Evaluating National Research and Development Programs in Korea

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Abstract

Given the increasing significance of government-funded research and development (R&D) programs in Korea, the importance of an efficient overall coordination of those programs based on the objective evaluation seems certain to increase. This paper introduces how government-sponsored national R&D programs are evaluated in Korea, and addresses current issues encountered in process of evaluation. We finally propose a reform measure for the improvement of evaluation practice.

Introduction

As the importance of science and technology (S&T) for the socioeconomic development increases, the government expenditures on research and development (R&D) in Korea has also been enhanced substantially during the past 10 years. For instance, 4.8% of the total government budget is drawn to R&D investment in 2004, compared to 2.8% in 1995. With the growing amount of government-sponsored national R&D programs, the efficient allocation of limited government budget on those programs has been a matter of primary interest to the policy decision-makers in Korea. In order to increase the efficiency and effectiveness of national R&D programs, Korean government has actively evaluating over two hundreds national R&D programs funded by the government every year since 1998.

This paper introduces how government-sponsored R&D programs are evaluated in Korea. We also address current issues and problems raised by stakeholders in process of evaluation and offer possible solutions for improvement of future evaluation practice. We hope that this informative article on evaluation system in Korea will convey some meaningful insights to policy makers in this area from other countries as well.

Evaluation Practice

Overview

In May 1997, the Korean Government enacted "Special Law for S&T Innovation" and began to perform 'survey, analysis and evaluation' of national R&D programs according

to this law. Later, in 1999, the Ministry of Science and Technology (MOST) of Korea introduced 'pre-budget coordination' procedure and finished framing 'overall coordination' system of national R&D programs. At the same time, Korean government organized National Science and Technology Council (NSTC) in 1999 to support these activities. NSTC has been a leading organization in the field of S&T in Korea since then, and it especially manages and supervises the 'overall coordination' of national R&D programs funded by the government.

Evaluation practice in Korea should be understood under the framework of the 'overall coordination' system. The 'overall coordination' refers to the overall efforts to derive the global or national optimum through the process of the investigation, the adjustment and the compromise of conflicting interests arising from all interested parties. The 'overall coordination' of national R&D programs in Korea comprises of two main procedures. The first is the 'evaluation' procedure. In this procedure, the performance and validity of all government-sponsored R&D programs are carefully measured and evaluated by experts in this field. The evaluation procedure usually starts at March and end by May of the year. The second, 'pre-budget coordination', is the planning procedure and the order of programs that government should support at the following year is decided based on the significance of the programs and the results of the evaluation procedure. This procedure is carried out between June and July, followed by the evaluation procedure. Given that the objective 'evaluation' is the prerequisite for the efficient 'pre-budget coordination', and, further, the success of 'overall coordination' of national R&D programs in general, the importance of evaluation procedure cannot be overstated.

While NSTC draws up a general plan for the overall coordination of national R&D programs including evaluation, the actual evaluation practice is carried out by the Korea Institute of S&T Evaluation and Planning (KISTEP). The Korean government set up a specialized agency, KISTEP, in 1998 with the responsibility for the evaluation and planning of national R&D programs. KISTEP has played a key role in providing impartial and objective evaluation to government departments.

Classification of R&D programs and subjects of evaluation

The R&D programs in Korea are divided into four broad groups based on economic and social perspectives, rather than technological perspectives. These are further classified as twelve sub-groups. Table 1 summarizes the classification of R&D programs.

Table 1. Classification of R&D programs in Korea

Groups	Sub-groups
R&D programs for basic, public and welfare technology	Mission oriented basic technology
	Public technology
	Welfare technology
R&D programs for industrial technology	Short-term industrial technology
	Mid and long-term industrial technology
R&D infrastructure	International cooperation
	Development of human resources

	Infrastructure
Supporting for research institutes	National laboratories
	Government supported research institutes for basic technology
	Government supported research institutes for industrial technology
	Government supported research institutes for public technology

KISTEP usually evaluates above R&D programs directly related to S&T. It, however, does not include the following items as the subjects of evaluation: (i) personnel expenditures and utility and facility costs in government-sponsored institutes and national universities, (ii) secret military R&D programs, and (iii) expenditures related to survey and research on policy, program planning and decision-making in R&D institutes.

Evaluation committee

There is one committee in each sub-group of R&D program in Table 1, leading to the total of twelve program evaluation committees. It is these twelve evaluation committees that carry out actual evaluation practice. Each program evaluation committee is made up of about twelve members including civilian expert panels who recommended by related government departments that will be evaluated and staffs of NSTC. To maintain objectivity, experts who are directly involved in particular programs evaluated are not allowed to become evaluation panels.

