



THE ROLE OF INDUSTRIAL POLICIES IN SHAPING INNOVATION AND CONTRIBUTING TO ECONOMIC GROWTH

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ABSTRACT

However, this paper shows that, while industrial policy can support good economic development, it is not a determinant of economic success. All successful economies have pursued industrial policy, but so have all unsuccessful ones. This suggests that industrial policy, in and of itself, is not a determinant of economic growth and competitiveness. The effectiveness of industrial policy depends on its design, its ability to avoid market distortions, and its capacity to stimulate genuine private-sector investment rather than crowding it out. The findings are also valid under a series of robustness tests and endogenous corrections. The results of heterogeneity tests confirm that there are heterogeneous effects pertaining to industrial policy on economic growth among different sub-regional areas, administrative levels, industrial development stages, and industrial policy types. Overall, this paper supports the hypothesis that industrial policy has positive effects on economic growth and, accordingly, provides a basis for industrial policy implementation. His common thread between all these different policy models is that they are highly targeted towards certain outcomes-not towards certain companies. A second shared feature is that they want to achieve change in key factors for economic success-including innovation and structural economic change. It remains heavily dependent on direct grants, which can sometimes replace rather than complement private-sector investment

Keywords: industrial policy economic growth, innovative economy, innovation-driven economies

INTRODUCTION

A large body of scholarship in economics examines the role of industrial policy in overcoming market failures and promoting innovation and economic growth at both macro and micro levels. These studies have made significant progress by delving into both theoretical justifications and economic outcomes of a variety of industry policies. These policies aim to promote new infant industries or selectively protect traditional sectors through tax allowances, loans, grants, education and training, special organizations, selective investments, government procurement, regulations, and more. Despite conflicting theoretical arguments and mixed empirical findings, there is still limited evidence on how industrial policy impacts the relationship between

innovation and fundamental factors through the lens of congruence. Technological innovation plays a pivotal role in driving economic growth, enhancing industrial competitiveness, and promoting societal development. In the context of an increasingly knowledge-based global economy, governments around the world have come to view innovation as a central element of national development strategies. As a result, industrial policy has regained prominence as a key mechanism for guiding structural economic transformation. Broadly, industrial policy refers to deliberate government interventions—such as subsidies, tax incentives, regulatory adjustments, and public-private collaborations—designed to address market inefficiencies and foster investment in research and development (R&D). These efforts aim to overcome systemic barriers to innovation, including coordination failures, financial limitations, and insufficient support for high-risk ventures. Such policy measures are particularly crucial in sectors characterized by high uncertainty and long innovation cycles, where private actors may hesitate to invest without state backing. By creating a supportive and predictable environment, governments can reduce barriers to entry and stimulate technological breakthroughs with far-reaching economic and societal implications. The need for effective industrial policy has become even more urgent in light of global challenges such as health crises, digital disruption, and climate change, which require coordinated public action to steer innovation towards sustainable and inclusive solutions. Theoretical approaches offer valuable insights for shaping effective industrial policy. Evolutionary economics emphasizes the role of institutional learning, capability building, and the cumulative nature of technological change. These perspectives suggest that industrial policy should prioritize collaborative learning environments and systemic innovation networks over isolated financial interventions. Empirical research supports the positive influence of well-structured industrial policy on innovation outcomes. Government R&D initiatives have been shown to enhance patent activity, improve productivity, and generate breakthrough innovations. In today's fast-paced and complex global economy, industrial policy must be both strategic and adaptable.

LITERATURE REVIEW

Xiuping Hua (2025) This paper investigates the association between firm innovation and endowment-based fundamental factors through the lens of congruence and then examines the impact of a national-level industrial policy on this newly established link. Based on a sample of small and innovative firms listed on the National Equities Exchange and Quotations, China's NASDAQ counterpart, we find that firms with greater congruence with local endowment structure tend to have more innovation inputs and outputs. Additionally, in a quasi-experimental setting, we further examine the effect of the “Made in China 2025” (MC2025) industrial policy. Our findings indicate that MC2025 increases bank loans for treated firms and weakens the positive association between congruence and firm innovation. This suggests that MC2025 has a dual impact: while it increases access to capital, it may also lead to capital misallocations and policy distortions, ultimately hindering long-term innovation capabilities

Wei Yang (2024) Cultivating strategic emerging industries (SEIs) is an important strategy for most countries around the world to seize the economic frontier. Academics have not yet reached a unified conclusion on whether the adoption of industrial policy from the government level can effectively promote its R&D and innovation behaviors and contribute to industrial upgrading. Based on the data regarding 33,425 Shanghai and Shenzhen A-share-listed companies from 2007 to 2020, this article employs the difference-in-difference

model (DID) and the mediated effect model to identify the effect and mechanism of how industrial policy affects the innovation behavior of SEIs. The results of this study show that the promulgation and implementation of industrial policies can help stimulate enterprises to carry out R&D and innovation behaviors and improve the innovation level of SEIs. Its promoting effect on state-owned enterprises is more significant than that on non-state-owned enterprises, and its promoting effect on the eastern and central regions is more significant than that on the western region. Further analysis reveals that government subsidies and tax incentives are important transmission mechanisms through which industrial policy affects firms' innovation, with government subsidies playing a positive facilitating role and tax incentives having a negative impact.

