

Analysis and Enlightenment of Outstanding Enterprise Achievement Transformation Practice at Home and Abroad

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ABSTRACT

This article summarizes and refines the practices of GE, Siemens, IBM, Cisco and other companies, and puts forward suggestions and measures for central enterprises to improve the transformation of scientific and technological achievements, so as to provide reference for domestic scientific and technological enterprises to improve the transformation mechanism of scientific and technological achievements and enhance the value creation ability of scientific and technological achievements.

Keywords: *scientific and technological achievements, transformation*

1. INTRODUCTION

The transformation of scientific and technological achievements is a common problem in the management of scientific and technological innovation in domestic and foreign enterprises. After long-term exploration, excellent enterprises have gradually formed a relatively mature management model through the improvement of system and mechanism, which guarantees the effective transformation of scientific and technological achievements inside and outside the group[1]. Large-scale central enterprise groups are usually large in size, with different types of subordinate enterprises such as scientific research and industry inside, and scientific and technological achievements can be transformed inside and outside the group.

2. THE MAIN PROBLEMS IN THE TRANSFORMATION OF SCIENTIFIC AND TECHNOLOGICAL ACHIEVEMENTS OF CENTRAL ENTERPRISES

2.1 *The quality of scientific and technological achievements needs to be improved*

The low quality of scientific and technological achievements is mainly manifested in the following.

First, scientific research units have insufficiently considered industrialization issues such as manufacturing costs, development platforms, technical compatibility and interfaces, resulting in low maturity of results, poor compatibility or versatility of product systems and high investment in secondary development.

Second, in the process of transforming scientific research results into products, scientific research units are insufficiently involved, which reduces the efficiency of the conversion of results and increases the cost of conversion.

Third, in the work of achievement transformation, industrial units tracked the projects of interest and found that many achievements were difficult to truly land. Although it is technologically advanced, there is still a long way to go to realize industrialization, that is, the products and technologies developed are not in line with market demand [2].

Fourth, the need for the unit's right to speak in the process of scientific and technological project guidelines, project establishment and scientific research needs to be improved, and the transformation of results has not been embedded from the beginning[3].

2.2 Channels for transforming scientific and technological achievements are not smooth enough

Most enterprises have incomplete market mechanisms for the transformation and trading of scientific and technological achievements. On the one hand, the scientific and technological achievements that both the supply and demand sides can pay attention to are relatively limited, and each unit has problems in its own fight, and scientific research is relatively closed; On the other hand, both the supplier and the demander passively carry out the transformation of results, and the initiative is not strong.

At present, there are personal behaviors in the transformation of results, that is, the technical personnel know the needs of the other party's results by themselves, and communicate and communicate with the relevant links of the achievement transformation through individuals. The normal result transformation based on the perfect market mechanism is insufficient [4].

2.3 Operational value development of scientific and technological achievements needs to be strengthened

Scientific research industry units mainly pursue the output of scientific and technological achievements, and the overall emphasis on intellectual property operations is not enough. The economic and social value of the achievements needs to be strengthened [5].

A complete professional team for intellectual property operations has not been established, and the level of professional operations such as intellectual property transactions and protection needs to be improved [6].

The energy of scientific researchers is mainly concentrated on the research and development of the results, and the lack of awareness of the layout, combination and protection of intellectual property rights during the research and development process restricts the subsequent transformation of the results [7].

3. MAIN PRACTICES OF TRANSFORMATION OF SCIENTIFIC AND TECHNOLOGICAL ACHIEVEMENTS OF DOMESTIC AND FOREIGN ENTERPRISES

3.1 Promote seamless collaboration and cooperation

There are usually two difficulties in the transformation of scientific and technological achievements: first, how can scientific research institutions timely and accurately grasp the most real and

urgent technical needs of application institutions in order to adjust the research direction in a targeted manner[8]; second, how to ensure the successful transfer of scientific and technological achievements of scientific research institutions to application institutions[9].

Through formal communication and exchanges, we can master each other's resources, needs and development trends, understand the progress of existing R&D projects, and jointly negotiate and determine future R&D projects. The leaders of the GE business unit visit the Global Research Center in New York every quarter to learn about the latest technological developments, check the progress of the project, and decide on the next R&D investment. The designated personnel of GE's research institute are responsible for liaising with the business department and stationing regularly to understand the technical needs of the business department. IBM set up an innovation service department in the research institute. Scientists in this department work directly with customers as consultants to collect actual needs and problems encountered by customers. At the same time, each IBM research field has its own researcher as a "relationship manager" to build a bridge between the research department and the product department, and is responsible for ensuring smooth communication with the product department.

