

A study on evaluation methodology for preliminary (ex-ante) feasibility analysis of government R&D program in Korea

The Republic of Korea has recognized the importance of science and technology as a driving force of national growth and has continuously increased the proportion of government fiscal spending. As of 2019, government spending on R&D exceeded about 20 trillion won (about USD 190B). Over the past few decades, Korea's R&D has been investing heavily in areas of relatively clear economic and industrial effectiveness so is called 'fast-following strategy'. However, in recent years, it has begun to be used as a means of exploring knowledge, advancing and solving social problems in order to transform into new R&D paradigm so is called 'first mover strategy'. The national R&D program is conceptually defined as "a program in which the government establishes specific orientations and goals and strategically collects R&D resources to solve the problems of science and technology in areas requiring R&D at the national level" And is legally defined as a "R&D program in the science and technology field, in which a central administrative agency specifies R&D tasks based on laws and regulations, supports all or part of the R&D expenditure, or supports them through public funds. Although government R&D budgets can be defined from various perspectives, basically, they can be defined as "budgets that the government supports in promoting new knowledge accumulation and science and technology innovation." The government R&D budget is implemented to complement private research and development activities and to develop science and technology in the basic, public, and welfare fields where pre-development of future core technologies and market failure can occur.

Many large R&D programs are being pursued to meet the government's policy objectives in Korea. For such a large-scale investment, it is necessary to examine the feasibility of the program's necessity, purpose, detailed activities, and implementation strategy. Nowadays, the government has reached the world's highest level of R&D investment as a proportion of GDP in the process of expanding future growth potential, expanding basic research and related large-scale infrastructure, and supporting SMEs. There is an assessment that the rapid expansion of the R&D investment has led to a number of technological, economic and social achievements, and that the efficiency and effectiveness of the investment scale are relatively insufficient. During the period of rapid expansion of R&D budgets, the ongoing project, which was being promoted by each ministry, was expanded without careful examination of the science and technology development plan if only the policy compliance was recognized. To this end, new large-scale R&D programs are also being planned competitively by each ministry, and problems have arisen with regard to the soundness and efficiency of investment in relation to the increase in total R&D budget. In the process of accumulating these problems, the consciousness of the efficiency of the government's fiscal

execution has accumulated. As a result, the recognition of the need to thoroughly verify the feasibility of national R&D projects from the planning stage has become a background for introducing preliminary feasibility studies into the government R&D sector.

The preliminary feasibility analysis refers to the preliminary validation and evaluation conducted by the Minister of Strategy and Finance in order to establish a budgeting and fund management plan for large-scale new programs. The preliminary feasibility analysis is aimed at preventing the waste of budget and contributing to the efficiency of financial management by making transparent and fair decision based on priority of new investment of financial business through objective and neutral investigation of the feasibility of large-scale government funded programs (or projects). In other words, the preliminary feasibility analysis is a process of reviewing the financial business in advance for efficient allocation of resources under the constraints of finite government budgets. Through this, it is possible to provide objective and neutral information related to the project promotion, such as feasibility of the project and review of alternatives, in advance for the business plan established by each department. Preliminary feasibility analysis on national R&D programs are carried out by a third party institution that has no specific interest in the project for objectivity and neutrality. KISTEP is the overall main managing/operating institution that is specified in 'The Guidelines for Preliminary Feasibility Analysis for National R&D Programs'

In this study, systematical methodology for preliminary feasibility analysis of R&D sector will be introduced and discussed. This study was undertaken to succeed and develop the results of preliminary feasibility studies and policy studies accumulated over the last 10 years, and to reflect recent policy conditions and stakeholders' voices. In the last decade since the introduction of the preliminary feasibility analysis for national R&D programs, the importance of economic analysis and the view of financial efficiency (for example, benefit to cost ratio, ROI) have been emphasized. It is hoped that the paradigm of government investment in science and technology will shift from economic growth to advancing S&T knowledge exploring and progress.

Keywords : government funded R&D, S&T innovation, R&D paradigm shifting, preliminary feasibility analysis