

International Comparison and Policy Options of Scientific Research Budget Management Model

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Abstract The article analyzes the scientific background of scientific research funds budget management, making international comparison scientific research funds management model of the United States, Japan, Germany and China from budget preparation, budget implementation, budget adjustments and budget monitoring four aspects. On the base of summary and draw on international experience, On performance and quality and usefulness of goal-directed, flexible, realistic and substance to form as a matter of principle, study our scientific research budget management policy choices.

Key words Scientific research; Budget management; International comparison; Policy options

1 Introduction

With our increase of invest in science and technology, the inefficient use of scientific research funding caused thinking about policy of scientific research funding management. The key of scientific research fund management is scientific research fund budget management, Analyze the scientific research budget management, which has great significance in theory and practice.

At present, our scientific research budget management has a series of problems, which is incompatible with the scientific research.

1.1 Complex in scientific research funding management

Our scientific research channel variety of sources. Various department, provincial or municipal organizations and scientific research association invest in scientific research, formulated the related regulatory policy, caused the complication of scientific research funding management.

1.2 Rigid in scientific research funding budgeting

Our present related policy set too detailed in the range of scientific research expenditure, provision the proportion of expenditure too rigid, ignored the research project specific requirements, which lead to rigid in scientific research funding budgeting.

1.3 Research projects cannot consistent in fund

Large numbers of departments ignore the development of objective laws; emphasize Shorten the period for use of scientific research fund. In some departments, research projects cannot consistent in fund, lead to “money wait for projects” or “Project wait for money”.

2 International Comparison of Scientific Research Funds Management Model

2.1 International comparison of scientific research funds budget preparation

2.1.1 Budget preparation of U.S.A: Department establish, Congress approve

In the United States, many departments have their own R & D program, their project of R & D can be self-contained, include projects, budgeting, implementation, evaluation. However, it's technology and development activities are mainly supported by the federal government and industry. The department proposed funding plan according the project demand, approval by the Congress into the annual budget.

2.1.2 Budget preparation of Japan: Strict formulation of the government

Government of Japan attaches great importance to budget management of science and technology projects, preparation of annual budget formulation strictly. Japan's scientific research funding mainly consist of delivery operating costs and competitive research funds. Delivery operating costs mainly used for personnel expenses and operating expenses, competitive research funds generally divided into direct and indirect financial expenses.

2.1.3 Budget preparation of Germany: Completed by the Federal Bureau of Statistics

Germany's annual public education budget prepared by the Federal Bureau of Statistics completed, including education and scientific research expenditure. It's scientific research funds budget use the internationally accepted statistical methods as much as possible, the distribution of expenditures in education and research within the framework of a planned, clear division of different parts of the budget, to avoid duplication.

2.1.4 Budget preparation of China: The project leader applicant, government approval

China's scientific research funding application and budget preparation is executed by the project leader. The project leader to prepare topics budget and expenditure budget funding at the same time, relevant government department in charge of science and technology evaluation and assessment of budget approval.

2.2 International comparison of scientific research funds budget execution

2.2.1 Budget execution of U.S.A: mainly project contract performance

The U.S. government adopted the Research budget execution mode mainly project contract performance, which Characterized Explicitly included Project implementation costs of necessary in the budget, Review of the budget was adopted as the fundamental basis for execution of the contract.

2.2.2 Budget execution of Japan: government legislation guide

The Japanese Government formulated the "Basic Law of Science and Technology", "Science and Technology Basic Plan". On this basis, the provincial department formulated the annual "Key to guide the direction of science and technology", provides policy guidance for the strict implementation of research budget.

2.2.3 Budget execution of Germany: technology and business guide

Germany's science and technology system on the base of science and business, supplemented by state and government. It is more flexible system, the government engaged in coordination. Science and technology management mainly charged by the Federal Ministry of Education Science and Technology, the federal government ministries, the German Research Association, Industrial Research Associations in the management of four departments together.

2.2.4 Budget execution of China: scientific organizations and the project leader execute

China's scientific research funds budget mainly rely on scientific organizations and responsible person execute. Scientific organizations execute management, control and supervision, responsible person execute autonomy within the budget, liability issues on the completion of the task.

2.3 International comparison of scientific research funds budget adjustment

2.3.1 Budget adjustment of U.S.A: determine by the policy and research projects

The U.S. government determines the adjustment of research funding according the technology policy and priority of science and technology projects. Congress authorized legislation to establish the size of the total budget and Individual research organizations' increase of the budget in the future. Scientific research fund adjust the budget for research institute.

2.3.2 Budget adjustments: determine by government regularly check the progress of the project

In Japan's research budget implementation process, there is a comprehensive system of research funding budget adjustments. Research budget adjustments required by the consent of government authorities. The progress of science and technology projects should to be regularly checked, Problems discovered should make timely adjustments proposed as the reference to budget for next year.

2.3.3 Budget adjustments: government entrust a professional organization

In Germany, the government usually commissioned professional organization to operate scientific research funding management. Budget adjustments always charged by Federal Research Department. However, usually the Federal Research Department commissioned 14 "project coordination and management unit" set up by different areas to execute professional in the field of project management.

2.3.4 Budget adjustments: responsible person decelerate according to procedure

In China, the science and technology projects are complex, budget allows for some adjustment between subjects. Larger adjustment, the implementation after approval by the project leader; small adjustment, just report detailed and confirm in subjects concluding summary or acceptance report.

2.4 International comparison of scientific research funds budget monitoring

2.4.1 Budget monitoring: national legislation, combined with external oversight and internal control

In the United States, the system is so complete from the national legislation, external oversight to the internal control, has formed a complete and mature research budget oversight mechanisms. Budget monitoring start from the application of the scientific research funds, guarantee the smooth implementation of the project and the proper use of research funding through rigorous project application and review.

