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Author

GUO, Rong

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Key Players and the Nature of Their Interactions in Chinese STI Resource and Budgetary Allocations

GUO Rong

The formation process of China's S&T budget is complex, including both formal and informal components. It involves multiple ministries and actors vying for a limited pool of resources, each playing a different role in the budget creation. While the process is not completely transparent, a look into it reveals both similarities and stark differences from the U.S. budget formation process.

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China's budget expenditure for science and technology (S&T) continues to scale upwards, as it has done continuously since 2001. Its growth exceeds that of China's gross domestic product as well as most other Chinese central government budgets. Experiencing only periodic minor decreases, China's S&T budget's share of total central government expenditures rose from 7.7 percent in 2001 to 12.32 percent in 2011 (see Figure 1).

THE FORMAL S&T BUDGET FORMATION PROCESS

In 1998, when the State Science and Technology Commission (SSTC) transformed into the current Ministry of Science and Technology (MOST), the budget formation process also underwent significant changes. Prior to 1998, the SSTC played a large role in coordinating the S&T budgets of various ministries and other central bodies. During that period, planned S&T budget expenditures were first sent to SSTC, which then sent back recommendations to each ministry after a comprehensive review of the budgets.

In 2000, a new budget system was established, giving each ministry more control over its own budget and shifting the consultation role from the SSTC (or MOST) to the Ministry of Finance (MOF). Concurrently, the "twice-report, twice-relay" (两上两下) principle was introduced, which continues today. Under this principle, an initial budget is created by each ministry based on S&T needs forecasts, targets set in China's Medium-to-Long-Term Plan for the Development of Science and Technology, the national S&T five-year plans, and annual project targets. This budget is submitted to MOF, where it is reviewed and considered in conjunction with other ministries' budgets. MOF then sends back (relays) new target budget limits to the ministries, which revise their initial budget and submit (report) to MOF. This second budget is then submitted by MOF in the Central Government Budget Report to the

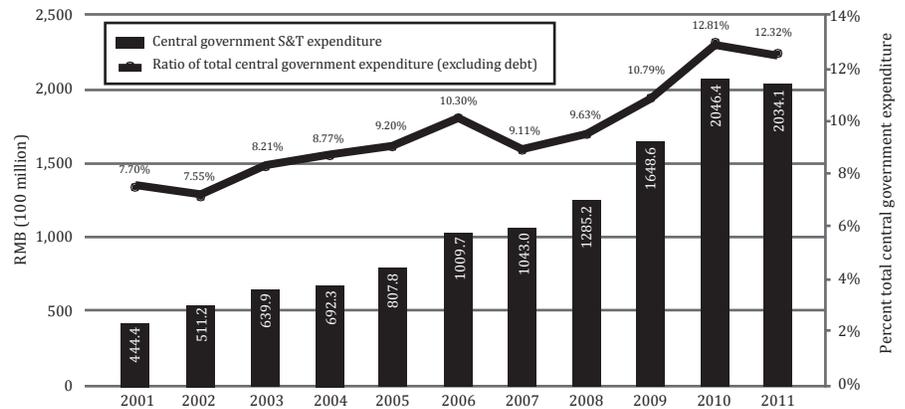
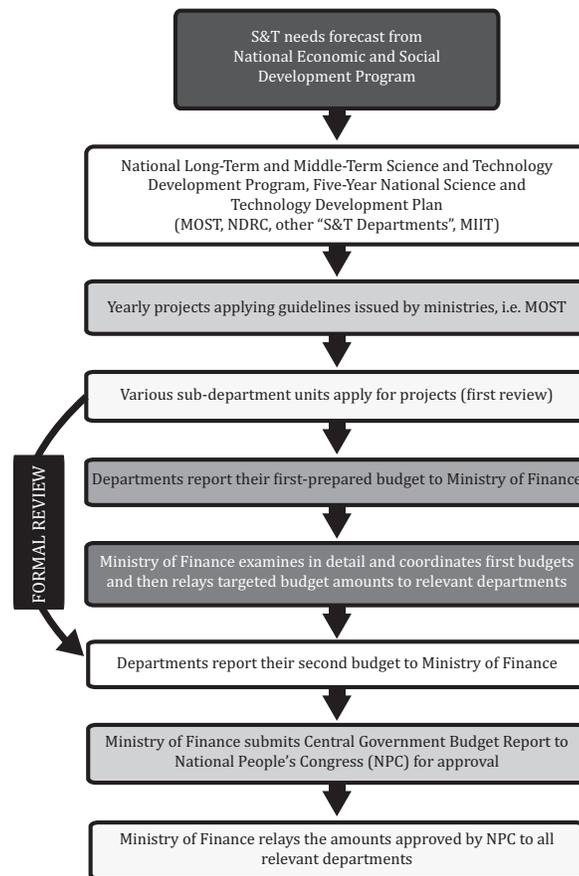


Figure 1. Central S&T budget and expenditures

National People's Congress (NPC) for approval. Approved amounts are then relayed back to each ministry. Figure 2 provides a simple diagram of this process.

