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Construction and operational mechanism research on management model of science and technology innovation from the perspective of public governance theory in China

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ABSTRACT

Science and technology innovation is the effective convergence of innovative resources and elements, by the way of breaking through the barriers among innovative subjects, fully releasing "talent, capital, information, technology and other elements of innovative activity" and realize the process of deep cooperation, it is a complex innovative organization. The paper is mainly from the perspective of public governance theory, uses the theory of multi-level and multi-central governance, the model of holistic and decentralized governance, based on the analysis of problems and reasons about current science and technology innovative management in our country, research the construction of management model and operational mechanism, to explore and construct management model and framework for science and technology innovation and operational mechanism, will create a favorable policy environment and social atmosphere to lay the foundation to promote its development.

KEYWORDS

Public governance; Management model of science and technology innovation; Operational mechanism.



INTRODUCTION

With the rapid development of global economy, many important scientific and technological innovations are no longer a single subject activity, but it must be more innovative subjects participating and cooperating. This determines that the model of science and technological innovation management and operational mechanism have been unable to meet the demands of the New Age, we need to carry on the research and construction under the new theoretical perspective and management conception.

The public governance theory is one of the latest frontier as the field of public administration, it is a new theory including rich content, profound connotation, and the model and operational mechanism about science and technology innovation management are also in need of advanced theory as its guidance urgently, in order to promote more efficient operation and management, give full play to its function, make a real contribution to the development of our society. Thus, it advocated the ideas of public governance about multiple subjects, multiple levels, multiple centers, network type, participating types of public management theory, it provides a new perspective for science and technology innovation management in our country.

DEFINITION OF THE PUBLIC GOVERNANCE THEORY

Connotation and characteristics of governance theory

The thought and action about governance theory have a long history, such as Lan Zhiyong and Chen Guoquan (2007)^[1] had proposed, historically dominant activities can be considered governance. But about the public governance theory, it is concerned by the international social practice and theory in 1990s, people also gradually give the more abundant content to the governance theory. From the development about the upsurge of governance theory, it initially mainly came from the World Bank and the United Nations, other international organizations, the EU as the main representative of the regional organizations, practiced the theory actively, promoted the development of the governance theory. At present, all the countries in the world whether developed or developing countries, are beginning to pay attention to the using of governance theory in the field of public management. In 1989, the World Bank began to use the word “crisis of governance” in its report at first, in 1992, world bank entitled annual report “governance and development”. The United Nations has set up a management committee, in 1995, celebrated 50 anniversary of the United Nations Commission, global governance committee had issued a “special report about Tianya Zorpia”, In 2000, the Millennium Assembly of the United Nations Secretary General report describes the global governance issues^[2]. At the same time, it also pointed out four characteristics of governance: (1) Governance is not a set of rules, is not an event, but a process; (2) The basis of governance process is not controlled, but coordination; (3) Governance not only relates to the public sector, also including the private sector; (4) Governance is not a formal system, but continued to interact with each other.^[3]

The core idea and model of public governance theory

The expert on public governance theory, Stock (Stoker, 1998) think, many scholars have put forward five main views on governance theory^[4]. (1) Governance implies a series of social public institutions and actors which is from the government but not limited to the government. (2) Governance means the existing fuzziness about boundaries and responsibilities in seeking solutions to social and economic problems. (3) Governance means existing power dependence among the social public institutions related to the collective behaviors. (4) Governance means that the participants will eventually form an autonomous network. (5) Governance means the ability to do good things, is not limited to the power of the government and the governmental issue orders or the use of authority.

Public Governance model mainly has three models—the multi-level governance, multi-center governance and network governance. Multi-level governance is “the obvious characteristics of EU structural policy, it is used to describe the ongoing negotiation system among inter-national organization, European Union, nation, regional and local government”. In 1996, America scholar, Gary Marx, in the article: “European Integration since 1980s: the National Center Theory on Multi-Level Governance”, used the conception to describe “belonging to different levels (cross-country, EU and nation) among the cooperation of governmental units, rather than hierarchical relationships”^[5]; Multi-center governance model breaks the traditional model of government management ways, and after the introduction of market management reform, further expand the governance subject, taking into account the third departments, such as public participation in governance, in fact it is more emphasizes the diversification of governance subjects; the realization of network governance pattern needs build trust and coordination mechanism among network members, and to participate in the dialogue and exchange system of network governance, mutual respect, sharing learning, and form a good public governance relationships^[6].

