

## Research on Small and Medium-sized Enterprise Innovation Dynamic and its Operating Mechanism

Jinzhao WANG<sup>1,a</sup>, Bin ZHENG<sup>2,b</sup> and Chengbo HU<sup>3,c</sup>

<sup>1</sup>Shenyang University, China

<sup>2</sup>Wuhan University of Technology, China

<sup>3</sup>Shenyang Aerospace University, China

<sup>a</sup>email:5948841178@qq.com, <sup>b</sup>email:853106030@qq.com, <sup>c</sup>email:174068598@qq.com

**Keyword:** Small and Medium-sized Enterprise(SME); Innovation; Innovation Dynamic Mechanism; Operating Mechanism

**Abstract.** The small and medium-sized enterprise(SME) innovation is under the influence of various factors, each dynamic has different position and plays different role in different stage of small and medium-sized enterprises. Thus, it is necessary to make a detailed analysis to these influences that deplore the dynamic of innovation and development of SME and promote the rapid development of SME. SME innovation, it is not a simple superposition of the different factors, but relates these factors together organically. It is integrated together by the internal –external dynamic, an effective operation dynamic and development mechanism to form a continuously circulation of value-added.

### Introduction

The development of SMEs in China is fast that SMEs have become an important force to promote economic growth of China. The research on technology innovation dynamic took place long time ago, prior to mid of 1960's according to the economist Schumpeter's Innovation Theory, scholars sum up the technology-driven model, that is technology innovation model of entrepreneurs. The theory assumes that the breakthroughs from technology is the original dynamic of enterprise technology innovation. Scientific technology from research development as an endogenous factor will lead to a formation of new product model and new market structure. After the mid 1960s, Schumpeter put forward that the market growth and market potential is the key factor to determine the speed and direction of invention. And then, later scholars sum up the demand-pull dynamic model from industrialization of scientific and technological achievements. Since the mid 1970s, North put forward the system-determinism from industrialization of scientific and technological achievements. Under his research frame, organization change is prior to technology innovation and is an important factor in determining its speed, scale and direction. In the 1980s, Mowery Rosenberg put forward a dual model of technology-driven and market-pull. Chinese scholars Zhang gang divided the dynamic of enterprise technology innovation into internal dynamic and external dynamic; Fu jiaji think innovation incentives include national macro incentive and enterprise internal incentives. The innovation dynamic are analyzed from different angles are analyzed.

### The Core Elements of Innovation Dynamic Mechanism

From the point of view of SME, they can be divided into two categories for all various types of dynamic determining and influencing the innovation activities-internal dynamic factor and external dynamic factor from SME.

**Internal Innovation Dynamic Factor Analysis.** Internal innovation power factor mainly refers to the factors which is from enterprise itself and have influences with innovation and development of SMEs, which mainly include entrepreneurship, intellectual property, technology and interest. In this framework, the various factors influence each other and restrain each other, form an integrated whole and promote enterprise innovation and development. In the process of innovation,

entrepreneurship is innovation main body, the innovation consciousness, decision-making and supervision from entrepreneur has play a great role for innovation success. Intellectual property is a kind of intangible property right, it refers to achievements from intellectual creative work and is right the intelligence laborer shall enjoy. Intellectual property rights can greatly boost innovation. It is a decisive factor whether or not innovate for SME to protect and respect intellectual property . Technology innovation is a reasonable selection. Technology innovation is an internal dynamic to induce enterprise innovation since that enterprise meet social need and excess profit and relative advantage. The objectives of enterprises is to maximize the profit, innovation can bring new interests and interests drive the innovation of enterprise.

