Research on R&D Resource Allocation Efficiency
Improvement Strategy in China

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Abstract. Focusing on short board is one of the key points to push forward the structural reform of the supply side and cross the "middle income trap". At present, China's economy into a new normal, economic growth from the original "factor-driven" into "innovation-driven." R&D as the core of scientific and technological innovation activities, its input scale and output efficiency has become a measure of a country or region of science and technology and innovation ability of the important indicators. In this paper, based on the research on the efficiency of R&D resources allocation and its influencing factors at home and abroad, this paper, based on the current development trend and actual situation of China's R&D, the lack of investment in R&D, the gap between regional industry and the lack of intellectual property protection, We will improve the efficiency of R&D resource allocation by improving the quality of personnel investment, promoting regional technological innovation, carrying out domestic and foreign cooperation and strengthening government cooperation.

Introduction

Internationally, R&D activities are often used to reflect the size and intensity of a country's scientific and technological strength and core competitiveness. The R&D level of a country embodies the political and economic strength of a country, the R&D level of an enterprise, which embodies the competitiveness of an enterprise. International famous companies regard R&D as the life of the enterprise, all invested heavily in R&D. Therefore, it is an important theoretical and practical significance to promote the balanced development of China's R&D activities by exploring the spatial differences and the evolution trends and laws of R&D resources in China.

R&D Resource Allocation Efficiency Influencing Factors in China

The influencing factors of resource allocation efficiency are mainly divided into endogenous factors and exogenous factors. The endogenous factors include R&D resource input quality and structure (personnel input, capital investment, technology investment) and R&D configuration model, exogenous The influencing factors mainly refer to the degree of international trade.

Technical Input

Enterprises can improve their efficiency in R&D process through technical training, technical cooperation and technology accumulation. Technology accumulation: enterprises through the establishment of technical knowledge base to achieve the accumulation of knowledge of technical resources, input to the knowledge base of the technical resources will be set by level confidentiality to ensure security, and the development of research and development centers around the world to share, at the same time, around the R&D center Will also be acquired around the new technology into the knowledge base to ensure the continuous updating of technology and incremental development. Technical cooperation: two forms, one is the company's internal technical cooperation, that is, mutual support between R&D centers, in the face of technical problems, through internal information sharing, access to other R&D center support; the other is the company and External technical cooperation, that is, with the relevant technical capacity of enterprises to sign technical
cooperation contracts in order to obtain technical support at any time. Technical training: two ways, one is the internal training, generally organized by the enterprise, for technical staff, to carry out a variety of technical training, so that employees have the necessary technical capacity, and understanding of new technologies to improve the company's Technical capacity; the other is external training, will be training outsourcing, through professional training companies to train staff.

**Staff Input**

Enterprise R&D human resource allocation determines the enterprise technology innovation, product development, and sustainable development capabilities. R&D personnel refer to all the staff involved in R&D, including the project team responsible for the overall progress of the project, including the support staff of the service and the R&D related administrative staff. Human resources configuration includes five aspects. Through the human resources planning, human resources acquisition, staff performance management, staff training, team building to improve the R&D investment under the premise of improving the quality of personnel into.

**Capital Investment**

Capital investment R&D is an innovation, in essence, is from scratch process, can not guarantee that R&D results come out, whether it has lost market opportunities, therefore, there is a lot of uncertainty, the development cycle is longer in this way. And technology research and development on the funds have a strong dependence, the funds are scarce resources. Therefore, for any high-tech enterprises, the rational allocation of R&D funding resources is an urgent issue, corporate funds are limited, must be used to the long-term interests of enterprises more favorable place. For enterprises, the allocation of funds not only to consider the balance between each R&D projects, but also the necessary measures to ensure the efficiency of R&D funds in use.

