Industrial Policies in Support of Innovation: Principles, Practices, and Prospects[1]

Jia Jingdun[2] CF40 Guest Speaker

Abstract: *From the perspective of economic principles, the government's support of innovative enterprises in the form of industrial policies can help them reduce innovation risks. China's policy system in support of enterprise innovation roughly involves fiscal policies, tax policies, financial policies, and supporting policies at the local level, etc. All these policies have developed into inclusive policies and have overall remarkable effects. They were usually introduced during periods of rapid economic growth. How to carry out policy innovation in the high-quality development stage deserves further in-depth discussion, and policy formulation needs continuous evaluation and improvement, especially the supporting strategies that differentiate between all types of enterprises (e.g. large enterprises and small and medium enterprises (SME)) and industries (e.g. traditional, emerging, and future industries).*

I. Analyzing Industrial Policies from the Perspective of Economic Principles

To begin with, industrial policies in support of innovation are analyzed from the perspective of economic principles here. In reality, all enterprises involving innovation go through a high-risk cycle as they progress from early development to maturity, and this cycle is equivalent to a start-up cycle. In this cycle, innovation features high investment, long periods, and high risks, and its externality is prominent because entrepreneurial enterprises are immature, uncertainties are high, and their innovative research and development (R&D) are prone to spillover, thus exacerbating high risks. This is an objective economic law during innovation and entrepreneurship.

In response to this law, innovation and entrepreneurship, compared with common economic activities, have a greater need for government intervention. When the market is difficult to function effectively, the government's necessary support can help hedge the risks faced by enterprises, thus motivating them to innovate.

Industrial policy is controversial worldwide, as people argue whether it distorts the market. Besides, industrial policies that support innovation cannot be simply equated to traditional industrial policies. Supporting innovation is different from supporting industrial development because the risk degree and contents are different between developing technologically mature traditional industries and developing emerging and future industries. Therefore, how to formulate industrial policies, especially those in support of innovation, remains a hot topic in economics, and research in this area is cutting-edge. Meanwhile, it is also a significant practical proposition.

It is common around the world, including in what is known as mature market economies, for governments to implement supportive innovation policies to facilitate the development of innovation, especially in technology-based emerging industries. In the 1980s,

1 This article is remarks delivered by the author at the 171st CF40 Youth Forum on Evaluation of Industrial Policies Supporting Innovation on August 6, 2024. It was translated by CF40 and not reviewed by the author. In case of any discrepancy or ambiguity between the English and Chinese versions, the Chinese version shall prevail.

2 The author is the former director of the Torch High-Technology Industry Development Center, Ministry of Science and Technology.

economist Paul Romer put forward the influential "endogenous growth theory" that won the Nobel Prize in Economics in 2018. According to this theory, knowledge, management, and technology can become endogenous factors of economic growth, which means that science and technology innovation can be endogenized through market mechanisms, but the prerequisite is that the government has corresponding policies and institutional arrangements for hedging innovation risks to promote the endogenization of innovation and technological R&D.

In the case of the United States (U.S.), the Small Business Administration was established as early as 1953 to specialize in policy research and implementation in support of small business development and innovation. Its support policy was manifested in the combination of financial and fiscal policies, and the government supported the development of small enterprises by providing low-interest loans or guaranteed financing. Later, similar policies were continuously enriched and improved, and by now, the U.S. has formed a systematic policy system supporting enterprise innovation, especially small business innovation, such as the introduction of the Bayh-Dole Act in 1980. Although the direct policy objective of this act is to accelerate the transfer and commercialization of federally funded research achievements, the focus is to support the development of small enterprises. In 1982, the U.S. introduced a special program to support small business R&D, which is "pre-competitive R&D" oriented without violating the relevant provisions of international trade rules. In 1992, the U.S. introduced the Small Business Innovation Development Act and set up a special program to support small business technology transfer. Small enterprises have strong innovative vitality, and support for their innovative development will significantly promote the innovative development of industries. These are industrial innovation policies guided and supported by government finances.

According to long-cycle monitoring and evaluation, the policies in support of business innovation have reaped tremendous results. There is no doubt that the U.S. would not have consistently produced world-competitive technology enterprises without these systematic innovation policies.

However, a problem that remains unresolved by the economics profession and policymakers is that while any government support, whether by fiscal or tax means, may have a positive impact, it may cause market distortions for other industries. This is the "productivity paradox" in economics. Therefore, formulating policies to support industrial innovation requires in-depth research for better solutions.

