

1. Introduction

- # Academic research, which produces the bulk of scientific knowledge for the construction and development of an advanced society founded on scientific knowledge, is important. However, the deployment of strategic basic research for the creation of social and economic values that have been generated through the objectives established by the national government is also important. Strategic basic research also contributes to the creation of new, use-inspired scientific knowledge.
- # In addition to driving initiatives to take on the challenges of clarifying the significance of strategic basic research, sorting out its concepts, and securing a more effective and transparent scheme for the development of the strategic basic research scheme, the national government should also send a clear message to citizens on the significance, scheme, and benefits of strategic basic research.
- # The expert panel discussed the envisioned state of strategic basic research promotion as represented by JST's Strategic Basic Research Programs (CREST, PRESTO, ERATO and ACCEL for creating seeds of new technologies). The R&D system was wholly reviewed from a high level with a long-term perspective, and methods for fostering innovation rooted in basic research were studied and finalized into this report.

2. Organizing Strategic Basic Research

- # Use-inspired basic research, which inextricably links the pursuit of fundamental principles and the pursuit of creation of social and economic value, was organized into the two approaches below.
 - Concept-oriented research is led by researchers for pursuing work aimed at shedding light on what could be possible in the future. The results have breadth, in general tend to require a relatively long time to emerge, and also spread out from the initial starting point.
 - Task-defined research is led by a program manager (PM) for the purpose of resolving a specific and extant challenge. The results are focused, requires a relatively short time-to emerge, and converges to a single point.
 - “Result” is generally interpreted narrowly as a solution to an existing problem. For concept-oriented research, however, the word should not necessarily be limited to the narrow definition.
- # In Japan, there are lively debates surrounding innovation viewed as task-defined research focusing on technical innovation yielding economic benefits in a relatively short time. Tying scientific knowledge to the creation of social and economic value, however, also requires the establishment of a scheme for proposing measures appropriate for the pursuit of concept-oriented research. The expert panel, therefore, in accordance with the objectives set forth by the national government, furthered the discussion of concept-oriented research as a strategic basic research approach for furthering use-inspired basic research.
- # Distinct from R&D performed by private-sector companies, concept-oriented research seeks to acquire new scientific knowledge that is valuable to the public and, therefore, requires the government to actively support and play a role in such research.
- # Effectively funding concept-oriented research requires government strategies for formulating objectives that link the pursuit of fundamental principles based on the internal motivations of the researchers who lead the research, with the policy decisions for creating social and economic value. Government strategies for building schemes for the formulation of such objectives are also required.

3. Envisioned State of Concept-Oriented Research

- # To ensure that the strategic objectives for JST's Strategic Basic Research Programs (CREST, PRESTO, ERATO and ACCEL) are formulated on the basis of the purpose of concept-oriented research, 1) a Guideline for the Establishment of Strategic Objectives will be established, and 2) a policy management

cycle (PDCA cycle) will be established to help ensure that formulated policy are continuously improved based on evaluations for strategic objectives.

(Establishment of Guidelines for the Establishment of Strategic Objectives)

To fulfill the purpose of concept-oriented research in the formulation of strategic objectives, a systematic analysis of trends in research inside and outside Japan, starting with basic research, will be undertaken following the process below so that, on the basis of the analysis, the nature of the social and economic impacts of pursuing research on the identified research trends can be anticipated. It will also be necessary to specify research scopes appropriate for each strategic goal to prevent excessive focusing of research efforts.

[Step 1] Prepare an overview of domestic research trends by using database technology to analyze results information from Grants-in-Aid for Scientific Research and prepare an overview of international trends through a Science Map bibliographic analysis.

[Step 2] Gather input from organizations and researchers with knowledge of the latest research trends and use it to identify noteworthy research trends.

[Step 3] In workshops or other venues, hold dialogues with researchers and experts with knowledge of the needs of industry and public institutions, and decide on strategic objectives in which both scientific value and social and economic value can be created.

(Establishment of a Policy Management Cycle)

Prepare a forum where the formation and revision of the Guideline for the Establishment of Strategic Objectives that is consistent with the purpose of concept-oriented research can be considered. Establish a policy management cycle that, every fiscal year, will assess the strategic objectives guidelines, the strategic objectives formulation process, and implementation phases, and reflect assessment results in guideline revisions. To keep the cycle running, a permanent forum for study should be established.

(Considerations for Implementing Concept-Oriented Research)

The pursuit of concept-oriented research will require program management that encourages the formation of optimal research teams.

Acceptance of serendipity and maintenance of researcher motivation will be required.

Flexible management for overall optimization will be necessary to keep in mind relationships and exchanges with other forms of research including academic and task-defined research. For example, exchanges between researchers leading concept-oriented research and task-defined research will be required.

The development of personnel for identifying researchers that will lead concept-oriented research will be important.

4. Actions Going Forward

Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) will establish the strategic objectives for the 2015 fiscal year based on the guideline document specified in this report. When the strategic objectives have been formulated, MEXT will report the findings to the expert panel, which will then study the appropriateness of the strategic objectives and opportunities for improvement in the guideline.

Beyond the 2015 fiscal year, MEXT will establish a forum for studying the management and assessment of the strategic basic research programs in the MEXT Council for Science and Technology, and the forum will serve to revise the Guidelines for the Establishment of Strategic Objectives and to assess the formulation process for strategic objectives.

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