Within the planning process, there are two categories of financial management: plans (计划) and projects (项目). Projects are often short-term and seem to be more subject to budget negotiations and cuts. Plans, such as the 863 and 973 Programs and Project 211, along with China's megaprojects, on the other hand, all have stable funding streams through the central S&T budget.

Figure 2. The formal budget formation process



THE INFORMAL S&T BUDGET FORMATION PROCESS

Informal exchanges also play an important role during the budget formation process.¹ Following budget submission, formally ministries are completely detached from the final review process (for example, MOST would never send observers or lobbyists to a NPC budget hearing), but informally coordination between ministries and budget-setters occurs often.²

While few open examples of lobbying were provided, two brief instances were mentioned. First, during the transition from SSTC to MOST in 1998, MOST officials lobbied MOF officials through a variety of informal avenues. Second, the launch of the 863 Program in 1986 resulted from informal lobbying. Hoping to strengthen China's high-tech capabilities and begin various targeted high-tech projects, SSTC embarked on a two-track process of utilizing official ministry avenues as well as the influence of four influential scientists, who communicated directly with Deng Xiaoping.

MINISTRY ROLES IN THE BUDGET FORMATION PROCESS

Despite the existence of a centralized S&T ministry, China's S&T budget is very fragmented. In fact, MOST received only 10–11 percent of the 2011 S&T budget allocations (a decrease from 17 percent in 2001). Government ministries and central bodies that receive S&T funds include MOST, Chinese Academy of Sciences, Chinese Academy of Engineering, Chinese Academy of Agricultural Sciences, the China Association for Science and Technology, National Natural Science Foundation (NSFC), National Planning Office of Philosophy and Social Science, Ministry of Education, Ministry of Health, and Ministry of Industry and Information Technology (MIIT). It is believed that approximately 50 percent of S&T expenditures went toward military defense.

As illustrated in Table 1, management of S&T projects is distributed among several different ministries and organizations.

Specific roles of bodies under the State Council include the:

- *Leading Group of National Science, Technology, and Education (State Council)*: Responsible for studying and reviewing national S&T and education development strategies along with significant policies. Forms the core of China's S&T policy.
- *Ministry of Science and Technology*: Along with the Leading Group, MOST forms the core of China's S&T policy. It holds primary responsibility for leading development of S&T plans and policies and oversees implementation of S&T development. MOST does not have its own research institutes except for strategic research institutes, and it does not have budgets for its individual units. Instead, its budget comes through funds for projects and plans. It most often engages in projects that involve intersecting fields, particularly ones involving multiple ministries.
- *Ministry of Finance*: Holds authority for reviewing, examining, and approving ministries' annual budgets. It also formulates budget allocation policies and

Table1. Management of S&T projects

Name	Total Number	Initial Year	Managing Organization
National Labs	6 (as of 2012)	2006	Ministry of Science and Technology
National Key Labs	260 (as of 2012)	1984	Ministry of Science and Technology
Knowledge Innovation Project Base	10 (as of 2008)	1999	Chinese Academy of Science
985 Project	39 (as of 2011)	1998	Ministry of Education (leading 35 universities) Ministry of Industry and Information Technology (leading 3 universities) Central Military Commission (leading 1 university)
National Engineering Technology Research Centers	327 (as of 2012)		Ministry of Science and Technology
National Engineering Research Centers	127 (as of 2009)	2007	National Development and Reform Commission
National High and New Technology Development Zones	105 (as of 2012)	1988	Ministry of Science and Technology National Development and Reform Commission

financial management policies concerning the use of special fiscal funds and tracks the effectiveness of special funds. MOF holds fiscal oversight for S&T funds' use in project execution.

- *National Development and Reform Commission (NDRC)*: Draws up national economic and social development program including technological programs. NDRC supports the commercialization of high-tech developments and coordinates and manages S&T infrastructure construction.
- *Ministry of Industry and Information Technology*: Takes the leading role in megaprojects. MIIT also works on structural reform in traditional industries.

In addition to fragmented allocation between multiple ministries and organizations, financing the S&T budget is also divided between various sources (see Figure 3).³

LOCAL S&T EXPENDITURES AND BUDGETS

In addition to the central component of the S&T management system, local governments play a major role in managing S&T funds. This includes provinces, autonomous regions, municipalities, and their respective counties and cities. The management model follows the same pattern as the central government, but localities are often charged with implementing the broad directives issued by central ministries and bodies. Previously averaging about 60 percent of the size of central S&T budgets, local S&T expenditures increased dramatically in 2007 to be near equal to central budgets (Figure 4).

