

# Research into the Phased Supporting Enterprise Innovation Policy of China

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## Abstract

*A technology enterprise has its own unique characteristics and laws of development at different life-cycle stages. These characteristics are seen in business venture and enterprise development and differ in terms of enterprise size, organizational management, innovation activities, investment and financing, market environment, and business risk. Therefore, the policy demands of enterprises at different life-cycle stages vary widely. The government should follow the rules of business venture and enterprise development, and formulate and improve a policy system featuring the characteristics of different stages in order to create a favorable entrepreneurial environment. Based on the analysis of characteristics of enterprises at the startup stage, the developing stage and the mature stage and their different policy requirements, this paper proposes an innovation policy system based on enterprise life-cycle stages, and makes suggestions on how to improve it.*

Keywords: enterprise life cycle, technology enterprise, policy system

JEL classification codes: L25, L52, L53

## 1. Introduction

China is fully implementing the Innovation-Driven Development Strategy, the core of which is strengthening enterprises' status as the main bodies of innovation. Due to the characteristics of enterprises at different stages of development, there is a need to introduce targeted policy measures. Currently China's science and technology policy is still relatively sweeping and there is a lack of research on enterprise characteristics. We need to study science and technology enterprises' development cycles and their characteristics, develop a targeted policy system, and strengthen the cohesion of all aspects of policy.

## 2. Research on an Innovation Policy System Based on Enterprise Life-Cycle Stages

### 2.1 Division of the life cycle of technology enterprises

The enterprise life-cycle theory is a set of systematic management theories, which has developed gradually since the 1950s. Mason Haier (1959) first proposed the concept of an enterprise life cycle. Haier believed an enterprise, like an organism, has its own growth curve and life cycle. An enterprise always experiences a process running from birth, to growth, maturity, recession, and eventually death. Subsequently, different scholars had different methods to classify the life-cycle stages, such as a three-stage model, a four-stage model and a five-stage model. For example, Lippitt and Schmidt (1967) raised a three-stage model: birth, adolescence and maturity; Smith, Mitchell and Summer (1985), from the perspective of enterprise size,

presented another three-stage model: birth or early growth, mid-life, and organizational maturity; Ichak Adizes (1988), from the perspective of flexibility and controllability, put forward a new three-stage model: birth and growth, maturity and recession. Quinn and Cameron (1983), based on management style and organizational structure, developed a four-stage model: entrepreneurship, collectivity, formalization and control, and elaboration of structure. Neil C. Churchill and Virginia L. Lewis (1983), from the perspective of enterprise size and management factors, divided the organization life cycle into five stages: startup, survival, success, take-off and maturity. Since then, more and more scholars have improved the enterprise life-cycle theory from different perspectives. Different scholars have their own ways to classify the enterprise life cycle and presented different life-cycle models.

**Table 1: Typical Division of an Enterprise Life Cycle**

| Scholar(s)                      | Life-Cycle Model | Criteria for the Division                    |
|---------------------------------|------------------|--|
| Smith, Mitchell, Summer, 1985   | 3                | enterprise size                              |
| Downs 1967, Lippitt, 1967       | 3                | complexity of organizational structure       |
| Scott, 1971                     | 3                | complexity of organizational structure       |
| Zhou Sanduo, Zou Tongqian, 2002 | 3                | business strategy                            |
| Steinmetz, 1969                 | 4                | owner's control mode                         |
| Quinn, Cameron, 1983            | 4                | management style, organizational structure   |
| Kazanjian, 1988                 | 4                | life cycle of product or technology          |
| Timmons, 1990                   | 4                | management style                             |
| Li Ye, 2000                     | 4                | sales volume                                 |
| Greiner, 1972                   | 5                | management style<br>organizational structure |
| Galbraith, 1982                 | 5                | management style<br>organizational structure |
| Lewis, 1983                     | 5                | organizational size, operational strategy    |
| Roweetal, 1994                  | 5                | organizational size, management structure    |
| Chen Jiagui, 1998               | 5                | enterprise size                              |
| Flamholt, 1990                  | 7                | enterprise size, sales volume                |
| Adizes, 1989                    | 10               | flexibility, controllability                 |

Although enterprise life-cycle models differ with the scholars' criteria for the classification, the criteria for the division of the life cycle of technology enterprises can be summarized into five aspects: enterprise size, organization and management structure, the features of innovation activities, the financial situation and the source of funds, and market positioning. Based on the five-stage characteristics and shared requirements for policy, this paper develops a three-stage model of technology enterprises.