3.2 Adopt market-oriented scientific research project establishment and management mechanism

In the process of research and development projects, a systematic and scientific research project approval mechanism is established to ensure the scientificity, effectiveness and smooth completion of research projects, and to make scientific research results more in line with market orientation.

For example, Siemens has organized the exchanges and cooperation of relevant personnel in the marketing, production and research departments before the project is initiated, and jointly determines the priority order and development design of the project based on factors such as market demand, economic benefits and development cycle.

During the progress of the project, personnel from all disciplines are invited to discuss regularly. Determine strategic planning on the basis of market forecasts; discover business opportunities on the basis of strategic planning; carry out projects that have passed multi-departmental feasibility verification, and constantly check whether the projects meet market needs during the implementation process.

3.3 Efficient way to transfer scientific and technological achievements

As an innovation resource, scientific and technological achievements can realize value creation through various methods such as transfer and transformation.

IBM has obtained considerable income through diversified patent operations and transfer methods. IBM licenses some idle patents that are basically unrelated to its business to other companies and even competitors to earn revenue.

For patents that are rarely used or need to be divested of related businesses, IBM directly transfers them and charges transfer fees. For technical inventions that are not protected by patents, they can also be used by others for free to maintain innovation. In 2017, IBM generated approximately \$1.2 billion in revenue from its licensing business. At the same time, IBM adopts an offensive patent strategy, actively investigating whether there is patent infringement, and reaching a transfer or licensing agreement through negotiation. Qualcomm exercises intellectual property rights in a variety of ways, cooperates with intellectual property licensing, transfer, litigation, etc., and even transfers intellectual property to intellectual property non-practising entities to maximize benefits.

3.4 Improve market transaction entities and operating mechanisms

The first is to establish a comprehensive intellectual property implementation strategy. China Aerospace Science and Technology Co., Ltd. clarifies and implements the intellectual property requirements of each node in the application, project implementation and project acceptance of various scientific research and industrialization projects, and carries out the whole process management. The coverage rate of all units' intellectual property distribution in key areas reached more than 70%. Closely integrate intellectual property rights with technological innovation, market development and brand creation. Intellectual property work runs through the entire process of research and development, production, sales and service, and comprehensively improves the level of intellectual property creation, management, protection and use.

The second is to build an information system for the release of scientific and technological achievements. Aerospace Science and Technology establishes an information system for internal and external transformation of scientific and technological achievements of the group company, integrates the intellectual property information resources of the group company and establishes a database, and improves the ability of intellectual property analysis and information

utilization. The internal platform runs on the internal website of the group to promote the efficient circulation of patented technologies and products within the group company, increase the conversion rate of scientific and technological achievements, and increase the starting point for research and development; the external platform is mainly used for the external publicity and authority of scientific and technological achievements in the main business areas of the group company release and marketing promotion.

The third is to establish an intellectual property and scientific and technological achievements transformation center. China Electric Technology has established an intellectual property center at the group level, which is affiliated with a secondary unit, which is mainly responsible for internal and external scientific and technological achievements transfer and transformation information release, external communication, policy and regulatory support, and personnel training. At the same time, carry out the entire process management of intellectual property which throughout the entire process of scientific research and structure key technologies to form a technical pedigree. Based on this, the intellectual property distribution plan is determined, which effectively improves the quality of intellectual property and provides the basis for conversion.

4. ENLIGHTENMENT AND SUGGESTIONS ON THE TRANSFORMATION OF SCIENTIFIC AND TECHNOLOGICAL ACHIEVEMENTS OF LARGE-SCALE CENTRAL ENTERPRISES

4.1 Enlightenment and Suggestions on the Transformation of Scientific and Technological Achievements of Large-scale Central Enterprises

In order to promote the smooth transformation of scientific and technological achievements, it is necessary to improve the coordination and cooperation mechanism between various units from the two aspects of strategy and operation.

4.1.1. Strategic level coordination.

The purpose of the coordination of the strategic level is to maintain the consistency of the scientific research strategies of each unit and to increase the importance of the senior management of each unit to the transformation of scientific and technological achievements.

Solve the problem of insufficient attention paid by various units to the transformation of results, and break the situation of self-closing and fighting each other in the scientific research system.