ANALYSIS OF PROBLEMS AND REASONS EXISTING IN THE PROCESS OF MANAGEMENT ABOUT SCIENCE AND TECHNOLOGY INNOVATION MANAGEMENT IN CHINA

At present, during the course of implementation and operation about management of science and technology innovation, its main problems are the government leading, enterprise and other institutions carry on the cooperation and achievements transformation according to the governmental leading direction, operational system is not flexible, it is lack of autonomy, seriously hinder the development of creative ability. Furthermore, government and enterprises, and the other research institutions, they do not form the efficient interaction and effective cooperative mechanism, don't give full play to

the advantages of cooperating agents. Eventually it has formed the situation about “lack of leadership, unwilling to cooperate; imbalance of interests, do not want to cooperate; thought is different, not good synergy; compartmentalization, difficult to coordinate”^[7]. We mainly analyze the existing problems and reasons from three aspects about macroscopic, mid-gradational, microcosmic levels.

Macro level

Government Focus on the Role from the Perspective of Supply, but the Policy Mechanism about Guiding Science and Technology Innovative Management is not Perfect

In the process of science and technological innovation management, the government's leading role can not be ignored, and play a very important role. But in the actual process of operation, government plays a role only from the angle of supply, such as: policy supply, providing information consulting, services and so on, but for the funding problems, technological supply and transformation encountered in the process of science and technological innovation management, if it is consistent with the demands of other research institutes, but it doesn't give related guidance. Furthermore, from the policy mechanism, although the government has introduced a variety of policies, but also further strengthen in the practical implementation of the policies, rules and the relevant interest allocation, resource sharing system, the intellectual property protection system and service system.

Intermediate level

The Existing Error and Bias about Model of Science and Technology Innovative Management and Collaborative Subjects

The main model of science and technology innovation management in our country is the type of government guiding, university leading, enterprise cooperation, joint construction, each model has its own advantages and disadvantages, can play their advantages according to the specific situations. But in the process, all the subjects, because they need broaden the sources of funding urgently, improve resources sharing, speed up the achievements transformation, often can not fully consider the advantages of subjects and majors, the characteristics of regional developing, just according to the need to conduct cooperation, choose some kinds of innovative management model, then affect efficiency of science and technology innovation management. For the cooperative agent selected, only according to their own needs of subject construction, and cooperate with enterprise or scientific research institutes, but in the process of cooperation, how to output the research results, if it can promote the development, it is not expected to plan and forecast.

Micro level

The Insufficient Ability and Power about Participating in Science and Technology Innovation Management in China

For our country itself, it has insufficient abilities participating in science and technology innovation management, lack of the connection with micro-level planning, industrial and subject cluster, has no abilities of high-level joint research. They use their own advantages in scientific research to cooperate and innovate, rather than cooperating with the other subjects to do collaborative research, their abilities of jointing research will be improved. The researching subjects, although they bear the task and responsibility of scientific research, but they need external support from the relevant departments for the achievements transformation, technological application and protection of intellectual property rights, and the institutions have not feasible policy to encourage scientific research personnel to conduct achievements transformation and technological transfer, the enthusiasm is not high. And the researchers are in the process of professional title evaluation and performance appraisal, mainly regarding the paper, the project as the assessment standard, rarely understand and use technological achievements in the practice, lack of power in participating in production-teaching-research science and technology innovative management.

PUBLIC GOVERNANCE THEORY AND THE MODEL OF SCIENCE AND TECHNOLOGY INNOVATION MANAGEMENT IN CHINA

Based on the model of multi-level governance, multi-center governance about public governance theory, the researching subjects should fully understand its role and position, should be combined with many institutions to construct science and technology innovation management platform, namely, the government, university, market, enterprise and social service system—multi-level, multi-center institutions jointly carry out the construction of scientific and technological innovation platform, so we can observe the developing trend and direction of scientific and technological innovation from the newest, the highest perspectives in the future.

Mainly from the perspectives of behavior subjects and the process, regarding “supply and demand relationship” as the link about scientific and technological innovation management among strategy subjects, “division of labor, improve efficiency” as the foundation, to create the related network among the subjects of science and technology innovation management. Among them, mainly regarding the innovative demands as the basis about university, conducting the mutual supply and transformation with other four subjects—government, market, enterprise and social services institutions about related aspects of knowledge, technology and policy, so university will conduct funding and policy supply with the government, and property rights protection and achievements transformation with marketplace, innovation and resource supply with enterprise, service policy and system supply with social service system, and to form “dynamic model about five

main body—university production-teaching-research science and technology innovation management platform,” to lay a foundation for the further strengthening science and technology innovation strength, improve the innovative mechanism, strengthening the scientific research management. (As shown in Figure 1)