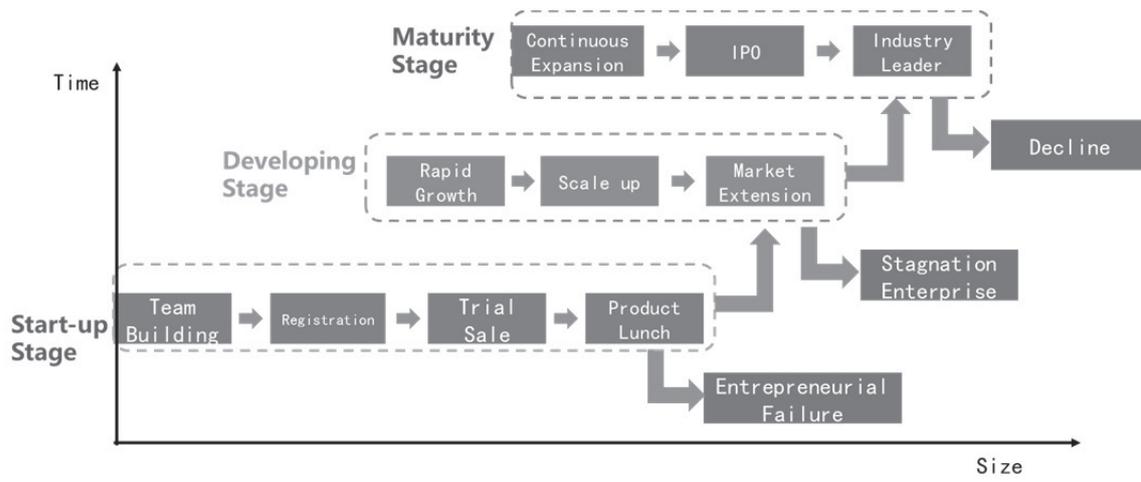
**Startup stage:** At this stage, enterprises are set up as entrepreneurial teams are built. The startup enterprises begin to operate, making products and generating revenues. However, the enterprises can't generate a steady stream of revenue as they incur a lot of initial costs and risks. It is difficult for them to get bank loans. Therefore the startup stage is also called the "death valley" stage of enterprise development.

**Developing stage:** At this stage, the enterprises generate stable revenues, with an increase of size and market share. They make active efforts to expand their production and explore new

markets. The enterprises have passed through the “death valley”. After the primal accumulation and struggle for survival, the enterprises have generated stable revenues and standardized the operational management mode and financial management. They have entered a phase of rapid development.

**Maturity stage:** At this stage, the enterprises explore new businesses and markets. The enterprise businesses become mature. Some of them are listed on the stock market or receive financing. They have entered a phase of stable development and become the backbone or even the leading enterprises in the industry.

**Figure 1: The Three Stages of Technology Enterprise Development**



## 2.2 The Stage Characteristics of Technology Enterprise Development

Based on the analysis of six characteristics of the technology enterprise life cycle—enterprise size, organizational management, innovation activities, financial situation, market environment and risks—this paper summarizes the unique characteristics of technology enterprises at the three stages of the startup stage, the developing stage and the maturity stage.

**Startup stage:** The enterprises are small and have limited personnel numbers. The employees are required to undertake multiple tasks, most of which are skilled technical tasks. The organization structure is simple and linear. The decisions are centralized and the division of labor is clear. Enterprise members are allowed to participate in important decision-making. Product development and design, and turning scientific research achievements into a productive force are their primary innovation activities. Startup firms invest more in research and development, and they urgently need to attract resources to conduct technology research. However, products have not been fully recognized by the market, and therefore the market share is still low. The higher production costs weaken the enterprises’ financial situation. Most of the enterprises run at a loss, and only a few of them gain poor profits. The products or services at this stage are not mature, and consequently they have not been recognized by the market, even though some of them are really good and have great market potential. Additionally, the higher research and development costs incur great risks for the enterprises. They’re mainly faced with technical risks, namely, the failure of innovation activities caused by technical factors may incur capital losses.