**Configuration Mode**

R&D resources include human resources, technical resources and financial resources, which can improve the effectiveness of any kind of resources will improve the effectiveness of R&D resources allocation. vice versa. Moreover, the resources also have a substitution effect, in the overall R&D resources under the premise of one of the resources to improve the effectiveness of the other two resources can make a reduction in demand. However, if one of the resources is too short or weak, the other two resources and then the effectiveness of R&D resources can not improve the effectiveness of the allocation, reference bucket effect. Therefore, we can not unduly optimize a certain kind of resources, but according to the objective reality to optimize the most efficient type of resources, so as to obtain the best resource allocation effect.

**International Trade Degree**

Foreign direct investment, bringing a lot of capital and advanced technology, for the less developed countries, foreign direct investment can make it quickly and directly access to foreign advanced equipment, and localized foreign advanced technology, production practice, at the same time, due to advanced Technology innovation will bring a substantial increase in domestic technology research and development of the enthusiasm and level, so as to further promote the domestic R&D level.

**The Existing Problems of R&D Resource Allocation Efficiency in China**

**The Total Input and Output Increased, the Input Intensity is Relatively Insufficient**

Through the analysis of the present situation of R&D investment in China, it is found that the expenditure of R&D in China is RMB1416.99 billion, an increase of 115.43 billion yuan or 8.9% over the previous year; R&D expenditure is 2.07%, up by 0.05 percentage point over the previous year. R&D staff full-time workload calculated per capita expenditure of 377,000 yuan, an increase of 26,000 yuan over the previous year. Although the R&D investment in China has steadily increased this year, the proportion of R&D investment in GDP has been significantly improved.
However, the intensity of R&D expenditure in China is relatively low compared with the investment intensity of R&D funds such as USA, Japan and Sweden. Level, in order to achieve sustainable economic growth, China also need to further increase the R&D funding efforts to enhance the quality of R&D personnel.

**R&D Investment Significantly Imbalance, Regional and Industry Differences**

By region, 2015 R & D expenditure of more than 100 billion yuan in the provinces (cities) have five, respectively, Jiangsu (12.7%), Guangdong (12.7%), Shandong (10.1%), Beijing (9.8%), Guangdong (10.7%), Zhejiang (7.1%). R&D funds invested more than the national average of the provincial (city) 8, respectively, Beijing, Shanghai, Tianjin, Jiangsu, Guangdong, Zhejiang, Shandong and Shaanxi. R&D inputs are significantly different in the eastern, central and western regions. The eastern region is much higher than the central and western regions in terms of R&D funding, R&D expenditure per person, R&D project funding, or R&D expenditure per unit project. R&D investment in the industry is also a significant difference between the communications equipment, computers and other electronic equipment manufacturing R&D funds and R&D project funding is the highest total. R&D investment in these regions and industries is relatively inadequate, restricting the efficiency of R&D activities and technological progress, thus affecting its economic sustainable growth.

**Government Guidance is not Enough, Intellectual Property Protection is Weak**

Although there are studies that the government R&D investment to a certain extent, enterprises and other departments have a certain guidance and demonstration effect, but due to different regions of different industries R&D resources vary, the government in the R&D investment in the driving effect difference is also large, Especially the low guiding effect of the region and the industry still have great potential, at this stage the government R&D investment on the enterprise guidance effect is still room for improvement. Thereby improving the current situation of R&D investment imbalances in basic research, applied research and experimental development. At present, China's intellectual property evaluation system, low reliability, poor efficiency, which exacerbated the high-tech transformation and investment risks. Moreover, China has not yet formed a good environment for the protection of intellectual property rights, the lack of intellectual property rights in the development of enterprises, technical staff fear of technical leaks, do not want to cooperate and communicate with others, which greatly reduced the speed of results into the transformation.

**Enterprise-led R&D Investment Model has not Yet Formed**

Enterprises in the technological innovation plays an increasingly important role, although the R&D from the source structure of the current point of view, the enterprise's R&D investment accounted for an absolute dominant position, but this does not mean that China's R&D investment model has entered the enterprise-led R&D investment model. Compared with developed countries, China's R&D investment model has not been effectively formed, which requires a long process and efforts. The size of the enterprise, whether it is high-tech enterprises and entrepreneur innovation capacity and other factors will also affect the degree of enterprise-led R&D investment model, the R&D resource allocation efficiency also have a greater impact.