Twelve program evaluation committees are supervised by one head committee that examines and confirms the final evaluation results submitted from each evaluation committee. Head committee consists of about twenty people including civilians from NSTC and chairman of each program evaluation committee. In addition, the secretariat that consists of staffs of KISTEP and specialists suggested by government departments help a smooth and efficient evaluation process.

Evaluation criteria and methods

Evaluation panels evaluate R&D programs based on three major criteria: validity of program contents, efficiency of program management, and effectiveness of program results. Especially, each program evaluation committee determines the criterion regarding the effectiveness of program results (i.e. output and outcome) depending on its own nature and characteristics of the program evaluated. The detailed questions panels usually ask in evaluating programs are reported in Table 2.

Table 2. Evaluation criteria

Criteria	Key questions
Validity of program contents	• Are aim and scope of the program appropriate? • Does the program feature contemporary economical and social environments?

	• Are sub-projects in the program not overlapped one another?
Efficiency of program management	• Does the detailed practice plan of the program set up systematically and strategically? • Is the conduct of the program efficient? • Does the program procedure concur with the practice plan? • Is the program carried out in cooperation with other stakeholders? • Is the budget for the program spent and distributed in an efficient way? • Are mistakes pointed out at the previous evaluation and pre-budget coordination procedure corrected?
Effectiveness of program results (output and outcome)	• Does the program reach the main purpose for the appointed fiscal year? • Will the program be able to attain the final goal of the program in the future? • What are the scientific and technological achievements? • How effective the program is in nurturing human resources in R&D? • How effective the program is in building R&D infrastructure? • Does the program contribute to the strengthening of industrial competitiveness of the country? • Is the program conducive to the promotion of public welfare? • Are the research activities in R&D institute suitable for its given mission?

Once the evaluation committees score each program evaluated according to the above criteria, they give each program the final grade using 'relative evaluation' approach based on the percentile. In addition, the panels draw up an opinion and prepare the written evaluation report for each program. The final grading is classified as five or three groups. Table 3 shows the grading system.

Table 3. Grading system

Number of classification	Grading
5 groups	A (highest ≥ A ≥ 90 %), B (90 % > B ≥ 70 %), C (70 % > C ≥ 30 %), D (30 % > D ≥ 10 %), E (10 % > E ≥ lowest)
3 groups	Excellent (highest ≥ Excellent ≥ 70 %), Ordinary (70 % > Ordinary ≥ 30 %), Poor (30 % > Poor ≥ lowest)

Note: The above grading system is under modification as of year 2004.

Evaluation procedures

Evaluation practice is typically done over the following five stages.

Stage 1 (around March)
Once NSTC confirms the master evaluation plan for the appointed year and evaluation committees are made up, KISTEP offers the forum where it presents aims and scope of evaluation and explains a detailed evaluation plan, guidelines and instructions designed by KISTEP to selected evaluation panels of the committees. In order to expedite the evaluation process and help evaluators have better understanding of the programs they are supposed to evaluate, documented materials submitted from program officers (i.e. persons in charge who actually perform R&D programs that will be evaluated. Most of them belong to government departments, even though few of them are from the private sector) are distributed to evaluation panels in advance in this forum.

Stage 2 (beginning of May)
Next, various evaluation strategy meetings are held by committee by committee. During those meetings, evaluation panels discuss about the way they steer their committees and elect chairmen in each committee. In addition, they decide appropriate evaluation indicators they will base for their evaluation and other important evaluation methods like which indicators they should put more weight on in the course of evaluation.

Stage 3 (beginning of May)
The third stage is the 'the first panel evaluation.' In this stage, evaluation panels carefully review documented materials that they received at the forum in Stage 1 and draw up opinions for the first time. They also prepare for questions they may ask to program officers at the next stage meetings.

Stage 4 (mid of May)
In the fourth stage, evaluation panels meet directly with program officers and listen their presentations on achievements over the past year and future plan from them. The meetings are held by evaluation committee by committee. In those meetings, panels also ask questions prepared in Stage 3 and often discuss certain topics with program officers on the spot. Evaluation panels may require some additional materials needed for better assessing their performance from program officers.