Developing stage: As the sales volume increases, the enterprise grows in size and in the number of employees. A further division of labor makes rapid changes to the organizational structure. Functional departments are established so as to adapt to the rapid development of the enterprise. Many enterprises use a matrix structure to enhance cooperation and information exchange among departments. At this stage, the technology enterprise must remain active in technology innovation, intensify the innovation of second-generation products and strengthen the research capacity of hi-tech products in order to make a diversified series of products and increase competitiveness. The effect of economies of scale has been achieved. Business profits grow fast. The enterprise sees a rapid increase in financing capacity and can raise money from banks and other indirect financing. The products or services are positioned in the market and technical advantages have been shown. The market share also increases gradually. Some enterprises have made the transition from a single business to an integrated business. With the significant improvement of risk resistance capability, the enterprise is able to basically fend off technological risks. Market risk and management risk are the most major.

Maturity stage: The expansion of scale obviously slows down. The enterprises have entered a phase of steady growth. To avoid contention between the business and the internal resources of multiple departments, the enterprises usually use a flattening and networking organizational structure. Initiative in technology innovation wanes compared to the first two stages. At this stage, technology innovation activities have different forms, mainly including developing new products and technology and upgrading the old. To seek to maintain a leading position in the industry, the enterprises no longer develop general or mature technology, but focus more on making technological breakthroughs and innovations. The enterprises begin to seek cooperation with institutions, universities and other external agencies, and obtain and develop original and cutting-edge technological achievements in order to occupy a leading position in technology development. Many enterprises begin to establish their own research and development institutions and vie for top-notch professionals. The enterprises have a stable return on capital and profits, as well as a strong capacity for the payment of financial commitments. They also enjoy a very robust financial situation at this stage. Thanks to the improvement of the financing environment, the strategies for enterprise development and financing are designed for the enterprise capital operation. Due to the characteristics of high-technology, the reorganization and replacement of resources are more involved in the transition. As a result, the risks in the transition are higher.

**Table 2: Characteristics of Technology Enterprises at Different Life-Cycle Stages**

| Stage         | Characteristics of size             | Characteristics of organizational management | Characteristics of innovation activities                       | Characteristics of financial situation                                     | Characteristics of market environment | Characteristics of risks |
|---------------|-------------------------------------|--|--|--|---------------------------------------|--------------------------|
| Startup stage | Limited personnel number; part time | Simple, centralized                          | Make technological breakthroughs; large investment in research | Poor income; financing difficulties; majority of enterprises run at a loss | Not been recognized by the market     | Technological risk       |

|                  |                |   |   |  |  |                              |
|------------------|----------------|---|---|--|--|------------------------------|
| Developing stage | Expand rapidly | Further division in management; matrix management | Second-generation innovation; expand size   | Economies of scale occur; increasing profits; enhanced financing ability | Unique features of product positioning; market share increases gradually | Market risk; management risk |
| Maturity stage   | Steady growth  | Multiple departments; business overlap            | Develop new products and technologies; seek leading positions in technology development | Improved financing environment; capital operation                        | Explore new markets  | Strategy risk                |

### 3. Innovation Policy Demands of Technology Enterprises at Different Life-Cycle Stages

As enterprises grow, their demands for innovation policies also change accordingly. In general, they have four demands: for innovation resource services; for innovation ability; for technology finance, and; for creating an innovation environment.

#### 3.1 Policy demands of enterprises at the startup stage

The major problems of enterprises at the startup stage lie in an incomplete industrial structure, a weak innovation ability, financing difficulties, and the high pressure of survival, which hinder the innovation and development of enterprises. To overcome the above obstacles and create a favorable entrepreneurial and innovation environment, the government should focus on reducing the innovation and initial costs of enterprises.