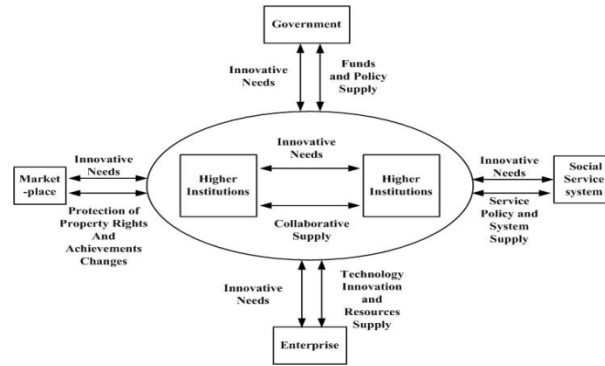


Figure 1 : Dynamic model about five main body—science and technology innovative management model in China

The operational mechanism of science and technology innovation management model in china from the perspective of public governance theory

In the operational process of science and technology innovation management in our country, namely “five main body dynamic model”, should always run through the core conception of public governance theory and the model of multi-level, multi-center governance, mainly regarding the science and technology collaborative innovation center as the leading role, co-organize technical support model as the basis, in order to make clear the task, team building, resource coordination and performance assessment—four steps to complete task goal together, and conducting mutual cooperation with the relevant policies and funding, resources supporting platform and the other team supporting platform, and ultimately jointly completed tasks of science and technological innovation about five main body dynamic model each other.

At first, in the clear mission phases, positioning the organizational roles about science and technology innovation management model, organize and complete the task of role structure, role adjustment, role clarity and role positioning, make the subjects clear role tasks, and lay the foundation for the successful completion of the tasks. Second, start to build up the team, according to the personal interests, research expertise and the needs of science and technology innovation and development, to form a strong technological innovation and management team, and give comprehensive consideration on the power structure, power sharing, power equivalence and balance of power, fully measure the power of distributional performance; Third, conducting the resource coordination about science and technology innovation management among subjects, mainly including four aspects about the structure of knowledge, technology sharing, management construction and technological innovation, so that all levels of resources can be integration and cross, to achieve the maximization of resource utilization; finally, carry out the performance appraisal, establish dynamic incentive policies, and the organization and individuals, groups and teams of science and technology innovation management platform to carry out all-round, multi-lateral assessment, will organically combine with formative and summary assessment, to further improve the strength of evaluation, and inspire the enthusiasm of the subjects about science and technology innovation management, improve the operational efficiency of science and technology innovation management organization. (As shown in Figure 2)

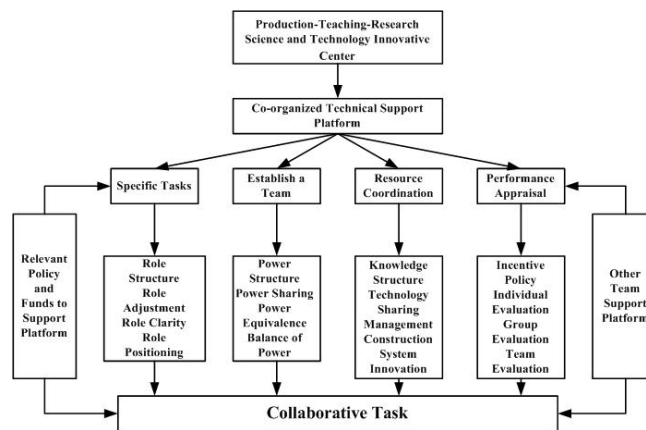


Figure 2 : Dynamic model about five main body—science and technology innovative management model

At the same time, according to two paradigm theories of public governance model, holistic and decentralized governance theory, based on the implementation of the overall macro management model of technological innovation model of governance, the implemental model of science and technology management innovation model at the Intermediate level, it is divided into two parts, namely the endogenous decentralized governance model—the internal elements of science and technology innovation management and exogenous innovative technological innovation management, the model of the internal elements of science and technology innovation management is based on four functions about personnel training in university, scientific research, social services, cultural inheritance and innovation, mainly including: (1) Collect talents and technology strength, to build the core competitiveness; (2) Construct characteristic discipline and interdisciplinary platform, to face scientific developing frontiers; (3) Create the applicable and transformation platform of scientific and technological achievements, to serve the regional economic development; (4) Construct characteristic culture inheritance innovation and system innovation system, increasing innovative vigor in university. (As shown in Figure 3)

At the same time, Through using the resources and advantages of universities and colleges, is conducive to the sharing and using of scientific and technological innovative resources, is good for communication and integration of innovative information, and improvement and increasing of innovative efficiency, and then form the gathering effect, gathering all part of strength, improve the core competitiveness. Produced centripetal force through the aggregative effect of the university and to diffuse the external environment, produce the diffusive effect, attract the external human resources, capital, technology and other advantages of technological innovation resources to the university internal system, lead to produce innovative ability, further enhance the capability of internal science and technological innovation management.