2.4.2 Budget monitoring: combination of budget management and project evaluation

In Japan's research budget implementation process, there is a comprehensive evaluation of the project budget management system and budget oversight mechanisms. In the process of budget execution, Governments also have a special system of state auditors to monitor science and technology funds as well as strict management and evaluation by the organization and the higher authorities.

2.4.3 Budget monitoring: government improve through legislation

Germany has a comprehensive assessment and monitoring system in the research budget management, and the specific content and requirements should to determine with the form of law. From the project application approval, subsidized organization and research organization, the project leader or subject leader both execute management, inspection, assessment, funding, monitoring content in accordance with the contract.

2.4.4 Budget monitoring: funds final accounts and approval

China's budget monitoring mainly funds final accounts and approval, launches by the form of topic annual funds final accounts, the intermediate stage appraisal and ties forms and so on topic approval, Mainly implements the budget monitoring by the government and expert group commissioned, essentially linear form of regulation.

3 Result

As mentioned above, The scientific research funds management model of the United States, Japan, Germany, China has different features due to different background, their features of scientific research funds management mainly summarized to Budget Preparation, Budget execution, Budget adjustments, Budget monitoring. International comparison of scientific research funds management model is as shown in the table 1:

Table 1 Comparison of Scientific Research Funds Management Model about the United States, Japan, Germany and China

Construction	Budget preparation	Budget execution	Budget adjustments	Budget monitoring
U.S.A: Project Model	Department establish, Congress approve	Mainly project contract performance	Determine by the policy and Research projects	National legislation, combined with external oversight and internal control
Japan: Centrally coordinated Model	Strict formulation of the government	Government Legislation guide	Determine by Government regularly check the progress of the project	Combination of budget management and project evaluation
Germany: Federal decentralized Model	Completed by the Federal Bureau of Statistics	Technology and business guide	Government entrust a professional organization	Government improve through Legislation
China: Take the Project as the core	Responsible person applicant, government approval	Scientific organizations and responsible person execute	Responsible person decelerate according to procedure	Funds final accounts and approval

4 China's Scientific Research Budget Management Model Policy Options

4.1 Target guiding of China's scientific research budget management

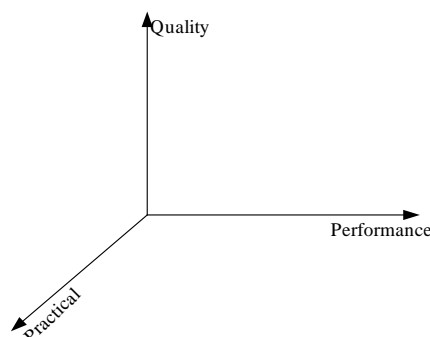


Figure 1 Target Guiding and Principle of China's Scientific Research Budget Management

Mention to China's scientific research budget management, we can focus on the target guiding from three dimensions including performance, quality, practical, specific ideas in Figure 1.

As mentioned in figure 1, performance refers to clear the output and the specific investment effect of research funding through performance evaluation, quality refers to Rational value and significant effect of research project, practical refers to contribution of research funding in basic research field and application study field.

4.2 China's scientific research budget management model policy options

China's scientific research budget management model policy options can expand from four aspects, such as budget preparation, budget execution, budget adjustment and budget monitoring, Specific ideas in Figure 2:

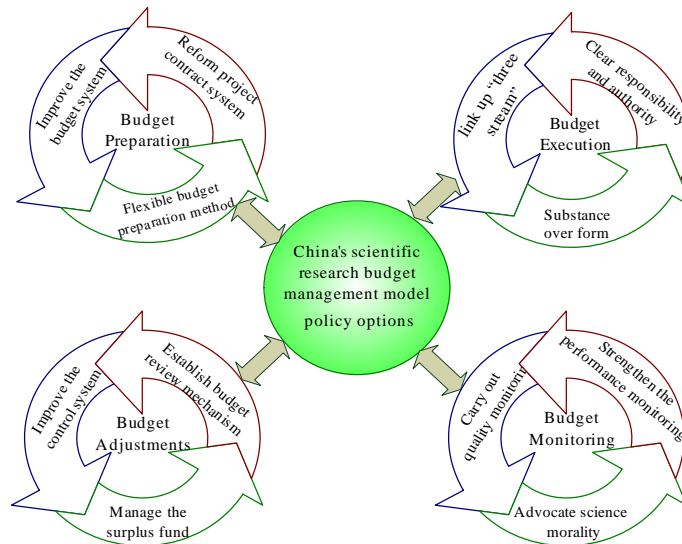


Figure 2 China's Scientific Research Budget Management Model Policy Options

4.2.1 Policy options of scientific research funds budget preparation

Refer to budget preparation, we can gain inspiration as follows: Reform project contract system; Improve the budget system; Flexible budget preparation method.

4.2.2 Policy options of scientific research funds budget execution

Refer to budget execution, we can gain inspiration as follows: Clear responsibility and authority of scientific research funds budget Management; Realizes link up “business stream”, “fund stream”, “information stream”; Insist accounting system for scientific research with the principle of substance over form.

4.2.3 Policy options of scientific research funds budget adjustment

Refer to budget adjustment, we can gain inspiration as follows: Establish budget review mechanism; Improve the scientific research management control system; Reinforce the management of scientific research surplus fund.

4.2.4 Policy options of scientific research funds budget monitoring

Refer to budget monitoring, we can gain inspiration as follows: Strengthen the performance monitoring; Carry out quality monitoring; Advocate science morality.

5 Conclusion

Through the international comparison of scientific research funds management model, further research China's scientific research budget management model policy options, we can provide the overall direction and the concrete mentality for the research management transform the research spending budget management model, formulate and revise research management policy.

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