**External Innovation Dynamic Factor Analysis.** External dynamic factors refer to all various kinds of factors from external environment which can influence the SMEs and force them make decision, these factors might come from government, market and the development of technology and so on. They have positive and negative role to the development and innovation of SMEs. A sound external environment plays an important role for SMEs' technology innovation, the government must create a sound external environment for SMEs, The external environment mainly includes establishing perfect legal system for SMEs, strengthen support of the government's fiscal, financial and credit, giving tax reduction and preferential, add investment of technology development, improve information system, energetically develop socialized service system, etc. Market dynamic includes two factors, one is the market demand, the other is a market competition. With the development of economic globalization and increasingly fierce competition, the enterprise has a strong sense of crisis, this kind of crisis is to obtain push force for competitive advantage through the technological innovation. The market demand bring technological innovation for survival and development and market competition force enterprises to take faster ,better and more effective technological innovation than their competitors'.Breakthrough from science and technology is the strongest driving force of social economic development, often can influence the up and down of the industry, the rise and fall of the enterprise. Only the market demand, is it impossible to be realized for technological innovation without the support of science and technology. At present, in the timing of rapid development of science and technology, the development of science and technology is another one of the decisive factors to the technological innovation.

### **Small and Medium-sized Enterprise Innovation Dynamic Mechanism**

Innovation and development of SMEs is a synergistic effect, it is influenced by the following factors such as the protection of intellectual property, pull force from market , governmental incentives, technological push from both internal and external technology and driving force from interests.

**Intellectual Property Rights.** Intellectual property is a kind of intangible assets, can be converted into capital through the transaction. In many cases, a patent is a enterprise "assets", a technology is almost equal to all of the "resources" of a enterprise. It is necessary and essential to build a industry credit mechanism,for a industry or for a small enterprise. You make research and development, the others fake and free from punishment , dare you spend money on research and development?Core technology developed of year's effort was revealed by malicious job-hopping of staff, how to kee the projects under such investment environment? Intellectual property can't be protected well, they can't be protected well such as innovative products, technology, patent and so on, SMEs dare not and is not willing to innovate.

**Entrepreneurial Innovation Spirit.** To model economic growth, no any a group like "entrepreneur group" that has such an important creativity. A society without entrepreneurs will never have a real and sustainable economic growth, no matter how rich the resources is, how well the capital is, and how strong the labors are. The status and the function of entrepreneurs have been fully embodied in the developed countries, there was no doubt that entrepreneur and entrepreneur spirit plays an important role. In fact, entrepreneur spirit also has an irreplaceable role in the process

of industrialization of developing countries. A SME operates good or not depends on the quality of operators. Especially at present, SMEs in China need amount of entrepreneurs with the courage to take risks, with the competences of judgment and confidence.

**Market Demand.** Market demand is a pulling power of enterprise innovation and sustainable development for SMEs. The change of market demand, not only affects the level of market sales and profits of SMEs, but also provide a new market opportunities and new ideas of product development, guide SMEs to carry out technical innovation, thus, form a pull and incentive force of technology innovation for SMEs.

**Government Incentives.** The policy of the government is the guide force of enterprise technology, the market demand and market competition is the market driving power of enterprise technology innovation, which is based on the perfect market mechanism. It is necessary to effectively stimulate and guide the enterprise technology innovation activities through the government's stimulus policy, under the circumstance such as in the initial period of industry, or in the ill market development situation, and lack of the market mechanism dynamic or even failure situation. Practice in the developed countries and emerging industrial countries shows that small business is the main body of technology innovation, and the government plays an irreplaceable role in the process of SMEs' technology innovation. The European and American developed country government are trying to support SMEs' technology innovation in order to enhance enterprise development ability and production capacity. Europe, the United States and other developed countries have a series of supports in order to guide and support sustainable innovation of SMEs, and make it standardization, from the aspects of government plan guidance, laws and regulations protection, technology development direction, technology transfer, credit and guarantee to fiscal preferential for SMEs.