ISSUES IN S&T BUDGETS

Despite the “twice-report, twice-relay” process of forming budgets, fragmentation, repetitiveness or overlap, and waste remain major concerns on S&T projects.⁴

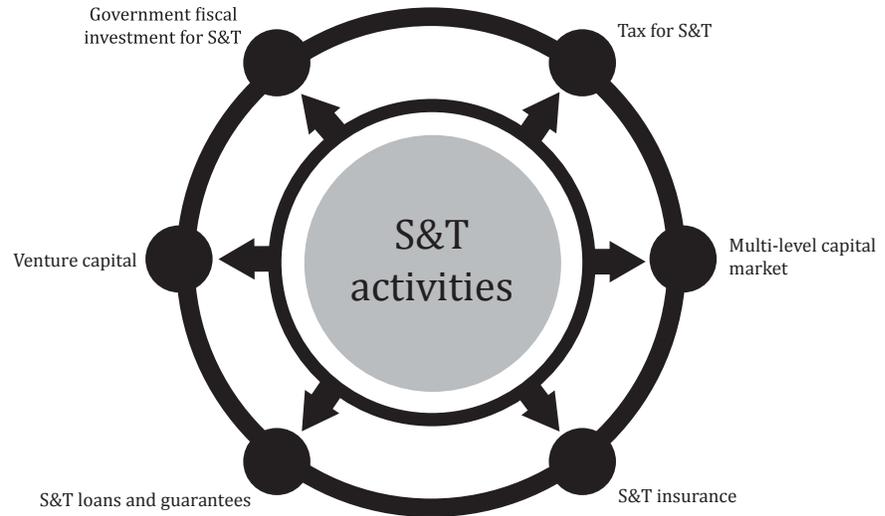


Figure 3. Financing for S&T activities

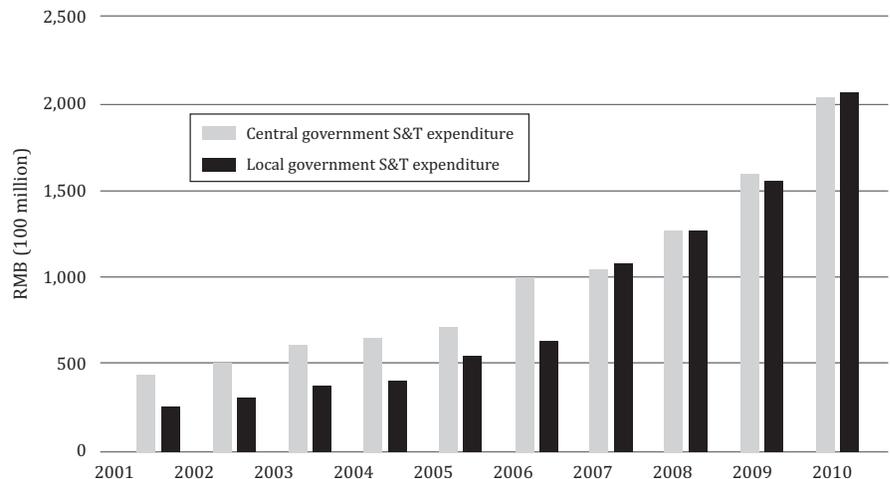
The misleading nature of official research and development (R&D) statistics has also been raised as an issue. Current R&D statistics do not include education expenditures, despite education expenditures including R&D funds spent on university research—a sum of approximately 30 billion RMB. R&D statistics are also only provided in aggregate. This is partially misleading, since over the past few years, the S&T budget has increased, but the increase has been primarily led by a few projects/organizations such as the 973 Program and the NSFC.

A fundamental characteristic of China's S&T structure is its continuance of the Soviet pattern of public ownership. During the transition

process, most of China's innovation system, especially its research component, was government supplied. With the exception of a small number of private enterprises such as Huawei, most leading industry enterprises were publicly owned. Whether these publicly-owned enterprises should receive their funds from the government or from private investments is a key issue that still needs to be resolved.

China's S&T budget targets have undergone a significant change. S&T expenditures now are targeted to “bare” research funding and do not include administrative or labor costs. Competitiveness is also now part of the allocation process—a change

Figure 4. Local and central government S&T expenditures, 2001–2010



that has brought many benefits but continues to be a sensitive issue. The benefit comes from the incentives provided through competition, but it has caused many research institutes and even some research fields to be shut down. Some worry that this may negatively impact the innovative vitality of China's research enterprise.

These issues, along with others, will continue to drive Chinese policy discussion on S&T budgets and expenditures.

Endnotes

1. This section draws heavily on comments by Chinese participants in the Q&A session that followed the presentation.
2. One participant noted that MOST and MOF had a very close relationship in "perfect harmony" (水乳交融), and that relationships between other ministries would be similar.
3. The level of importance of the different sources was not discussed.
4. One Chinese participant noted that the Leading Group on National

Science, Technology, and Education should lead in addressing these challenges, but currently it is not doing enough to solve the problem.

GUO Rong is a member of the Chinese Academy of Science and Technology for Development.