#### 3.2 Policy demands of enterprises at the developing stage

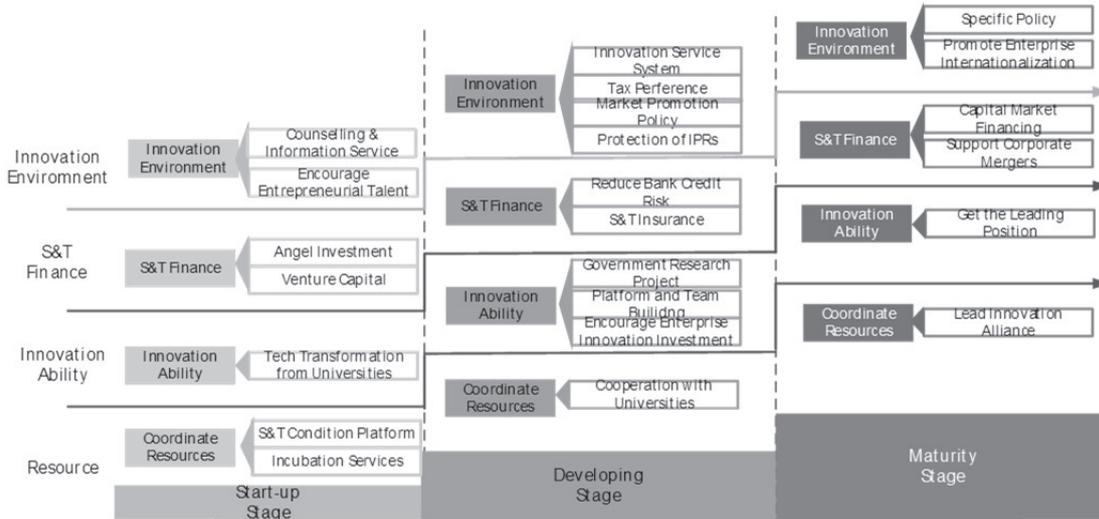
Enterprises at the developing stage have a strong technological innovation capacity. Thus, at this stage, enterprises need to attract and use good employees, technologies, capital and other resources, expand operations, reduce costs, occupy the market quickly, and increase competitiveness. The core objectives of enterprises' technology innovation lie in keeping a vibrant technology innovation capability and consolidating the advantages in developing high-tech products (services) or technology.

#### 3.3 Policy demands of enterprises at the maturity stage

After a period of growth and expansion, an enterprise's management and technology become mature. Technology enterprises have their own featured products (services) and built-brand awareness. Their production, sales and services are accepted by most consumers. The prices and sales volume remain stable. The market is nearing saturation. At this stage, enterprises hope to achieve sustainable development and are thirsty for innovation in cutting-edge domains. They also strive to dominate the industry and master core technologies. Thus, their demands for

government policies are different and personalized.

**Figure 2: Policy Demands at Different Development Stages**



#### 4. Significance of an Innovation Policy System Based on the Enterprise Life Cycle

##### 4.1 It is beneficial to set policies with clear aims

The characteristics of innovation and financing demands will result in significant differences in the policy demands of enterprises at different life-cycle stages. If the characteristics of the stage are ignored, the same policy will be introduced in different types of enterprises. If so, it will be impossible to realize the original intentions of the policies. For example, the present policy of ratifying new and high-tech enterprises sets strict rules for the duration of an enterprise’s registration and core independent intellectual property rights. It results in the exclusion of startup firms, however, and it is these enterprises which are thirsty for government support and reduction of initial costs. We also find a gap between government support and enterprises’ policy demands. The present policies cannot meet the demands of most enterprises at the startup stage. So after fully grasping the stage characteristics at different enterprise life-cycle stages and enterprises’ policy demands, the government should establish an innovation policy system based on the enterprise life cycle, which will solve prominent problems at different stages, introduce policies with clear aims, and exert joint effects of policies.

##### 4.2 It is beneficial to exert the joint effects of policies

Many departments, such as technology departments, finance departments, economy and informatization departments, and reform and development departments, are entitled to set support policies and allocate capital. The division of department functions and responsibilities is not clear, which results in repeated policies and investment. Therefore, based on the enterprise life cycle and enterprise demands, the departmental responsibilities and the key projects they support should be clarified, and policies and capital should be coordinated. Only with that will the joint

effects of policies be exerted and the efficiency of government resources will improve.

#### 4.3 It is beneficial to clarify the boundary between the government and the market

The Third Plenary Session of the 18th Central Committee of the Communist Party of China proposed that “Economic system reform is the focus of deepening reform comprehensively. The underlying issue is how to strike a balance between the role of the government and that of the market, and let the market play the decisive role in allocating resources and let the government fulfill its functions better.” In terms of supporting technology enterprises, clarifying the boundary between the government and the market means handling relations between stable support and competitive support, direct investment and indirect investment, and government orientation and market orientation. The government should use different support modes and directions. For example, generalized preferential policies like preferential tax and tax reduction should be introduced to support startup firms. The government should also set enterprise-oriented policies for enterprises at the developing stage, such as a compensation mechanism and an incentive mechanism. What’s more, it should popularize advanced experience through demonstration by typical examples. Meanwhile, the government should avoid providing direct support to enterprises at the maturity stage. Instead, it should strictly follow market rules and give full play to the fundamental role of the market in the allocation of resources. Developing policies should take an enterprise’s life cycle into consideration. A policy system integrating market resources with government resources should be set up.