Coordinate the development of scientific and technological innovation plans. The scientific and technological innovation plan of each unit is jointly formulated by all participants, and discusses future trends, leads technology, and formulates intellectual property development strategies. Industrial units participate in the formulation of technical plans for reviewing scientific research units, and scientific research units participate in the formulation of product plans for reviewing industrial units. In this way, it ensures that scientific research units grasp the technological needs of industrial development, and industrial units clarify technological development trends to promote future cooperation between the two parties.

Establish a system of regular visits by senior leaders. Through formal communication and exchanges between the senior executives of each unit, master each other's resources, needs and development trends, understand the progress of existing R&D projects and market application requirements, and jointly negotiate and determine future R&D projects.

Establish a formal communication mechanism. By organizing regular or irregular strategic cooperation seminars to strengthen the information exchange on the latest scientific research progress and scientific research needs between the senior executives of each unit. Then, optimize the scientific research plan of the unit at the strategic level, and transform it into a cooperative project as the case may be.

4.1.2. Operation level collaboration

The purpose of the coordination of the operation layer is to match the needs of the supply and demand sides of the result transformation, promote the achievement of cooperation, and focus on solving the current problem of the asymmetry of the result transformation information and the large gap between the results and the application.

Scientific research, industrial and application enterprises shall set up special institutions or designated professional personnel to be responsible for the transformation of their own results. Application or demand companies intervene in research and development in advance. For applied science and technology projects, at the stage of topic selection and project approval, it is necessary to insist on "centering on market and user needs, scientific research serving the market, and setting up science and technology projects facing the market". Formulate a market-oriented management mechanism for the transformation of scientific and technological achievements. For applied science and technology research and development projects, we will strengthen the application and market orientation of scientific research in the whole process of project establishment, research and development, acceptance and achievement transformation. To solve the

problem of "difficult landing" in the transformation of scientific and technological achievements and make the achievements towards the application goal from the beginning, and improve the success rate of the final transformation application.

Establish a major scientific research team. In response to major scientific research needs such as UHV AC and DC, adopt the method of establishing major scientific research teams to promote scientific research and application of results. The research team is based on the project, and all the companies in the team participate in the formulation of major scientific research decisions and the review of key results. Assign specific scientific research tasks according to the professional fields and advantages of each enterprise, collaborate and jointly promote the research, development and application of scientific and technological achievements

Cooperate to establish a collaborative research and development platform. For joint research and development, the collaborative research and development platform between enterprises can be built to jointly carry out technological research and follow-up results application research and development. First, build a collaborative research and development platform based on the "Internet +" thinking. On this platform, member units can carry out their own research and development in parallel, interactively, and collaboratively around the same research and development goal. The basic data of the platform can be shared to ensure the consistency of the data source and the bottom layer of each link of research and development.

4.2 Improve the operational mechanism for the transformation of scientific and technological achievements

4.2.1. Improve the intellectual property transaction mechanism and functions.

Improve the functions of the intellectual property trading platform. Relying on the Intellectual Property Operation Center, and learning from the construction and operation model of social technology trading centers or platforms, improve the functions of platform information release, business negotiation, contract signing, and legal rights protection. At the same time, the company have to increase publicity and promotion both inside and outside to introduce more customers to the platform.

Improve the formulation of relevant systems for intellectual property transactions. Relying on the intellectual property trading platform, establish a management system for various transaction methods such as external transfer, licensing, investment, and financing of intellectual property, including rule-making, project whole-process management, technical consultation, etc.

4.2.2. Improve the operational mechanism for the transformation of scientific and technological achievements.

Scientific and technological achievements investment refers to the process in which holders of scientific and technological achievements participate in the investment in the form of capital after the scientific and technological achievements are evaluated. It is an important method of transformation of achievements.

In order to promote more investment in the company's scientific and technological achievements, and to maximize the value of the achievements, professional institutions can be established to undertake corresponding functions. It mainly includes tracking analysis of external factors affecting the purchase of shares, reasonable pricing, analysis of governance structure, risk prevention, etc., to provide professional consulting services for various enterprises.

5. CONCLUSION

The transformation of scientific and technological achievements is the "last mile" to realize the value of scientific and technological innovation, which is of great significance for enterprises to optimize the allocation of scientific and technological resources and promote the output of high-quality scientific and technological achievements.

The transformation of scientific and technological achievements involves the management of all links from strategic planning to operation management and control. It is necessary to continuously optimize the management model and related mechanisms from the strategic and operational levels, fundamentally solve the system and mechanism obstacles that restrict the transformation of scientific and technological achievements of enterprises, and enhance the ability of enterprises to create scientific and technological innovation values.

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