A Five-Dimensional Evaluation System for the Effectiveness of Industrial Policies in Support of Innovation[1]

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Abstract: *The effectiveness of industrial policies in support of innovation is usually evaluated in five dimensions. First, the industry creation dimension evaluates the effectiveness of innovative industrial policies in creating new industries according to the scale and quality of future industry generation. Second, the industry growth dimension evaluates whether industrial policies have accelerated the growth of emerging industries and strategic emerging industries, making them grow faster than in natural evolution, according to the scale and quality of industry growth. Third, the industry upgrading dimension evaluates whether industrial policies have promoted the upgrading of technology, market, or management mode of these industries according to the upgrading success rates of strategic industries. Fourth, the industry transformation dimension evaluates whether industrial policies have effectively promoted the transformation of traditional industries to a new development mode according to the success rates of traditional industry transition and transformation. Fifth, the industry transfer dimension evaluates the effectiveness of industrial policies according to whether the industries' inward and outward transfers align with the objectives of the industrial policies.*

How to assess the effectiveness of industrial policies in support of innovation has been controversial. The assumed objective of industrial policy formulation and implementation is rapid industrial development, especially in infant industries, which needs the government's "visible hand" to intervene. However, the boundary of government intervention is uneasy to determine because it is affected not only by the industrial development stage but also by the economics of scope and the content of innovation. According to the existing experience and research findings, industrial policies that support innovation are widely recognized as effective, such as the protection of infant industries, the suppression of transition industries, and the enhancement of innovation quality.

To determine the criteria or dimensions for evaluating the effectiveness of industrial policies, it is necessary to recognize the drivers of industrial innovation and industrial policies. Industrial innovation refers to the creative destruction of old industrial structures, and the core of industrial policies is not finance, fiscal, or taxation, but market access. Market access policies can be incentivizing, restrictive, or annihilating, such as industrial policies in support of innovation that is incentivizing. Technological thresholds as well as punitive and incentive measures are essentially to evaluate market access degree and access restrictions.

Therefore, I think the effectiveness of industrial policies supporting innovation can be evaluated in five dimensions.

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The first is the industry creation dimension. Industrial policies are necessary due to market failure, externality, and vulnerability which may require industrial policies to intervene, incentivize, restrict, or prohibit. The industry creation dimension concerns future industries, i.e. industries that do not yet exist today. This dimension examines whether incentives and encouragement through industrial policies can facilitate the early or accelerated formation of future industries.

Many emerging industries, including strategic emerging industries, did not exist 10 to 20 years ago, and whether they evolved naturally or were catalyzed by industrial policies can be evaluated. For instance, we are now focusing on areas such as future intelligence, future health, future energy, future materials, and future manufacturing, etc., and they are the immediate needs and the direction of the future. Technological advances are iterating rapidly in these areas, and we hope that future industries will emerge from these areas. The objective of the industrial policies here is clear, that is, to generate future industries.

To put it backwards, the criterion to evaluate an industrial policy that has been implemented for three years, five years, or even longer, is whether it has given rise to future industries. For example, e-commerce and e-commerce platform were spawned by a series of industrial policies that support innovation, especially the relaxation of market access for private enterprises and the incentives for research and development (R&D) activities (such as high-tech enterprise standard identification, substantial reduction in the corporate income tax rate, and 150% additional deduction of enterprise R&D input costs).

The second is the industry growth dimension. When an industrial policy in support of innovation is implemented, it is necessary to assess whether it promotes the rapid growth of emerging and strategic emerging industries, makes these industries grow faster than in natural market evolution, or leads to explosive growth. In retrospect, almost all the policies introduced by the Communist Party of China (CPC) Central Committee and the State Council in support of strategic emerging industries over the past 20 years have included energy conservation and environmental protection, information biology, high-end equipment manufacturing, new energy, new materials, and new energy vehicles as strategic emerging industries. After these policies were implemented, whether in access relaxation or the combined support of finance, taxation, and finance, their effectiveness can be evaluated from the perspective of industry growth. For example, the explosive rise of China's new energy automobile industry is a typical manifestation of industry growth.

The third is the industry upgrading dimension. This type of industrial policy usually targets strategic, pillar, and basic industries. Since these industries are indispensable, they cannot be eliminated but only upgraded, such as energy, oil, coal, integrated circuits, automobiles, real estate, and food. Regardless of how the world changes, these industries will remain strategic, pillar, and basic for a long period. Whether in incentivizing technological breakthroughs, market breakthroughs, or management model breakthroughs, one of the most important criteria for evaluating industrial policies in these areas is industry upgrading.

The fourth is the industry transformation dimension. This kind of industrial policy usually targets industries that can no longer develop according to their original industrial routes, and only through transitions can they revitalize their stock of resources and gain growth in new areas. If they do not transform, many traditional industries, due to the minimal space for technological progress and market competition in the Red Sea mode, can not develop or survive after consuming substantial social resources. Therefore, the focus of policy implementation is to urge them to transition and transform. Policies for such industries are mainly restrictive, such as punitive measures to force highly polluting and energy-consuming industries to phase out.

The fifth is the industry transfer dimension. The world is flat and the world's industries are pointed. Since different economies have different development stages, different factor endowments, and different economic models, their industrial landscapes have

various thresholds and potential energy differences. Latecomer countries and regions usually adopt incentivized industrial policies to attract the transfer of external industries, while developed countries or regions adopt inhibitory industrial policies to force the outward relocation of low-end industries to enhance the overall economic effectiveness and reduce resource consumption. The introduction and the relocation of industries are ultimately manifested as industrial transfer. Therefore, an important criterion to evaluate whether an industrial policy has achieved industrial transfer is whether the industrial policy orientation is consistent with the industrial transfer in reality.