### **5. Thoughts on Building an Innovation System Based on the Enterprise Life Cycle**

#### 5.1 The problems of China’s present policy system for supporting enterprise innovation

##### 5.1.1 The connections between policies for different life-cycle stages should be enhanced

Within the policy-making process the division of enterprises is too broad. The criteria for ratifying technology-based microenterprises, small and medium-sized enterprises, or large enterprises have not been laid down. The government does not have a good command of the stage characteristics of enterprises at the three stages, and fails to provide diversified support. Policies are incoherent also. Some enterprises never benefit from favorable policies or get government support. For example, in terms of offering a favorable innovation environment, newly-established enterprises, as well as small and microenterprises are not entitled to enjoy the favorable policies for new and high-tech enterprises. What’s worse, insufficient venture capital funding and the incomplete venture investment market put higher pressure on such enterprises.

##### 5.1.2 Support modes should be improved

In terms of means of supporting technology innovation, the government arranges grants and related policies in every link of the innovation chain, including technological development, commercialization of research findings, and business venture support. Compared with preferential taxation, financing for technology and other fiscal tools, the grants can directly reflect

policy intentions and are easily operated by the government. However, direct financial support to enterprises at the late stage of technology development or the industrialization stage means allowing the government capital into the competitive domain, which interferes with the operation of the market and causes unfair competition to some extent. On the one hand, government funding for helping the commercialization of research findings flows into the competitive domain, interfering with the operation of the market and causing unfair competition. On the other hand, government funding is always inclined toward large enterprises which have sufficient funds and strong research capabilities. Unfortunately, large enterprises often don't take financial funds seriously and have a lower efficiency than small and medium-sized enterprises.

### 5.1.3 Policies should be fully implemented

Systemic constraints have, to some degree, hindered the implementation and weakened the efficacy of certain policies. For instance, the cost of office space remains a daunting challenge for many startups despite extensive government support in this respect, such as subsidies and other supportive measures for incubators. One of the major hindering factors is a lack of policy coordination between industry and commerce, taxation, quality supervision, and other departments.

## 5.2 Suggestions on setting up an innovation policy system based on the enterprise life cycle

### 5.2.1 Undertake more research on an innovation policy system based on the enterprise life cycle

The government should undertake in-depth research on the stage characteristics of microenterprises, small and medium-sized enterprises and large enterprises, and their policy demands, remedy deficiencies in the innovation policies, and keep from overstepping its authority. A new innovation policy system based on the different life-cycle stages should be developed. The government should create a better innovation environment for startups, help small and medium-sized enterprises improve their innovation capabilities and encourage large enterprises to play an exemplary role.

### 5.2.2 Readjust government input into innovation support

The government should abandon the original scientific research funds, mainly grants, in support of projects, and gradually decrease the use of free economic aid. In terms of supporting business ventures and encouraging innovation input for large enterprises, the government should give indirect support to them by creating a better market environment, such as offering subsidized loans, and providing policy security and venture funding, in order to encourage enterprises to increase input into research and development, and guide social resources toward innovation activities.

### 5.2.3 Promote policy coordination between different departments

The government should coordinate internal functional departments. From the perspective of setting up a regional innovation system and improving industrial innovation policies, the

government should specify a clear direction and proper support modes. It should also readjust the positioning of functional departments, and optimize the functions of departments and the goals of policy regulation in order to promote policy coordination between different departments and the development of high-tech industry.

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## Reference

Adizes, Ichak (1988): "*Corporate Lifecycles: How and why corporations grow and die and what to do about it*", Englewood Cliffs, N.J., Prentice Hall

Churchill, Neil C., and Lewis, Virginia L. (1983): "The Five Stages of Small Business Growth", *Harvard Business Review*, 61(3), pp. 30–50

Haire, M. (1959): "Biological Models and Empirical Histories in the Growth of Organizations", *Modern Organization Theory*, John Wiley, New York

Lippitt, Gordon L. and Schmidt, Warren H. (1967): "Crisis in a Developing Organization", *Harvard Business Review*, 45(6), pp. 102–112

Quinn, Robert E., and Cameron, Kim, (1983): "Organization Life Cycles and Shifting Criteria of Effectiveness: Some Preliminary Evidence", *Management Science*, 29(1), pp. 33–52

Smith, K.G., Mitchell, T.R., and Summer, C.E. (1985): "Top-level Management Priorities in Different Stages of the Organizational Life Cycle", *Academy of Management Journal*, (28), pp. 799–820