

Economic Performance Analysis of National Research and Development Project

S.S. Kim^{a*}, S.W. Yun^a, S.E. Kim^a

^aDivision of Nuclear Policy studies, Korea Atomic Energy Research Institute, Daejeon, 305-353, Korea

*Corresponding author: sskim5@kaeri.re.kr

1. Introduction

Evaluation programs for the national Research and Development(R&D) projects can be divided into two streams, one which is performed under the supervision of the Ministry of science, ICT and Future Planning (MSIP) and the other under the control of the Ministry Of Strategy and Finance (MOSF).

There are a lot of differences between these two evaluation programs in terms of their main objectives, assessment items, and evaluation methods by item. When considering the recent evaluation trend of being more concerned with the objective and scientifically well-founded base of judgment than the qualitative results data, there seems to be much supplement and improvement points in both evaluation programs.

Firstly, the MSIP's evaluation program which is known as "The performance analysis of national R&D program in Korea" is applying the principle of ex-post evaluation for the overall performances of R&D activities focusing on the scientific and technological outputs, economic effects, and social performances such as the training of science and engineering personnel. Its report has been done and published by the collaboration of MSIP and KISTEP(Korea Institute of Science & Technology Evaluation and Planning). Also, its legal base is on the "Framework Act on Science and Technology" and "the law on the performance evaluation & management of national R&D projects".

Meanwhile, the MOSF's evaluation program which is named as the preliminary feasibility survey of national R&D projects is being performed in form of ex ante evaluation before the execution of R&D project with a view to determine whether or not to accept a R&D project. The preliminary feasibility survey for national R&D projects is being done by the KISTEP under the authority of the MOSF. It also bases the national finance law. Especially in the economic feasibility evaluation of the project evaluation process, there is a distinguishing aspect that the real and measureable ones which are not only the direct but the indirect effects could be all considered as the benefits through the expression in the monetary value.

The basic issue in this study started from the perception that the performances of the national R&D projects in the fields of science and technologies are not being appraised appropriately due to the deficiencies in evaluation system & methodologies even though there have been much contributions to industries and national economy. Moreover, the deficient or wrong perception for scientific & technological performances could lead

to the deficiency of necessity for the long-term national R&D programs. Therefore it is thought that the efforts to find out the improvements in the performance evaluation of national R&D projects are absolutely necessary.

From this point of view, the main point in this study is firstly to compare two evaluation programs mentioned above in detail in terms of the classification system of various forms of performances & their downstream items and the evaluation principles & methods for economic performances. Another point of this study is in finding out the improvements in the economic performance evaluation of national R&D projects by MSIP referring to the economic evaluation methodologies of the preliminary feasibility survey for national R&D projects.

2. Comparison of the evaluation systems for national R&D projects

As it is mentioned above, there is a basic difference between two national R&D evaluation programs in that the MSIP's performances evaluation is aiming of the survey and analysis on performances accomplished within the specifically defined year or period while the MOSF's evaluation is appraising the business feasibility by comparing the costs to be disbursed with the benefits through the business activities for determining whether or not to accept the business and invest the governmental fund.

As for the MSIP's performance evaluation, four indices in the first classification level were selected as follows: scientific performance such as thesis, technological performance such as patents, economic performance such as royalty income and technology transfer & business commercialization, and social performance such as manpower training & training support. The above four index are chosen referring to the various kinds of performance indices (five indices) recommended by national science & technology council. The contents for royalty income in the above economic performance consist of the result analyzed on the amount of royalty income and the number of royalty income according by the main agent, the research field, and the region. Those for performance of technology commercialization also are showing the analysis results for the numbers of technology transfer and direct commercialization by technology holder according by the government department, the R&D stage, the main agent of research fulfillment, the research field, and the region. That is, economic performances are generally

placing emphasis on the superficial quantitative effects and the qualitative meaning rather than measuring quantitatively the economic contributions to national economy or industries.

As for the preliminary feasibility survey by MOSF, three kinds of feasibilities indices are presented in the first classification level as follows: the technological feasibility, the economic feasibility, and the political feasibility. In economic feasibility which is applying the main methodologies of the cost-benefit analysis and cost-effectiveness analysis, whatever the real and measurable effects resulting from the related R&D activities are, they can be reflected into the total benefit regardless of the direct or indirect ones. Besides the contribution effects to national economy and the industry, it is a meaningful point that the scientific and

technological performances such as the research papers and patents could be evaluated by the cost-effectiveness analysis through the comparison with the similar alternative. However, the network spillovers effects which are the various kinds of ripple effects of outputs, value-added, employment, import & export are not being considered into the economic benefits due to the difficulty of measurability in market price and the non-existence of appropriate evaluation methodologies. This is disadvantageous for R&D projects in the context of the B/C ratios estimation by projects because the outputs or performances resulting from many R&D projects have the characteristics of intermediary goods within the economy or industry systems.

The comparison of the evaluation methodologies for national R&D projects is shown in Table 1.

Table 1. Comparison of national R&D evaluation systems

Items	National R&D performance evaluation (MIPS, KISTEP)	Preliminary feasibility survey for R&D projects (MOSF, KISTEP)
Legal base	<ul style="list-style-type: none"> ● Framework Act on Science and Technology ● Law on the performance evaluation & management of national R&D projects 	<ul style="list-style-type: none"> ● National Finance law
Objective	<ul style="list-style-type: none"> ● Appraisal of performances and activities for all national R&D projects in scientific and technological fields ● Ex-post evaluation 	<ul style="list-style-type: none"> ● Determination of project acceptance or refusal for the large size of national R&D projects ● Ex-ante evaluation
Appraisal categories	<ul style="list-style-type: none"> ● Scientific performance(paper) ● Technological performance(patent) ● Economic performance (royalty, commercialization) ● Social performance(manpower training, training support) 	<ul style="list-style-type: none"> ● Technological feasibility ● Economic feasibility ● Political feasibility
Economic performance	<ul style="list-style-type: none"> ● Quantification only for royalty income ● Not to consider in monetary term the contribution effects to economy or industry ● The deficiency of value evaluation methods to apply 	<ul style="list-style-type: none"> ● Applying a lot of economic evaluation methods to various effects for monetization ● Continuous enlargement of benefit items and evaluation methods
Spillover effects	<ul style="list-style-type: none"> ● Not considered 	<ul style="list-style-type: none"> ● Not considered

3. Conclusions

There seems to be a trend that the economic contributions to the national economy and the industries by national R&D projects have been underestimated due to the difficulties of not presenting properly the reliable quantitative effects even though they have contributed not only to the real economy and economic growth but to the industrial productions and public benefits. The key reasons to this phenomenon might be the deficiency of perception for evaluation tools & methodologies development and the original difficulty of evaluation for R&D performances.

Especially the evaluation results for national R&D projects could impact on the investment decision on the long-term national R&D program, with being based on

the investment efficiency or the necessity and urgency which might be represented by evaluation results.

In the context of the visible performance evaluation, it is thought that many evaluation methods and processes used in the preliminary feasibility survey need to be also applied in the national R&D performance evaluation by the MSIP. Furthermore the studies for finding the proper evaluation methodologies to the specific benefits should be implemented continuously from the viewpoint of securing the objectivity and realistic feasibility of national R&D projects.

REFERENCES

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