

# Environmental Regulation, Regional Innovation and Carbon Neutral Performance

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## Abstract

The report of the 20th National Congress of the Communist Party of China stated that "innovation is the first driving force" and "innovation must play a central role in the overall modernization drive of our country." But without a solid material foundation, innovation cannot occur. We have conducted research so that our country can carry out regional innovation while also implementing correct environmental regulations to reduce our country's carbon emissions and thereby promote our country's goal of achieving carbon neutrality in 2060. This article studies the current situation of regional innovation in China by studying the scientific and technological innovation environment, investment in scientific and technological activities, output of scientific and technological activities and other data, and concludes that our country still needs to continue to improve in terms of market vitality, brain drain, and supporting mechanisms. This article studies China's provincial panels from 2005 to 2015 and concludes that there are differences in the efficiency of environmental regulations on green innovation. This article also compares the carbon dioxide emissions of various countries. The research data shows that my country's carbon emissions continue to grow. At the same time, this article also analyzes and compares the degree of scientific and technological development in various provinces. Research data shows that provinces with faster scientific and technological development have higher carbon emissions. Therefore, compared with other countries, my country faces greater challenges in achieving carbon neutrality. The pressure will be greater.

## Keywords

Environmental Regulation; Technological Innovation; Panel Model.

## 1. Introduction

The report of the 20th National Congress of the Communist Party of China stated that "to grasp innovation is to strive for development, and to seek innovation is to seek the future." This shows the important position of innovation in my country's development. However, without a solid material foundation, it is impossible to comprehensively build a modern and powerful socialist country and promote green development. Therefore, technological innovation requires the support of a solid material foundation. However, as Sino-US trade frictions continue to intensify when developing scientific and technological innovation, problems such as insufficient basic research, insufficient talent training, and the inability to fully integrate industry and academia have gradually emerged. At the same time, due to the unbalanced and inadequate allocation of resources between provinces and between urban and rural areas, and the relative concentration of scientific and educational resources, the regional innovation gap has gradually widened. Moreover, the number of scientific research results based on this place is relatively small, and the conversion rate of scientific research results is low. We need to use policies to attract, promote the flow of resource elements, establish demonstration areas, and serve as templates and references for regional development. At the same time, the digital economy is used to break time and space constraints, allowing elements to better circulate in different

regions for use. Green waters and green mountains are mountains of gold and silver. As the global environment gradually deteriorates, our country, as the proposer of a "community with a shared future", has more responsibilities and obligations. Among them, it should control the threat posed by carbon emissions to the human living environment. However, as a country with a large population and a developing country, China has a long way to go to reduce carbon emissions. If we want to better carry out scientific and technological innovation, only through correct environmental regulation can we reduce carbon emissions while developing scientific and technological innovation. However, our country still faces many problems in environmental regulation. For example, enterprise costs will rise to a certain extent, small and medium-sized enterprises will be reluctant to transform due to high transformation costs, and the number of products produced by enterprises will decrease. We need the government to implement these measures in a low-carbon environment. Affected companies will be provided with policy support to stimulate their enthusiasm for low carbon. In addition, various environmental regulations have appeared in the market in our country, which has led to a certain degree of deviation in the development direction of enterprises. Therefore, we need local governments to formulate relevant laws and regulations based on the actual situation of each locality to point out the direction of development for local enterprises. Moreover, the government must play a leading role and guide the masses to correctly establish the concept of green consumption and travel, so that they can better Good implementation of environmental regulations lays a material foundation for regional innovation and contributes to China's 2060 carbon neutrality goal.

