

A Research on the Evolution of Science and Technology Policy in China

Zeng Jingjing, Zhong Shuhua

College of Public Administration, Huazhong University of Science and Technology, Wuhan, P.R. China, 430074

(E-mail: zjj19831014@163.com, shzhong@mail.hust.edu.cn)

Abstract Direct cooperation between the central and local governments in scientific and technological areas- what this article calls “Province-Ministry Science and Technology Cooperation” (PMSTC)– plays a significant role in areas of contemporary policy such as education, disaster response, economic development, social services, and environmental protection. Authors illustrate this evolution from the perspective of science and technology policy development. This paper proposes the China’s science and technology management mode, which has gone through two periods: the period of central governmental command oriented mode and the period of governmental conduct mode. The latter period can be further subdivided into three stages: reform stage, deepening reform stage, and province-ministry cooperation stage (also called the “science and technology governance” stage). Finally, authors concluded the paper with factors caused this evolution, namely, 1) the establishment of a partnership between the central and local governments, which is the prerequisite for province-ministry science and technology cooperation (PMSTC), 2) some scientific and technological affairs with the characteristics of the quasi public goods are the objective basis for PMSTC, 3) the scarcity, dispersion and waste of Chinese technological resources are the practical requirement for PMSTC.

Key words Province-ministry science and technology cooperation (PMSTC); National-regional; Science and technology governance

1 Introduction

Reaches adopted the multi-level governance mode as the overall framework to explore the participatory governance on S&T (Macleod, 1996^[1]; Lyall, 2007^[2]). The term “multi-level governance” was first described as a theoretical framework to identify the roles played by diverse actors on the European policy stage (Marks et al, 1996^[3]; Sloat, 2002^[4]; Bache and Flinders, 2004^[5]). The regional boundaries and dissimilar institutions confer on European countries a distinguishingly innovational system that affords multiple opportunities to interact among the different levels of governments. For some European countries, such as Finland, Scotland, UK, regional policy actors are playing increasingly the significant roles in the governance of S & T where the science policy was previously in the hands of central government (Charles et al, 2004^[6]; Sotarauta et al, 2007^[7]; Parsons, 2001^[8]). Therefore, national governments which desire to reinforce the S&T capacity at the local level must build policy network to advance multi-level governance and communication and cooperation with localities (Cooke et al, 1997^[9]; Cooke, 1998^[10]). This situation underlines the need for multiple levels to work cooperatively to deploy more holistic solutions to complex policy problems (Newman, 2001:59^[11]).

2 Early Days after the Founding of New China: The Period of Central Governmental Command Oriented Mode (1949-1977)

China has reconstructed its own scientific and technological management system by learning from the “Soviet Mode” since the 1950s with the characteristic of central planning. All the public institutions including schools, hospital, libraries and all the national causes of science, education, culture and health are all directly controlled by the central government. The Chinese scientific research institutes have adopted a system whereby the director assumes overall responsibility under the leadership of the Party committee. In these cases, scientific activities were limited to certain public institutions, called “five front armies” (figure 1), research unit expenditure allowances were allocated only by the central government.

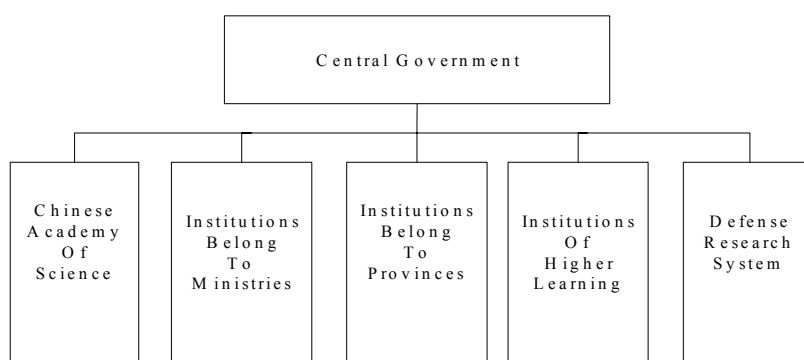


Figure 1 R&D System in the Early Days after the Founding of New China

3 Reform and Opening-up Period: Governmental Conduct Mode (1978-early 21st century)

3.1 Reform stage (1978-1991)

Since reform and opening-up policies have been implemented in China, profound changes have been taking place in the government science and technology management mode. However, there are still some problems existing in this management mode: the separation between science and economy, the barriers in commercialization of scientific and technological achievements, and scientific researches lacking of harmony.

