems in order to achieve growth and give full play to their social and economic functions.

The author believes that micro and small sci-tech enterprises should exert themselves in 4 aspects. First, they should accurately position themselves in the market and concentrate on seizing the niche market in which they have competitive edges. Second, they should adopt appropriate imitation strategies to avoid unnecessary risks and innovate under the premise of imitation. Third, they should strengthen external cooperation and cooperate with others in marketing to achieve win-win situation. Fourth, they should enhance collaborative innovation and cooperative reciprocity, improve collective bargaining ability and exert agglomeration effect while utilizing agglomeration advantages. At the same time, the government should further improve relevant policies, laws and regulations, build a complete financial system, improve the level of social services to facilitate the development of micro and small sci-tech enterprises.

The growth system model of micro and small sci-tech enterprises reflects the influence exerted on their growth by individual, population and environment of their own kind in a certain region. Based on the theory of organizational ecology, this paper studies micro and small sci-tech enterprises, which is conducive to in-depth study on the basis of enterprise ecosystem. The exploration of the population and cluster of micro and small sci-tech enterprises and the analysis of the competition and cooperation between enterprises are to be deepened so that the growth system theory of micro and small sci-tech enterprises is more comprehensive, enriching theoretical research while providing reference suggestions for the growth of micro and small sci-tech enterprises.

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