**Technology Innovation.** Technology innovation is to get economic benefits, thus getting benefits is the driving force and purpose of innovation. The characteristics of getting benefits mainly lie in it is the the final standard of testing the innovation success or not to emphasize the market realization degree and obtain business benefits. Technology innovation is a systematic project and is effected and hindered by a number of factors from the view of concept and characteristics, these factors include the innovation of basic knowledge, such as knowledge creation, knowledge flow, etc.; market maturity degree, such as the innovation dynamic, innovation environment, innovation main body, etc.; the guidance of scientific policies and support, such as the establishment of innovation fund and bonuses, science and technology legislation and so on. Along with the expansion of science and technology and the advance of ability, the diffusion of innovation ability has its inevitability, nevertheless we also see the limitations of research and development of SMEs, which greatly limits the function of technology pushing to innovation. Therefore, it is the premise of technological pushing force for the government that how actively to assist SMEs' innovation, how to play the role of leveraging from research institutions.

**Benefits.** Profit distribution policy is a basic policy related with the virtual material benefits of both enterprise and employees, which decide the distribution manners and specific distribution proportion between enterprise and country, enterprise and employees. Profit distribution policy directly restricts the main body of enterprise innovation –the behavior of people. Interest plays an important role in the operating process of enterprise innovation dynamic mechanism. This is not only due to maximum benefit is the purpose of the enterprise innovation, but also because external various dynamic elements will eventually be transferred into enterprise benefit and play a role. First of all, innovation of enterprises will be profitable only when a certain need can create economic benefits and the enterprise also can have the impulse of innovation. Secondly, internal incentive mechanism is closely related with behavior goal of individual in the innovation dynamic mechanism. The purpose of participating innovation for individual lies in achieving the maximum profit of individual, the enterprise internal incentive mechanism is a shortcut to help individuals to achieve this purpose.

## **Small and Medium-sized Enterprise Innovation Dynamic Operating Mechanism**

Through the analysis of the enterprise innovation dynamic mechanism core elements, it is known that all kinds of forces from internal and external promote enterprise technology innovation activities, these factors that influence and interact mutually form a dynamic system of enterprise innovation. Generally, innovation includes four elements: main body of innovation, the opportunities for innovation, innovation environment and innovation support system. Considering the characteristics of the SMEs, we believe that "Unitary main body, multiple support" innovation model can describe SME innovation dynamic operating mechanism more comprehensively and accurately.

**Main Body of Innovation.** Main body of innovation is a undertaker of dynamic, ability, investment, activities and benefits of the innovation. Narrowly speaking, innovation is technology innovation, people think enterprise is the main body of innovation generally. First of all, innovation is a economic activitie closely related with the market, only enterprise will take part in innovation under the incentive and constraint of market mechanism. Secondly, according to the innovation theory of new classical economics, innovation refers to the reset of the production elements, this reset achieved through trough the market by entrepreneur, and it is irreplaceable by other organization and individual. Thirdly, technology innovation needs a lot of specific knowledge related with industry, they are the foundation of industrial technology innovation. General understanding of innovation, government will be regarded as main body of system innovation and institution and university will be regarded as main body of knowledge innovation in national innovation system. Entrepreneur is the key designer of innovation strategy, the organizers of the innovation activities, and even the creator of innovation environment. The key to set up an innovative enterprise is to cultivate innovation spirit of entrepreneurs.

**Innovation Opportunities.** Enterprise innovation opportunity includes internal innovation opportunities and external innovation opportunity. The enterprise internal innovation opportunity mainly includes the following four conditions: "accidents", "inconsistent", "process need" and "changes of industry and market structure" and so on. Innovation opportunities can come from external, including the social environment, political environment, cultural environment, the changes of knowledge environment and so on. The sources of innovation opportunity happened outside of enterprise and industry summarized by Drucker include "demographic data", "the changes of social cognization", "the changes of technology and knowledge" and so on. To sum it up, it will bring the opportunities of innovation no matter internal innovation opportunities or external innovation opportunities occur. The entrepreneur who is sensitive to innovation opportunity is good at seizing the opportunity and achieves systematic innovation he invests all kinds of elements resolutely at right time. Enterprise innovation achievements will be everfount, which can make the enterprise get a competitive advantage in the market for a long time.