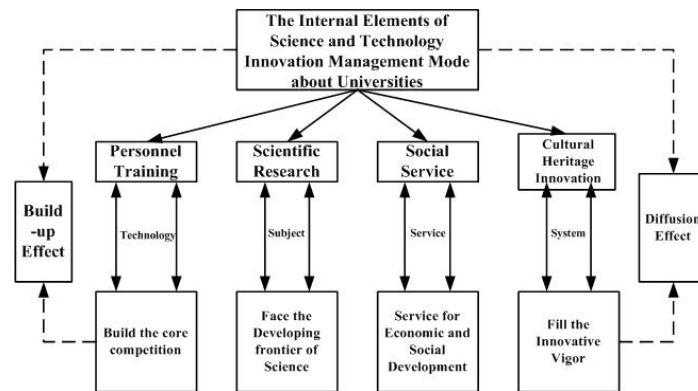


Figure 3 : Model of the internal elements of science and technology innovation management

The model of exogenous innovative organization science and technological innovation management including: (1) Government guidance, supply funding and policy support; (2) Market driven, improve the capital and technology transferring mechanism; (3) School-enterprise cooperation, safeguard the combination of theory and practice; (4) Build a carrier, support the upgrading of the industrial chain. Government should be in the light of its general trend, encourage and support science and technology innovation management cooperation, especially in the aspects of financial and policy support, implementing environment support, and makes the production-teaching-research innovation management have powerful support; The market should also be based on changes in the situation, adjust the direction of achievements transformation and technological application, provide support for putting science and technology innovation and technological achievements into practice; at the same time, universities and colleges should cooperate with enterprises, to conduct technical training, enterprise incubation, learning and practicing the output in the practice; through social service system, to set up financing, information service carrier, eventually support to upgrade the production-industry chain. (As shown in Figure 4)

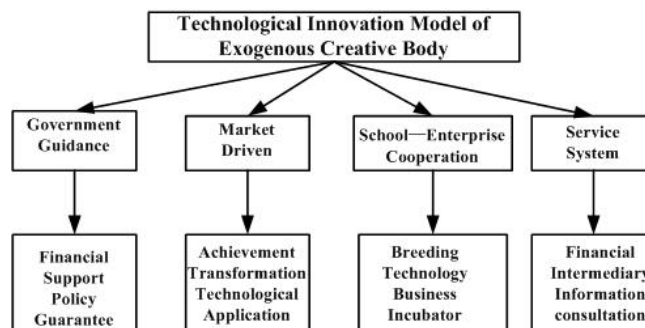


Figure 4 : Model of exogenous innovative organization science and technological innovation management

In the process of science and technological innovation management, the internal elements innovative system and exogenous innovative system implement and interact together, form internal-external coordinated developing, high efficient science and technology innovation management organization, at last, improve science and technological innovation management system and the innovative ability, give the contribution to strength national science and technological development, joint-research ability and comprehensive national power.

CONCLUSION AND PROSPECT

This paper has mainly studied and constructed science and technology innovation management model in China from the macro and medium layer, by the way of establishing science and technology innovation management—“five body dynamic model” and “the operational model of science and technology innovation management platform”, the analysis of the operation about internal elements and endogenous innovation subject of science and technology innovation management model, can further promote science and technology innovation management smoothly, and proved the necessity and feasibility of enhancing the innovative ability of our country about science and technology innovation management system. Then it can form a “spectrum”, radiate to all the aspects of the work, to achieve the cooperation of a single or several projects, and establish strategic alliance of science and technology innovation management and stable mechanism of science and technology innovation management, avoid the interest risk, so that we can complete research, output, practice and application of scientific and technological achievements in the atmosphere of harmony, cooperative, mutual helping, to maximize the interests of all subjects about science and technology innovation management. No matter for our country to improve innovative and creative capability, combined with research ability, team cooperation ability, or to promote rapid production, transformation of scientific and technological achievements in China, and to improve the ability of scientific research and innovation, it has the important meanings.

In the process of research work in the future, we can better coordinate cooperative relationship of external bodies about government, market, enterprises and social services system and institutions of Higher Education, create more powerful resources sharing environment, coordinate the benefits of each participants, improve the operational system of organization, refine the operational mechanism of each links, which lays a foundation for establishing effective production-teaching-research science and technology innovation management system.

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