## 2. Current Status of Regional Innovation

To a certain extent, regional innovation capability represents a decisive factor in whether a region can gain competitive advantage in the economy. It is also an indicator to judge whether the region's economy is prosperous. According to the study of provincial comprehensive innovation level index scores, the overall innovation level of each province in China has improved to a certain extent in 2022, and the Beijing-Shanghai-Guangzhou Guangdong-Hong Kong-Macao Greater Bay Area has a leading position in innovation, leading the Yangtze River Delta and other regions to continuously improve their innovation capabilities. However, as the trade friction between China and the United States continues to intensify, problems such as insufficient basic research, insufficient talent training, and the inability to fully integrate industry and academia have gradually emerged in my country's science and technology field. At the same time, it has provided greater uncertainty for my country's regional innovation and development. sex. At the same time, the regional innovation gap in my country is gradually widening due to differences in resources, policies, and geographical conditions among various provinces. The regional innovation gap between urban and rural areas is also gradually widening due to problems such as uneven distribution of resources and the continuous loss of talents. Today, there are still scientific and educational resources in our country that are located in areas with developed science and technology and have few connections with underdeveloped areas. Moreover, scientific and educational resources cannot be researched based on the regions where they are located. At the same time, the conversion rate of scientific research results is low, which cannot meet the requirements of regional innovation in our country. . And according to data in recent years, the regional innovation ability rankings of typical resource-dependent cities in many provinces in China are constantly declining, but the regional innovation ability rankings of provinces dominated by emerging industries and service industries are constantly rising.

### 3. Current Status of Environmental Regulation

In the early days of the founding of New China, with the continuous development of my country's industry, environmental pollution problems continued to emerge, and environmental regulations also came into being. After entering the 21st century, with the continuous deepening of reform and opening up, my country's industrialization has continued to deepen, causing serious damage to the environment, and it has become increasingly difficult for the government to manage the environment. Nowadays, my country's environmental regulations will have a certain impact on enterprises. For example, it will cause the fixed costs, variable costs, explicit costs and opportunity costs of enterprises to increase to a certain extent. At the same time, environmental regulations will also reduce the production efficiency of enterprises, which is not conducive to the green transformation and long-term development of enterprises to a certain extent. Various environmental regulations have appeared in our country's market, but many companies have deviated to a certain extent in their actual implementation. At the same time, some companies equate "carbon reduction" with "production reduction." However, research by many scholars has shown that environmental regulation will have a certain positive impact on corporate green innovation. For example, appropriate environmental regulation can reduce the cost of environmental pollution caused by corporate production to a certain extent and stimulate corporate production enthusiasm.

### 4. Solution Path

Nowadays, carbon dioxide emissions in most countries have reached their peak. my country's carbon emissions are still growing. China is also a country with a large population. Therefore, compared with other countries, my country will be under greater pressure to achieve carbon neutrality. big. At the same time, China is a developing country, and the average income of its population still needs to be significantly increased. We cannot give up economic growth while reducing carbon neutrality performance. Reducing carbon emissions is also a key part of high-quality development. However, according to the study of provincial panel data, under the constraints of China's resource supply, China's energy structure is dominated by fossil energy. my country's economic growth has led to only an increase in carbon emissions. reduce. Therefore, we have a long way to go to achieve the 2060 carbon neutrality goal.

However, as the proposer of the global plan of a community with a shared future, facing the problem of high carbon dioxide emissions in most countries, our country has the responsibility and obligation to be a forerunner, demonstrate our responsibility as a major country, and take the lead in reducing carbon emissions through scientific research, development and innovation. Get better control and provide a plan for the global response to climate warming. High-quality economic development is the direction of economic development that adapts to my country's social changes and development laws. Promoting high-quality development will help our country clarify development ideas, plan economic policies, and implement macro-control. Economic development cannot be separated from the progress of science and technology, but the progress of science and technology cannot be separated from the guarantee of a solid material foundation. Therefore, we need to carry out correct environmental regulations based on the concepts of low carbon and environmental protection, and carry out economic development while maintaining low carbon, so that we can develop our country's economy with the goal of high quality.

Innovation-driven development is the main feature of a modern economic system. Faced with the influence of factors such as resources, policies, and geographical conditions in each province, we can promote regional collaborative innovation by continuously encouraging the free flow of talents and efficiently allocating resources for free flow. We also need to adapt to local conditions to form an innovation model with regional characteristics. In the face of

unbalanced regional development, demonstration areas can be established and then radially promote the development of scientific and technological innovation in backward areas, thereby facilitating the development of scientific and technological innovation in areas with relatively weak science and technology. At the same time, major installations will be tilted towards the western region to create an innovation highland. Regional innovation can create different low-carbon and environmentally friendly technologies based on different geographical locations. For example, the southeastern coastal areas can strengthen research and development of new energy technologies and gradually increase the proportion of new energy use.