**Innovation Environment.** Innovation environment mainly refers to the government behavior and effective technology innovation policy environment created by government, including the reasonable price, fair competition, perfect legal system, incentive policies of the technology innovation and the protection of intellectual property, etc. The government plays a leader and coordinator role in the innovation system, and is important organizers of the enterprise innovation, and its functions mainly include to create a atmosphere of independent innovation, formulate preferential policies and provide support for science and technology innovation, human resources development, and infrastructure construction, improve the innovation input mechanism and provide high quality logistics service, etc.

**Innovation Support System.** SMEs need a sound innovation support system in order to innovate and develop. This system mainly includes: intellectual property protection system, science and technology policy system and social environment support system.

**Intellectual Property Protection System.** Intellectual property system is a kind of benefit mechanism, it itself can not create invention and invention, but confirm and protect benefits relationship in the process of inventing and applying. Intellectual property system confirm and the property of intellectual achievements by legal authorization and ensure deserved benefits of inventor and creator and promote the more effective development and utilization of intellectual resource.

The decisive factor is the ability of intellectual property management, protection and application rather than the others, in order to change resource consumption and simple processing to the transfer of growth by technological innovation. Intellectual property system is one of important mechanism of technological innovation, but can not play a role individually. Intellectual property system combined with other systems and policies plays the role of incentive innovation.

**Science and Technology Policy System.** Technology policy system refers to technological action criterion that a country makes to achieve a certain technologic routain and tasks. Science and technology policy embodies the willness that a government develop technology, also embodies the guidance and regulation to all kinds of technological resource, power and behavior. The practice both at home and abroad shows that it plays a vital role to create a systematized and standardi science and technology policy environment for scientific and technological innovation, economic growth and social development for technological innovation, economic growth and social development..

**Social Environment Support System.** Social environment support system of enterprise innovation mainly includes material system, the spirit system and the regualtion system. Material systems include land, buildings, all kinds of machinery and equipment, other production material, all kinds of capital investment and human resources. Spiritual support system includes many kinds of scientific and technological knowledge, society and enterprise culture environment, cultural atmosphere and humanistic connotation s that the technology innovation needs. Regualtion support system mainly includes national regulation at macro level and enterprise regulation at micro level. National regualtion refers to economy regulation, economy policy and national technological innovation policies. Enterprise regulation include management innovation and innovation management.

## Conclusion

The operating of innovation model for SMEs can be can be expressed as follows: innovators carry out innovation activities when they are supported by knowledge, science and technology policies and social supporting system, innovators capture innovation opportunities according to demand information of market and development information of science and technology, they create innovation ideas by combining market demand and possibilities of technology, the innovation ideas are encouraged by operating environment and innovation policies to create innovation motivation. Innovation wins innovation benefits by competition in the market and then stimulate innovators to reinnovate and promote constantly cyclicdevelopment.

## Reference

- [1] Jorgensen, Frances; Ulhøi, John P. Enhancing Innovation Capacity in SMEs through Early Network Relationships Creativity and Innovation Management Enhancing Innovation Capacity in SMEs[J]. Creativity & Innovation Management. Dec2010, Vol. 19 Issue 4, P397-404.
- [2] Manso, Gustavo. Motivating Innovation. Journal of Finance. Oct2011, Vol. 66 Issue 5, P1823-1860.
- [3] Sawang, Sukanlaya; Unsworth, Kerrie L. A Model of Organizational Innovation Implementation Effectiveness in Small to Medium Firms[J]. International Journal of Innovation Management. Oct2011, Vol. 15 Issue 5, P989-1011.
- [4] Baer, Markus. Putting Creativity to Work: the Implementation of Creative Ideas in Organizations[J]. Academy of Management Journal. Oct2012, Vol. 55 Issue 5, P1102-1119.
- [5] Sheu, D. Daniel; Lee, Hei-Kuang. A Proposed Process for Systematic Innovation[J]. International Journal of Production Research. Feb2011, Vol. 49 Issue 3, P847-868.
- [6] Ramstad, Elise. Expanding Innovation System and Policy - an Organisational Perspective. Policy Studies. Nov2009, Vol. 30 Issue 5, P533-553.