Taiming Chen (2023) With the trend of innovation-driven development and the deepening application of digital technology, the role of digital transformation in the relationship between industrial policies and enterprise innovation is becoming increasingly significant, but it has rarely been analyzed in previous studies. This study found that both demand-side policy and supply-side policy have significantly promoted the technological innovation performance of enterprises. There is a synergistic effect between demand-side policy and supply-side policy, and demand-side policy strengthens the promotional effect of supply-side policy on technological innovation performance. Moreover, digital transformation can promote the technological innovation performance of enterprises. Further research has found that digital transformation can strengthen the synergistic effect between demand-side policy and supply-side policy and strengthen the positive impact of demand-side policy on technological innovation performance, but that it has weakened the incentive role of supply-side policy.

Jewellord T. Nem Singh (2022) Many developing countries have recently adopted a swathe of development strategies ranging from extremely selective to non-discretionary, functional policies – some if not all of which constitute what we may term 'industrial policy'. The collection provides an overview on the state of the art about new industrial policy and the place of politics in contemporary analysis of state intervention in the global political economy. The task of the paper is two-fold: first, it maps out the lessons from East Asian industrial policy and demonstrates how a new generation of political economy scholars have brought in a more political approach to industrialisation; and second, it synthesises the political economy literature to build a framework that incorporates new aspects of industrial policy, notably on the significance of economic linkages and rent management as a way of addressing global value chains.

The role of structural change in economic growth

The current understanding of economic growth is largely based on the neoclassical growth model developed in the Solow model, capital accumulation is a major factor contributing to economic growth. Productivity growth – measured as an increase in output per worker – results from increases in the amount of capital per worker, or capital accumulation. Capital deepening will continue until the economy reaches its steady state – a point at which net investments grow at the same rate as the labour force and the capital-labour ratio remains constant. The further the economy is below its steady state, the faster it should grow. In the steady state, all per capita income growth is due to exogenous technological change. The rate of technological process is assumed to be constant and not impacted by economic incentives. Several authors have found that capital and labour actually explain only a fraction of output growth and that allowing for the quality of the labour force (human capital) only partially reduces the unexplained growth – or Solow residual.

New technologies and transformative innovation policy

Especially in the context of innovation policy, the advent of new technologies became a particular focus of Post-War industrial policy. Two related developments encourage the latest round of technology-rich industrial innovation. First, policymakers increasingly foster initiatives to enhance technologies positively. Innovative activities are expected to generate new ‘value’, a key stimulant of increasing productivity and economic growth. As such, public investment in science and technology is generally politically considered palatable. While also validating and demonstrating new technologies to raise confidence and enhance adoption. Beyond the private/social wedge, the state— often through international state collaboration—also plays a critical role in addressing risky and long-term societal missions such as space exploration and tackling climate change.

Innovation Policy and Development

There is no one-size-fits-all approach to innovation policy. The type of innovation activity to be targeted, such as technology acquisition, as well as the supportive policy mix, change with different income levels. Different sets of policies are relatively more appropriate for countries at different stages of economic development. More generally, national innovation systems (NIS) need to be tailored to At this stage, acquisition of machinery and equipment (imported capital and equipment) and other forms of technology adoption are the main sources of enhancing productivity performance and technological learning. Embodied technological change through capital accumulation is often found to be more effective in generating productivity growth than R&D. Innovation policies at this stage then focus on facilitating technology adoption and learning (by importing and by doing). These developments are supported by access to markets, access to finance, and technical education and training systems. In turn, in countries in the lower-middle-income group, consolidating a network of technology diffusion institutions more widely gains in importance.