II. China's Support for Enterprise Innovation

In China, the introduction of specialized policies to support enterprise innovation began with the reform of the science and technology system in 1985. After the resolution on the science and technology system was issued, policies to support enterprise innovation were introduced one after another. For example, since the late 1980s, China has begun to implement policies for the development of high-tech enterprises. Notably, the policies to support the development of high-tech enterprises were not directly related to the so-called enterprise subsidies, and instead, it was introduced as a macro-policy with the following focuses:

First, it emphasizes the importance of high-tech industry development. In the 1980s, high technology sprang up in the U.S., which had a great impact on the development of industries in the world, and China therefore introduced a policy on high-tech enterprises. This is indeed an industrial policy that supports the development of high-tech industries as well as science and technology industries.

Second, it highlights the transfer and commercialization of scientific and technological achievements. At a time when the conversion rate of scientific and technological achievements in China was low, an important objective of this policy was to transform the scientific and

technological achievements of universities and research institutes into real productivity as quickly as possible.

Third, it recognizes the significance of stimulating the innovation enthusiasm of enterprises and motivating them to take the initiative to increase their R&D investment and enhance their innovation capability. This is a general requirement.

Fourth, it focuses on speeding up the transformation and upgrading of China's industrial system and cultivating new industrial dynamics and business models through scientific and technological innovation.

High-tech enterprise policies have long become inclusive, enterprises can voluntarily apply for them, and those that meet the conditions can be acknowledged. For example, the R&D investment standard, one of the recognition conditions, is classified into 3%, 4%, and 5%, and enterprises that do not meet the standard will not be eligible to apply. In addition, the income tax preferential tax rate is ex post facto tax incentives, to incentivize enterprises to increase R&D investment and strengthen scientific and technological innovation. Therefore, the policy is not equal to an enterprise subsidy policy. Moreover, to assess this policy solely from the perspective of measuring intellectual property rights is not economically rigorous, nor is it consistent with the objective of this policy.

China now has a systematic framework to support enterprise innovation. First, income tax concessions are given to all high-tech enterprises. Second, the policy of filing for science and technology-based SMEs was launched in 2017, with ex-post income tax and deduction incentives for science and technology-based SMEs, specialized and sophisticated SMEs, and SMEs in the manufacturing industry, which also draws on foreign policies. On the whole, policies to encourage enterprise innovation have positive effects worldwide. However, China has never introduced policies that directly support R&D in small enterprises like the U.S., and instead, it utilizes indirect policies, such as tax incentives.

Furthermore, China has a policy on science and technology finance, but it is operated in accordance with commercial finance, with two segments, namely commercial banks and the capital market, working together to support the innovation and entrepreneurship of enterprises. There are also complementary policies at the local level to support enterprise innovation.

Therefore, China now has a policy system to support enterprise innovation and industrial innovation, involving tax policies, financial policies, and supporting policies at the local level, and almost all these policies are inclusive.

III. Policy Effectiveness and Future Development

Over a long period, the effectiveness of China's industrial and enterprise innovation policies has been remarkable. First, the number of high-tech enterprises in China has exceeded 400,000, contributing nearly 70% of the country's corporate R&D investment. The R&D intensity of high-tech enterprises is much higher than the average. Second, high-tech enterprises contribute significantly to GDP, intellectual property rights, and employment. Moreover, employment in high-tech enterprises is likely to have the highest quality among all enterprises in China. Third, on the whole, the development of high-tech enterprises has played a key role in the development of China's high-tech industry, especially in the cultivation and development of emerging industries and new driving forces, and has better realized the intended macro-policy objectives.

In addition, how to assess policies in support of industrial innovation and development deserves discussion. The key is to target the policy objectives and consider multiple factors, such as tax incentives, tax collection methods, and enterprise R&D inputs. Attention should be given to not only intellectual property rights to draw a more scientific and developed conclusion.

Finally, how to incorporate innovation into industrial policies is another question. At present, global industries are categorized into primary, secondary, and tertiary. Many experts and departments categorize the modernized industrial system into traditional industries, emerging industries, and future industries, also a feasible way. Traditional industries are usually technologically mature industries, and emerging industries' technology is not yet mature. Future industries' technology remains at an early stage, with greater uncertainty, and they may become emerging industries in the future.

Since different types of industries are at different stages of innovative development, their risks are not the same. Therefore, the approach and intensity of policy support should be different. For traditional industries with mature technology and a good development foundation, improved innovation features are prominent, and industry upgrading should be the policy focus.

In addition, the innovation behaviors and features of large, medium, and small enterprises, as well as specialized and sophisticated SMEs are not the same. Therefore, the formulation of industrial policies in support of innovation should be categorized, and it is inappropriate to blindly superimpose innovation into previous industrial policies. This is an important frontier proposition of applied economics, which should be thoroughly studied and discussed. Besides, a scientific assessment of innovation policies that have been implemented for a period should also be evaluated to provide a basic reference for policy innovation.