Analysis on the Reasons of Insufficient Incentive Guarantee for State-Owned Science and Technology Enterprises

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ABSTRACT
State-owned enterprises are the backbone of realizing high-level self-reliance and self-improvement in scientific and technological innovation. In recent years, the incentive guarantee measures for scientific and technological innovation have been continuously improved iteratively, and at present, the incentive guarantee policy system with comprehensive coverage, complete categories and diversified tools has basically been formed. However, the incentive guarantee system for the characteristics of state-owned enterprises' scientific and technological innovation activities has not been fully established, and the problems such as inaccurate matching with the characteristics of innovation chain activities, the orientation and growth law of state-owned enterprises' innovation development, and inadequate scientific and technological support are still outstanding. Facing the new situation and new problems, this paper deeply analyzes the reasons for the lack of incentive guarantee for state-owned science and technology enterprises, as well as the concerns and difficulties in actual operation, so as to provide the basis and reference for optimizing and perfecting the incentive guarantee system for state-owned science and technology enterprises.

Keywords: *State-Owned Science and Technology Enterprises, Incentive Guarantee, Problems, Reasons.*

1. INTRODUCTION

"The only way to innovate is to get people". In recent years, China has thoroughly implemented the strategy of strengthening the country with talents in the new era, comprehensively trained, introduced and made good use of talents, encouraged industrious innovation to become rich, cultivated fertile soil for talents, respected the growth law of talents, and increased investment in talents. In addition, China has given full play to its role as a major organizer of scientific and technological innovation and introduced a series of incentive and guarantee measures to fully demonstrate the advantages of the new national system under the socialist market economy [1]. However, limited by the system and mechanism of science and technology management, the innovation vigor and enthusiasm of scientific and technical personnel are still insufficient, which leads to the fact that the innovation ability has not been fundamentally improved. On the basis of investigation and interviews [2].

To tamp the incentive guarantee mechanism is the basic guarantee to enhance the innovation ability of state-owned enterprises. The construction of incentive mechanism can effectively guide the innovation direction of state-owned enterprises. Since the founding of the People's Republic of China, the national system has been the "golden key" of China's major scientific and technological projects, and the essence of the national system is a solid incentive and guarantee mechanism, so as to realize that major scientific research projects can be "dedicated to each other". In addition, at present, it is the "window period" to deploy incentives for technological innovation in state-owned enterprises. Under the background that a new round of technological revolution and industrial transformation have spawned a large number of new technologies, new industries, new formats and new models, it is imperative to stimulate employees' innovative vitality and tap internal potential. Incentive mechanism can effectively stimulate the vitality of scientific and technological innovation of state-owned enterprises. The Guiding Opinions of the Central Committee of the Communist Party of China and the State Council on Deepening the Reform of State-owned Enterprises clearly stated that it

is necessary to "make state-owned enterprises stronger, better and bigger, and constantly enhance the vitality, control, influence and risk resistance of the state-owned economy." This not only shows that state-owned enterprises are the main body of innovation and development, but also points out the path to strengthen, improve and enlarge state-owned capital by strengthening "five forces" such as "innovation power". However, the state-owned enterprises are constrained by the inherent system and mechanism, and there are still "five shortages" in the development of innovation activities (lack of motivation, lack of ability, lack of experience, lack of brand, lack of environment) [3]. The construction of incentive and guarantee mechanism can set aside clouds for the innovation and development of state-owned enterprises. The incentive mechanism is conducive to promoting the construction of scientific and technological talents in state-owned enterprises. At present, it is an important window period to deploy the reform of incentive and guarantee mechanism. State-owned enterprises have a huge contingent of scientific and technological innovation talents. Improving the incentive and guarantee mechanism of scientific and technological innovation in state-owned enterprises will help to build a scientific research innovation highland that gathers outstanding talents from all over the world and attract high-end talents and professionals to work, research and exchange in China.

2. THE STATUS OF STATE-OWNED SCIENCE AND TECHNOLOGY ENTERPRISES INCENTIVE AND SAFEGUARD MECHANISM

(1) The top-level design of scientific and technological innovation of state-owned enterprises with mature stereotypes and system integration needs to be established urgently.

Generally, science and technology innovation of state-owned enterprises is plagued by problems such as imperfect legal system, unclear determination of property rights, inadequate resource guarantee and so on, and it is urgent to improve the national science and technology innovation system.