**Strategy of Raising Efficiency of R&D Resource Allocation in China**

**Increase R&D Funds, Improve the Quality of Personnel Inputs**

Relative to the huge economic base, China's R & D spending is actually not enough, it should continue to increase R & D funding. China's R & D funds into the total amount and intensity is difficult to reach the level of developed countries in the short term, China should adjust the basic research, applied research and experimental development of the three types of investment ratio, continue to support a large number of enterprise test development, promote enterprise rapid progress, Get short-term benefits, focus on basic research investment, improve staff input quality.
Innovative R&D Resource Allocation, Promote Regional Technological Upgrading

China's vast territory, the region in the accumulation of basic resources and economic development environment there is a big gap between the different regions of the R&D investment and R&D activities are also far from the efficiency of regional economic development in the deepening of the contradictions, which China's economic coordination and sustainable development has formed a huge challenge. The government should actively play its regulatory role in the R&D resources between different regions for a reasonable allocation. R&D investment in R&D lower, less R&D activities in the region, to increase R&D investment and give the appropriate policy incentives to stimulate the enthusiasm of its independent innovation. R&D investment in high intensity, relatively active R&D activities in the region, should strengthen the guidance, so that R&D resources flow higher efficiency of the sector. At the same time, we should explore the regional technical cooperation mechanism and carry out mutually beneficial and win-win economic cooperation according to the differences between natural and regional economic advantages, so as to realize the advantages of mutual complementarity, mutual benefit and common development.

Strengthen the Management of Intellectual Property Rights, Improve the Legal Security System

Strengthening the management and protection of intellectual property rights is a strong guarantee for the efficiency of R&D resource allocation. To strengthen the management and protection of intellectual property rights, we can guide enterprises, scientific research institutions, colleges and universities to establish and improve the management system of intellectual property rights, make full use of patent information and patent system, and continuously improve the number and quality of patents, strengthen the implementation of patented technologies, The process of real productivity transformation, and innovative means of transformation of the means and methods. At the same time to establish an effective incentive R&D personnel creative activities of the management system, material and spirit to encourage both, to give scientific and technical personnel corresponding treatment and social status, especially to promote high-level scientific and technological personnel training and gathering. The protection of intellectual property rights is the need to improve the market economy system and promote the independent innovation. It is also the need to establish international credit and carry out international cooperation. Give full play to industry associations in the protection of intellectual property rights in the important role, establish and improve the protection of intellectual property rights in the qualification system and social credit system.

To Carry out Domestic and Foreign Cooperation, Optimize the R&D Investment Model

Encourage research institutes, institutions of higher learning and overseas research and development institutions to establish joint laboratories or research and development centers to support international cooperation projects under the framework of bilateral and multilateral scientific and technological cooperation agreements. The establishment of the Mainland and Hong Kong, Macao and Taiwan R&D cooperation mechanism to strengthen communication and major R&D project joint research. Put our country's leading position, the implementation of "going out" strategy to expand the export of high-tech and its products. The establishment of overseas research and development centers or industrial bases, to promote our scientists and scientific research institutions to participate in or lead the organization of international and regional major scientific projects. Focus on learning, communication and training to support our scientists in the important international academic organizations in leadership positions, to improve our scientists to participate in international academic exchanges. Encourage multinational companies to set up R&D institutions in China to strengthen cooperation with internationally renowned multinational companies to improve their R&D capabilities and levels, so as to optimize the R&D investment model.
Summary

R&D is the catalyst to improve the core competencies and market competitiveness of enterprises, but also the internal driving force of economic and social progress. Technological innovation has become an important means to enhance the national comprehensive competitiveness. Improve the ability of independent innovation, building an innovative country to become China's future economic and social development in all areas of the important strategic needs and evaluation indicators. Therefore, by promoting the quality of personnel investment, to promote regional technological innovation, to carry out domestic and foreign cooperation, strengthen government cooperation in several aspects not only for scientific and technological innovation provides an important support, but also to promote national implementation of independent innovation strategy, efforts to fill our innovation and development of this short board.

References