The relevance of industrial policies for economic development

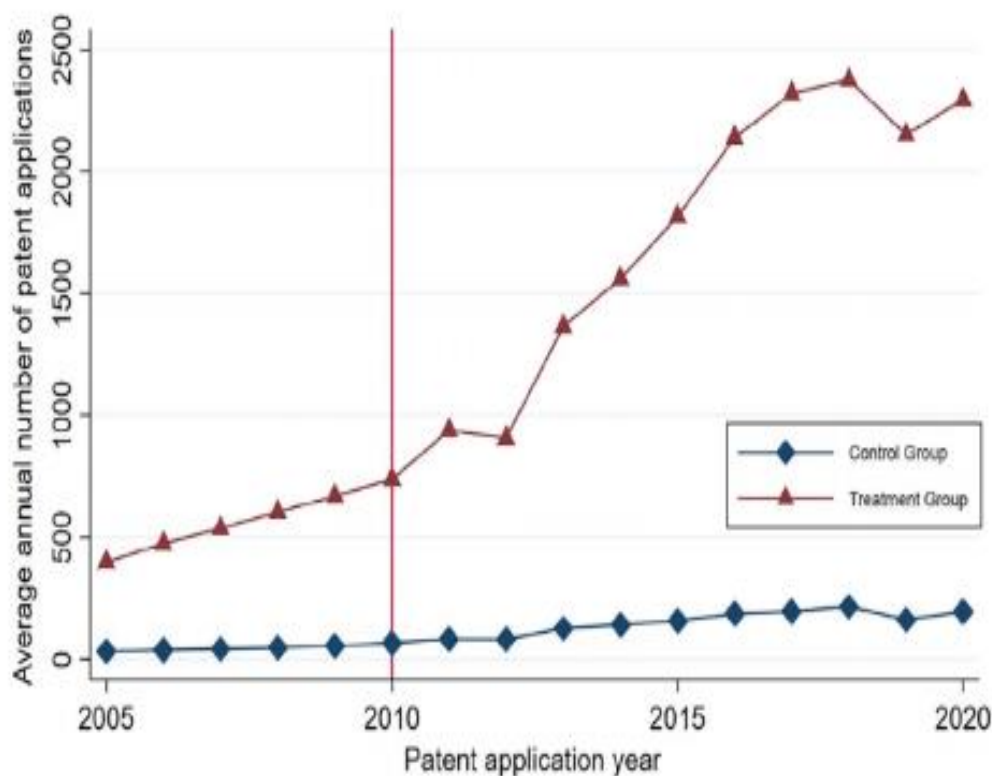
The development of a country is related to economic transformation deriving from technological change and from increasing the knowledge content of economic activities which induce as well as sustain productivity gains till, recently and in the context of the international financial crisis which may even be a cognitive crisis, policy makers, academics and opinion-makers are becoming more receptive to policies that, until very recently, were ostracized: industrial policy is gaining space in the public policy agenda. After a period in which the prevailing view saw fiscal austerity and inflation control as top priorities along with a regulatory role for the State, the recent crisis required immediate and unprecedented State activism, around the world, to prevent a generalized economic meltdown. Such activism brought back, with increasing force, the debate on its role in economic development. Although it is evident that, in coming years, the State will be an important player in managing crisis and sustaining economic growth, the contours of its presence, as well as the extent and depth of its intervention, are still to be defined. The elaboration of the upcoming economic reasoning for different

METHODOLOGY

This study employs a mixed-methods approach to explore the impact of industrial policies on technological innovation. By combining qualitative and quantitative research techniques, it aims to offer a holistic understanding of how these policies affect innovation outcomes across different economic contexts. The research framework is structured around four core components: recognizing policy limitations, gathering empirical data, and formulating a robust research design. This study adopts a comparative and analytical research design to investigate the influence of industrial policies on technological innovation. It combines a systematic review of relevant literature with empirical data analysis to assess theoretical frameworks and their real-world applicability. Both primary and secondary data sources are utilized in this research. Secondary data is collected from peer-reviewed academic publications, government documents, policy reports, and industry analyses. Key sources include reports from major international organizations such as the World Bank, the Organisation for Economic Co-operation and Development, and the United Nations Conference on Trade and Development, focusing on innovation and industrial policy. Quantitative metrics—such as research and development expenditure, patent activity, and productivity growth—are extracted from authoritative databases, including the World Intellectual Property Organization and national innovation agencies.

RESULTS AND DISCUSSIONS

Initially, we computed the average annual patent applications for inventions within the treatment group and the control group from 2005 to 2020. We then represented these averages in Graph 1, employing a triangular icon to signify the treatment group and a square icon for the control group. As depicted in Figure 8, although the treatment group exhibited higher absolute average annual patent applications for inventions compared to the control group, they both displayed a similar growth trajectory until 2010. Post-2010, the treatment group's growth rate in invention patent applications gradually outpaced that of the control group. This outcome suggests that the series of industrial policies enacted since 2010 may have fostered an increase in invention patent applications within the treatment group.