Firstly, the scientific and technological innovation laws and regulations system is not perfect. At present, China's scientific and technological innovation-related laws and regulations system is not perfect, and there is still a big gap compared with developed countries, which cannot meet the needs of high-quality development in the new era. For example, the United States has issued four statutory laws such as the National Cooperative Research Act and more than 20 bills such as the American Inventions Act around scientific and technological innovation, and established a relatively systematic and complete legal system for scientific and technological innovation. Among them, the Bush administration promulgated the "Creating Opportunities for Meaningful Promotion of First-class Technology, Education and Science", focusing on strengthening basic innovation and personnel training. The American Inventions Act allows enterprises and universities to form technology transfer alliances, and their cooperative research is not restricted by the anti-monopoly law. However, although China has the Science and Technology Progress Act, it has been 13 years since the latest revision, and the basic research ten-year action plan matching with the current national science and technology strategy is still being worked out. Laws and regulations on collaborative innovation and original innovation have not yet been promulgated, and the existing laws have not fully played a supporting role in science and technology innovation.

Secondly, the property right incentive system of scientific and technological achievements needs to be improved. The determination of property right plays an important role in promoting the transformation of scientific and technological achievements. Because of the perfect legal guarantee system and scientific property right management system, the developed countries of science and technology have been in the leading position in the transformation of scientific and technological achievements. At present, China's incentives for scientific research personnel's achievements mainly adopt the incentive method of rewarding cash and equity after the achievements are transformed (first transformed and then rewarded). According to the law, scientific research units can take the achievements as the co-owners and give the title of scientific and technological achievements to their posts by share-sharing. However, the shares of scientific and technological achievements should be held by the achievements, and the years of long-term use rights of enterprises are still not clearly defined in relevant laws. China should establish and improve the empowerment management system, work flow and decision-making mechanism of scientific and technological achievements, explore effective ways to endow scientific researchers with the ownership or long-term use right of scientific and technological achievements, and deepen the reform of the right to use, dispose and benefit scientific and technological achievements.

Thirdly, the guarantee of scientific and technological innovation resources is insufficient. From the situation of developed countries, financial input is an important source of funds for scientific and technological innovation, but our government's financial input for scientific and technological innovation is still insufficient. According to the OECD report, from 2013 to 2019, China's financial investment in science and technology innovation accounted for the 28th place among 36 OECD countries, with much room for improvement. Compared with the United States, Japan and South Korea, China's financial investment in

scientific and technological innovation is also at a low level. Although the gap with Japan has narrowed year by year in recent years, the gap with the United States and South Korea is still large. Taking national laboratories as an example, 30%-50% of the research funding of national laboratories in developed countries comes from financial investment, while the research funding of national laboratories in China mainly comes from project application, self-financing by sponsors, etc., and the government's financial investment guarantee level is still low.

(2) The incentive and guarantee system of scientific and technological innovation needs to adapt to the continuous advancement of the scientific and technological innovation strategy of state-owned enterprises.

In recent years, the State-owned Assets Supervision and Administration Commission (SASAC) has formulated a series of supporting policies around the incentive of scientific and technological innovation, especially in June 2021, the No.44 document was issued, which played an important role in stimulating the vitality of innovation of state-owned enterprises, and initially constructed a top-level policy framework to support the incentive of scientific and technological innovation of state-owned enterprises. In order to accelerate the implementation of the high-level self-reliance strategy, scientific and technological innovation needs to make concerted efforts in four aspects, such as basic research, applied research, experimental development and application of achievements, and the incentive guarantee mechanism needs to be further more precise and effective.

Firstly, a more targeted incentive and guarantee mechanism should be established to meet the needs of basic research and applied basic research. Basic research and applied basic research have the R&D characteristics of "two majors and one high" (great breakthrough difficulty, great uncertainty and high risk of failure), and the results are "quasi-public goods", which have the characteristics of public welfare and market failure, and are in contradiction with the natural attributes of enterprises' pursuit of profit. Therefore, incentive means such as equity and dividend incentives based on enterprise profits are difficult to apply to these two types of R&D activities. In addition, most of the policies that encourage basic research (such as policy documents, Measures for the Management of Young Science Fund Projects of National Natural Science Foundation of China, Regulations of National Natural Science Foundation of China, Optimization and Integration Plan of National Science and Technology Innovation Base, Some Opinions on Further Promoting the Opening of Scientific Research Base and Scientific Research Infrastructure to Enterprises and Society), the main body of the policy documents are basically scientific research institutes and universities, which cannot provide strong support for enterprises to carry out original innovation. According to the announcement of the National Natural Science Foundation of China, in 2020, the National Natural Science Foundation of China supported more than 45,000 projects, with the amount of support reaching 28.000 billion RMB, but the number of projects approved by enterprises and the amount of support are less than 3%.