Stage 5 (end of May)
The last stage is the 'the second panel evaluation.' In this final stage of evaluation, panels critically re-investigate and evaluate all materials obtained from program officers from previous Stages 1 to 4 and reach a conclusion. Panels compare this with the preliminary results in Stage 3 and modify and rate the final grade on each program after consultation. They finally prepare the final reports. This 'second panel evaluation' is newly introduced step in 2002 to increase the accuracy of evaluation.

Problems and Solutions

Like any other government policies and projects, evaluation on national R&D programs in Korea has been changed in search of efficiency and objectiveness over the past seven years since it was introduced in 1998. But improving evaluation practice is an abiding task that needs constant modification and adjustment. This section discusses contemporary issues encountered in process of evaluation in Korea as well as solutions suggested by a series of interviews with stakeholders including program officers, expert evaluation panel, practitioners and executive staffs in KISTEP. The following is the summary of current issues on evaluation.

• Appointing competent and credible outside panels of experts as evaluation committee members might be the first step toward the success of evaluation. According to the current policy, once related government departments that will be evaluated recommend appropriate outside civilians of their fields to NSTC, NSTC is supposed to accepts them as evaluation panels. Since different government departments have networks of the qualified experts of their own fields and have better information on them, this way of selecting panels certainly has many advantages. However, this recruiting system possesses its own problems. First, it is highly unlikely to guarantee objectivity of panels, which is one of the most important qualifications for evaluators. Panels entrusted by the related government departments tend to reflect departments' own interests. Secondly, even though government departments make every effort to recommend capable specialists in their own areas, sometimes the quality of these people are not up to the standard NSTC wants to meet. Even in such a case, NSTC has no specific ways to improve the situation under the current system. Lastly, government departments usually recommend new experts to NSTC every year, leading to lack of consistency because of a high turn over of the panels.

To overcome above difficulties, NSTC considers nominating evaluation panels directly out of all experts when government departments increase the number of recommended experts by three times. NSTC may select relevant and objective experts on its own by building a large pool of evaluators with excellent reputation, outstanding achievements and ample experience. Also, instead of temporary involvement, panels' tenure needs to be guaranteed for their consistent and responsible service.

• The question about whether it is necessary to evaluate on all R&D programs in each and every year has been another issue. It can be ineffective to carry out evaluation practice every year on all programs in the lump since the nature and context of programs may varies. Anticipated results will easily fail to be realized within a year given that most of national R&D programs are planned and performed from a long-term perspective. Sometimes, panels also need additional time beyond a year to evaluate more thoroughly and carefully on particular programs.

In order to solve these problems, the government tries to introduce 'in-depth' program evaluation. That is, rather than evaluating all programs every year with the same intensity, the government tries to pick few targeted programs for the specific year and rigorously analyze and investigate completely beyond the level of simple monitoring. The

program evaluated in such a way may skip evaluation in the following several years so that the government can concentrate on other target programs instead.

- While 'relative evaluation' is currently employed in grading R&D programs, programs officers start to question about appropriateness of this way of grading system. They argue that it is ineffective and unfair to grade programs that are scored based on the same measurement without considering the various nature and unique characteristics of the each R&D program. Numbering other's performance in order even considered as impertinent in oriental culture.

Thus, 'absolute evaluation' approach begins to be used in rating programs as an alternative. Incorporating a wide variety of qualitative as well as quantitative performance indicators is also suggested. In addition, program officers may be asked to self-assess their outcomes before they are evaluated by expert panels. In the end, the ideal evaluation would be the one that help R&D program officers achieve better results by informing them of their mistakes and suggesting a remedy rather than penalizing them and deciding ranking.

- Evaluation procedure is able to serve as one of better channels of gathering information for future important decision making to government policy makers. They may anticipate prospective areas to invest and shape a R&D policy on the basis of materials provided by program officers at time of evaluation. Thus, not only the required information for evaluation, but the more detailed and comprehensive 'performance reports and analyses' on particular R&D programs formulated by program officers in charge should be requested every year.

Conclusion

This paper investigates the evaluation system in Korea and looks at the current issues met during evaluation along with a reform measure for the improvement of evaluation practice. Efficient and objective evaluation of national R&D programs must be quite a challenge due to the inherent uncertainty and complexity of R&D programs and S&T. Moreover, the results of evaluation practice are to be largely bounded by a number of factors such as political, economical, social and cultural environments, and characteristics of administration and government departments. The best evaluation methodology, thus, should differ from country to country. The structure and experience of evaluation in Korea will be a good reference to other countries, especially developing countries that plan and begin to introduce similar system in the future.