To deal with the outstanding problems existing in the scientific and technological management mentioned above, the CPC Central Committee has promulgated “Decision on Reform of the Scientific and Technological Structure”, which has mainly focused on coordination between the economic structure and the scientific and technological structure.

3.2 Deepening reform stage (1992-2000)

Marked by the 14th Central Committee of the CPC as well as the speech Deng Xiaoping gave during his whirlwind tour of south China in 1992, China has entered a new period of deepening the reform of scientific and technological systems. The major contents of the reform included another two decisions: “Decision on Accelerating Progress in Science and Technology” (1995) and “Decision on Quickening Technology Innovation, Developing Advanced Science and Technology and Accomplishing Industrialization” (1999). In this period, the cooperation between the central and local governments mainly focused on basic science and education projects such as co-construction of universities and laboratories.

4 Province-ministry Cooperation Stage (2001-present): Science and Technology Governance

Since the 21st century, Chinese economy has been experiencing sustained and rapid growth, and China has also made extraordinary progress in knowledge and technology over the recent decades. However, the growth of GDP is not a good measure of environmental or social progress. Social development has still lagged behind economic development as a result of environmental pollution, ecological destruction, soil erosion, desertification, problems of biodiversity and so on. How to make the scientific and technological development promote economic and social sustainable development is an important task for Chinese government. In addition, speaking from an international or global perspective, the cooperation between the national and local governments is showing a tendency of rising. This phenomenon has sometimes been described as “new federalism,” “intergovernmental politics,” “intergovernmental management,”^[12] “intergovernmental system” “policy networks,”^[13] and “boundary-spanning management”. Meanwhile, with the development of some theories—economic globalization, global governance, new public management, the third sector participation in public decision-making and the request of decentralization reform—the concept of intergovernmental cooperation has got the widespread attention and become the new trends of the PA study.