Secondly, the incentive policies for experimental development and application of achievements are not operational. At present, the implementation of the transformation of achievements by state-owned enterprises is mainly based on the Law on Promoting the Transformation of Scientific and Technological Achievements. The legal provisions are relatively macro, and there is a lack of relevant operating rules for specific situations in specific fields, which leads enterprises to "dare not use, do not want to use, and cannot use". According to incomplete statistics, currently, the conversion rate of scientific and technological achievements in China is about 10%, far lower than 40% in developed countries. At the same time, in some fields, the implementation procedures of science and technology incentives are cumbersome, and the scientific and technological achievements of state-owned enterprises after being invested as state-owned shares need to be examined and approved by more than a dozen government departments in the transaction process, which is characterized by long cycle, many links, high uncertainty of interests and difficult implementation of policies, thus making it difficult to transform achievements.

Thirdly, the incentive mechanism to guide collaborative innovation and open innovation needs to be further optimized. Collaborative innovation, cooperative innovation and open innovation are becoming important ways of innovation. At the level of State-owned Assets Supervision and Administration Commission (SASAC), a large number of useful explorations have been made in setting up innovation consortia of central enterprises and accelerating collaborative innovation, which has played an active role in solving the bottleneck problem in key areas. However, the institutional mechanism of collaborative innovation is not perfect, and the consortium needs to establish a scientific and reasonable benefit distribution mechanism with equal responsibilities and rights, so as to encourage enterprises in the consortium to cooperate deeply and truly turn the innovation consortium into a community of interests.

3. THE STATE-OWNED ENTERPRISES HAVE CONCERNS AND DIFFICULTIES IN ACTUAL OPERATION.

The popularization and implementation of state-owned enterprises' science and technology innovation incentive and guarantee policies are still not in place, and there are concerns and practical difficulties in policy implementation, such as fear of loss of state-owned assets, difficulty in measuring the income from achievements transformation, etc., which affect the process and strength of enterprises in promoting policy implementation.

Firstly, out of concerns about the loss of state-owned assets, there is insufficient motivation to adopt equity incentives. How to maximize the role of incentive mechanism and prevent the risk of loss of state-owned assets is a difficult point. Reasonable pricing of state-owned assets is the basis of equity incentive implementation, which directly determines the verification of total incentive amount and equity value. If the evaluation is improper, it would bring the risk of loss of state-owned assets. However, the pricing of state-owned assets is a difficult problem, and the relevant documents do not give detailed information on the principles, standards and methods of state-owned assets pricing. Although documents such as Caizi [2016] No.4 document have been deployed to prevent the loss of state-owned assets, for example, enterprises should have a standardized corporate governance structure, the total equity incentive of large enterprises should not exceed 5% of the total equity of enterprises, and the incentive equity obtained by a single incentive object should not exceed 3% of the total equity of enterprises, etc., but the contents of these documents can't eliminate the concerns of enterprise management, and they often have insufficient motivation to promote the equity incentive of enterprises out of consideration of caution and fear of the loss of state-owned assets, and take a wait-and-see attitude.

Secondly, there are practical difficulties in the actual operation of the incentive scheme. The reward amount of project income dividends is determined based on the net income amount of scientific and technological achievements transformation, but there are great difficulties in actual calculation. Cai Zi [2016] No.4 only clearly stipulates the net income from technology transfer and license, but it does not clearly stipulate the net income from the transformation of scientific and technological achievements, such as new product sales, technical service and technical consultation, which is difficult to measure. Moreover, the research and development of some scientific and technological projects is based on the original achievements, and the incremental value of the achievements is not easy to calculate. In addition, in the actual management of science and technology projects, the value of scientific and technological achievements is not clearly marked in the technology transfer, service and consulting contracts between some units affiliated to central enterprises, so it is impossible to calculate the net income according to the measurement methods stipulated in relevant national laws and policies, and it is difficult to implement at the operational level.

4. CONCLUSION

To sum up, it can be seen that to enhance the innovation vitality of scientific and technological personnel in state-owned enterprises, it is necessary to systematically reconstruct the scientific and technological management system and mechanism, and build an environment conducive to the innovation of state-owned scientific and technological enterprises. Therefore, it is necessary to implement precise policies from two perspectives of government and state-owned enterprises. At the government level, the government need to formulate policy documents suitable for the characteristics of technological innovation of state-owned enterprises, such as reducing the constraints of policy implementation to further improve the autonomy of enterprises, to appropriately increase incentives by expanding the scope of policy implementation. Precise incentives are given by means of increasing policy propaganda and communication, enhancing policy operability and so on. At the level of state-owned enterprises, the first is to focus on the core areas and forward-looking layout of enterprises' scientific and technological innovation, and increase the investment level of incentives and guarantees. The second is to optimize the science and technology assessment mechanism, expanding the scope of linkage between scientific research innovation and salary assessment, increasing the proportion of performance pay, and expanding medium and long-term incentives. The third is to adjust the incentive guarantee structure, tilting the incentive guarantee policy for scientific and technological innovation to the grassroots, young researchers and leading talents, thus improving the difference of incentive guarantee in an orderly manner [4].

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