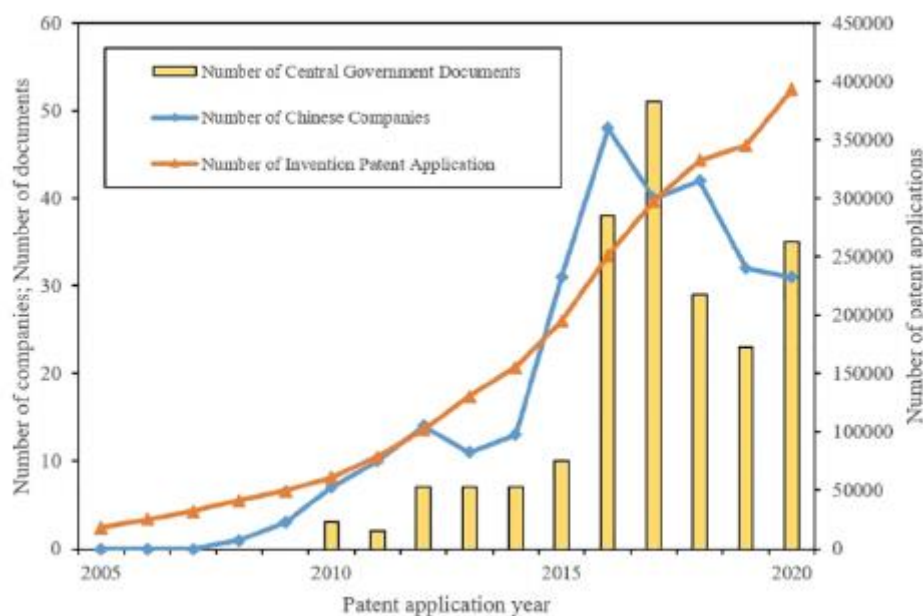


Graph:1 The average annual number of invention patents applied by the treatment group and the control group before and after the implementation of industrial policies.

Subsequently, we assessed the relationship between industrial policies and patent application activities in the technical domains related to intelligent phyto protection, employing equation (1). The regression results are presented in Table 1. The second column of the regression results, which includes control variables, demonstrates that industrial policy exerted a significantly positive influence on the activities involving invention patent applications for intelligent phyto protection technology. Following the policy implementation, the treatment group exhibited an average increase of approximately 1131 patents in invention patent applications for intelligent phyto protection technology when compared to the control group. This effect reached statistical significance at the 1% significance level

TABLE 1 Estimate of the impact of industrial policy implementation on the patent application activities of technology inventions related to intelligent phyto protection

Variable	Dependent Variable: The application number of invention patents for intelligent phyto protection	
	(1)	(2)
Treat*Post	1135.322*** (70.732)	1131.639*** (75.030)
IPCsubclass _{t-1}		0.001*** (0.000)
IPC_maingroup Fixed Effect	YES	YES
Year Fixed Effect	YES	YES
Adjusted R ²	0.6729	0.6932
Observations	14576	13665



Graph:2 The relationship between industrial policies and invention patent

Applications in the field of intelligent plant protection technology.

Received government subsidies between 2005 and 2020 due to concepts related to intelligent phyto protection, serving as a measure of the tangible impact of industrial policies at the enterprise level. In addition, we retrieved, reviewed, and statistically analyzed a total of 212 documents from 2005 to 2020 sourced from the central government's website. These documents either contained references to Smart Agriculture in the full text or featured Strategic Emerging Industries in their titles. Finally, we presented the three sets of data in the form of a combined chart, as illustrated in Graph:2 underscores that the implementation of industrial policies, both at the central government level and within the enterprise sphere represented by listed companies, exhibits a positive correlation with the overall trend of invention patent applications in the field of intelligent phyto protection technology over time.

CONCLUSION

This article has shown that industrial policy has an important part in developing social and ecological market economies. There is now a broad consensus that unregulated markets are unable to achieve optimal results in terms of economic efficiency, social equity, and environmental sustainability. The fact that industrial policy can significantly increase the number of invention patent applications by enterprises suggests that industrial policy helps to promote substantive innovation in SEIs. Innovation can originate anywhere. Increased education and economic growth have improved the capacity of developing countries to offer new products and services. Modern communications and transportation technologies allow these countries to share advances with consumer across the globe Heterogeneity analysis according to the grouping of the nature of property rights reveals that the innovation incentive effect of industrial policy on both state-owned and non-state-owned enterprises is significantly positive, but the promotional effect of industrial policy on state-owned enterprises is stronger. According to regional grouping, it is found that industrial policy can significantly promote enterprise innovation in the eastern region and the central region, in which the positive effect on enterprises in the central region is the largest, but the positive impact of industrial policy on the innovation activities of SEIs in the western region needs to be further examined.

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