In the context of the digital economy, the required elements in regional innovation break the constraints of time and space, which is more conducive to filling the gaps in the demand for elements in the development of innovative regions, and is more conducive to promoting resource elements between provinces and between cities and rural areas. flow, thereby ensuring that the efficiency of innovation and technology development in different regions gradually improves. At the same time, the government is required to pay attention to the development of the digital economy industry, build a digital R&D innovation base, continuously improve the digital economy infrastructure, and focus on supporting the construction of regional big data industrial parks and other parks.

Environmental regulation is the regulation of various behaviors that pollute the public environment with the purpose of protecting the environment. As an important means to manage environmental issues, environmental regulation will continue to have an important impact on the business development of various enterprises and departments in the economy and society. In order to implement the green development concept in the new development concept proposed by General Secretary Xi Jinping while promoting scientific and technological innovation, we should reduce the use of non-renewable and environmentally polluting energy and increase the use of primary energy through correct environmental regulations. At the same time, through the recycling of waste and recyclable materials, the consumption of resources is reduced, thereby reducing environmental pollution, promoting high-quality economic development in our country, and making an important contribution to the implementation of China's 2060 carbon neutrality goal and reducing carbon neutrality performance. . . Our country can improve environmental regulations by formulating relevant legal provisions, use subsidies to attract more companies to join, and create incentive environmental regulations. The government should take the initiative to guide independent and reasonable low-carbon transformation and strengthen support for environmental regulations to a certain extent. The government can also guide the people to engage in green consumption and travel through environmental regulations, and guide enterprises to establish correct low-carbon environmental protection concepts, thereby establishing correct production methods and marketing methods.

At the same time, we should speed up the improvement of our country's energy innovation system and continue to promote the construction of our country's primary energy national laboratory; we need to continue to promote improved energy utilization technology; we also need to establish a complete national resource library to integrate the energy resources of each province. The combination of systems will help our country regulate resources, improve the overall utilization rate of resources, and establish an energy system suitable for the current national production environment, so as to better achieve high-quality economic development and achieve the goal of carbon neutrality. Our country can adjust the energy structure, adjust the proportion of clean energy and fossil fuels, continuously improve primary energy refining technology, and reduce the cost of using clean energy; upgrade machines that need to use fossil fuels to use primary energy through continuous research machines that will help achieve our country's carbon neutral performance and continue to reduce it. The continuous decline in carbon neutrality performance is not only conducive to the high-quality development of our

country's economy, but also provides a development direction for countries around the world, especially developing countries.

China is a country with a large population. Low carbon is an opportunity for China, and to a certain extent, it is also a huge challenge. For enterprises, especially small and medium-sized enterprises, they will inevitably encounter huge challenges in terms of funding. At this time, the government needs to provide corresponding support to small and medium-sized enterprises. This will help mobilize the enthusiasm of enterprises for low carbon, and will also be conducive to regional innovation in China. At the same time, the environment is correctly regulated so that China's 2060 carbon neutrality goal can be achieved. At the same time, the country can also increase local research efforts on carbon-neutral technologies, promote in-depth cooperation between schools and enterprises, and jointly develop low-carbon innovative technologies, which is conducive to the development of regional innovative technologies and promotes the problem of low efficiency in the transformation of school-enterprise results. The government needs to scientifically grasp the direction and progress of environmental regulation, so that it can better implement environmental regulation correctly and develop regional innovative technologies that are suitable for our country and combined with the actual conditions of various places, so that our country can better realize 2060 . annual carbon neutrality target. In recent years, our country has also paid more and more attention to high-quality economic development. Environmental regulations based on the concept of green development will, in the short term, affect the enthusiasm of Chinese enterprises for development. From a long-term perspective, the government needs to correctly guide enterprises. development direction, and provide certain preferential policies and subsidies to enterprises that develop low-carbon technology based on regional standards to stimulate the development enthusiasm of enterprises. If things go on like this, China's economic development will shift to high-quality economic development and achieve the goal of carbon neutrality in 2060 . Just around the corner.

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