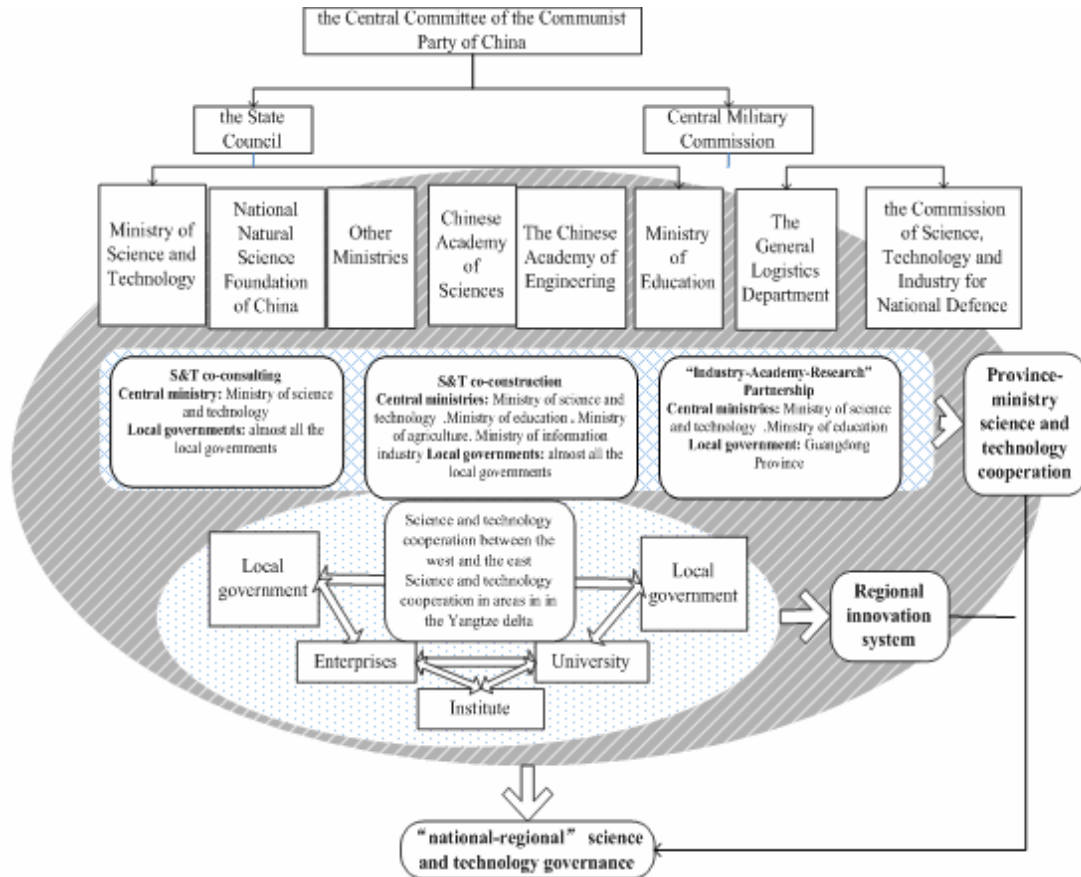


Figure 2 National—Regional Science and Technology Governance

Under these special circumstances and conditions, the Chinese government issued “State Plans for Medium and Long-Term Development of Science and Technology (2006-2020).” The keyword of this plan was “independent innovation,” and the goal of this plan was to construct a “national innovation system”; accordingly, the construction of a “regional innovation system” has also been put on agenda. However, province-ministry science and technology cooperation (PMSTC), as a connection between “national innovation system” and “regional innovation system,” was officially launched (fig 2).

5 Conclusion

There are three factors caused by the abovementioned evolution: first, the establishment of a partnership between the central and local governments; second, some scientific and technological affairs with the characteristics of the quasi public goods; third, the scarcity, dispersion and waste of Chinese technological resources.

5.1 The establishment of partnership between the central and local governments

Since 1949, China basically set up the highly centralized socialist system, which had suppressed the zeal of local authorities. Chinese governments have repeatedly placed too much emphasis on ensuring centralism and unification by the Party, and on combating decentralism and any assertion of independence. Since China introduced reform and opening policies, the economy has become more and more market-oriented, which surely had to change the highly centralized relationship between the central and local governments. To stimulate the people's initiative, the most important thing is to delegate power to lower levels, especially local governments.

Since the 21st century, Chinese society has entered an entirely new age of information and knowledge-based economy, in which social problems have seemed increasingly limitless. Confronting these social problems, a local government which at one time successfully dealt with these problems individually can not succeed with these same tactics again. It seems clear that public social problems are related to both the central and local governments. These two authorities have closer relative relations than ever before, for they have to face similar external circumstances and pressures.

5.2 The scarcity, dispersion and waste of Chinese technological resources

Strictly speaking, scientific and technological resources comprise S&T human resources, S&T financial resources, material resources, information resources and other relevant resources. And now, we choose R&D expenditure as the measure of the input of science and technology.

In China, the ratio of R&D to GDP was less than 1.34% until 2005. According to latest IMD world competitiveness yearbook published in May 10, 2007, the ratio of R&D to GDP in China ranks 24th in the world, which lags far behind technologically advanced countries such as the USA and Japan.

Alongside the scarcity of Chinese technological resources, viewed overall, many wasteful problems still exist-- blind investment, irrational and redundant construction and ineffective input.

5.3 Some scientific and technological affairs with the characteristics of the quasi public goods

Generally speaking, all scientific and technological projects can be divided into three categories according to their nature: public goods, private goods and quasi public goods. Basic research and military science belong to the public goods which should be provided by government – especially the central government. On the contrary, the results of efforts produced by company or private enterprise belong to the private goods which should be provided by these companies.

However, a great many scientific and technological projects intermediate between public goods and private goods, such as environmental pollution, ecological destruction, soil erosion, desertification, problems of biodiversity and so on. These problems, featuring a wide range of regions, long-term, and substantial risk, should be solved by governments at all levels as well as the other organizations involved. You can see these projects as follows: South-to-North Water Transfer Project and Three Gorges Project.

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