Expert Panel Report on the Envisioned State of Strategic Basic Research

June 27, 2014

1. Introduction

○ Today, the continuation and development of societies in developed countries relies heavily on the generation, transfer, and application of knowledge, and the added value brought about by knowledge-intensive social and economic activities has become critical for individual countries.

○ There are, therefore, high expectations for innovation that incorporates ways of thinking and schemes different from those of the past, generates new value, and gives rise to major changes in knowledge-intensive social and economic activities. Expectations are particularly high for innovation that is based on new scientific and technical knowledge and gives rise to discontinuous development and sustainable competitiveness in social and economic activities.

○ The new scientific knowledge announced in academic papers, for example, is the core of innovation, so, while efforts are made to create this knowledge in quantity and diversity, in its native form, it often does not lead to the creation of social or economic value. The translation of scientific knowledge into the creation of social and economic value requires a social structure capable of smoothing the understanding and development of scientific knowledge.

○ In other words, increasing the opportunities for scientific knowledge creation and development, and building and developing an advanced society founded on scientific knowledge, are important for generating scientific and technological innovation[1]. The key to that – basic research – carries with it great uncertainty regarding the consequent creation of social and economic value, so it is insufficient to rely solely on market principles for its pursuit and it is a government responsibility to step in and help promote it.

○ Academic research[2], which generates the bulk of scientific knowledge from science and technology research, is important as a foundation and so is the advancement of strategic basic research. With

[1] Innovations that provide links to intellectual and cultural value creation based on new knowledge from scientific discoveries and inventions, and to economic, and social and public, value creation resulting from the development of new knowledge from scientific discoveries and inventions (4th Science and Technology Basic Plan approved by the cabinet on August 19, 2011)

[2] Research that is pursued based on the internal motivation of the individual researcher, under the researcher's personal responsibility, for the primary purposes of elucidating truth, solving problems, and uncovering topics for further research (Higashi Nihon Daishinsai wo Fumaeta Kongo no Kagaku Gijutsu Gakujutsu Seisaku no Arikata ni tuite (Kengi) [On the Future of Science and Technology, and Academic, Policy in the Wake of the Great East Japan Earthquake (Proposal)] issued by the Council for Science and Technology in MEXT on January 17, 2013)

guidance from objectives set by the national government, strategic basic research turns the development of a great deal of scientific knowledge toward the creation of social and economic value, and also contributes to the creation of new, use-inspired scientific knowledge.

○ The Japan Science and Technology Agency's (JST's) Strategic Basic Research Programs (CREST, PRESTO, ERATO and ACCEL for creating seeds of new technologies) play important roles as strategic basic research in Japan, and are widely recognized. These programs have built a substantial track record in building and implementing research advancement frameworks, including research labs, and have been contributed to the production of results that in many cases have led to the creation of social and economic value.

○ Nevertheless, other countries are strengthening measures for translating scientific knowledge into the creation of economic and social value, and, at a time of intense global competition, it is necessary for Japan to evolve its scheme to strategic basic research to construct and develop an advanced society founded on scientific knowledge, and steadily translate scientific knowledge into the creation of social and economic value.

○ Toward that end, the national government must address the matters given below and deliver to citizens clear messages on the significance of, schemes to, and benefits of strategic basic research.

- Clarification of the significance of strategic basic research within the body of policies on the advancement of science and technology, academics, and innovation; and presentation of clear, concise underlying concepts.
- Making schemes to strategic basic research highly effective and transparent in light of its purpose.

○ Given the above understanding of the issues before it, the Expert Panel Report on the Envisioned State of Strategic Basic Research[3] wholly reviewed the R&D system from a high level with a long-term perspective, and studied methods for fostering innovation rooted in basic research. This report summarizes the expert panel's findings[4].

[3] In this report, the "proper management of strategic basic research" refers to proper ways of advancing strategic basic research as exemplified by JST's Strategic Basic Research Programs (CREST, PRESTO, ERATO and ACCEL for creating seeds of new technologies).

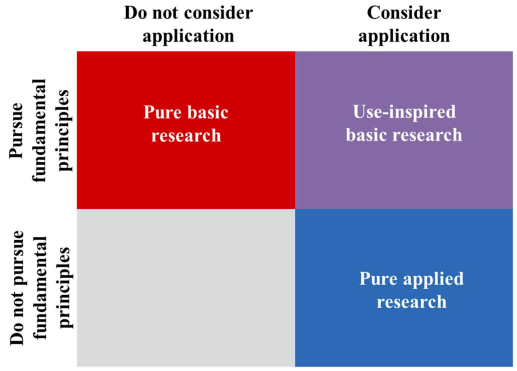
[4] The importance of academic research has been discussed in the Subdivision on Science of MEXT's Council for Science and Technology, and this report, as well, was prepared with reference to a preliminary report, "Gakujutsu Kenkyu no Suishin Hosaku ni kan suru Sogoteki na Shingi ni tuite (A Comprehensive Deliberation of Measures for Advancing Academic Research)," issued by the Subdivision on Science of MEXT's Council for Science and Technology on May 26, 2014.

2. Organizing Strategic Basic Research

(Note concerning "strategic basic research" as addressed in this report)

○ According to the OECD's Frascati Manual[5] and the Survey of Research and Development conducted by Japan's Ministry of Internal Affairs and Communications, research and development activities are categorized as basic research, applied research, or experimental development, and the term "basic research" is often used based on this categorization.

○ Research has traditionally been categorized from a linear perspective that begins with fundamentals and extends through application. In recent years, however, it has become popular to use a Stokes diagram with one dimension to indicate whether research is for the pursuit of fundamental principles, or not, and another to indicate whether research is applied, or not[6]. Using this diagram, research (basic and applied) is categorized as pure basic research, use-inspired basic research, or pure applied research[7]. [Diagram 1]



[Source]
"Knowledge creation process in science: Key comparative findings from the Hitotsubashi-NISTEP-Georgia Tech scientists' survey in Japan and the US," National Institute of Science and Technology Policy, Hitotsubashi University Institute of Innovation Research, and Georgia Institute of Technology (2011), Ministry of Education, Culture, Sports, Science and Technology). (Partially revised)

Diagram 1 Stokes Diagram of Research Types

○ Use-inspired basic research as shown in the Stokes diagram is basic research embodying two sides of the same coin – the quest to discover fundamental principles and the creation of social and economic value. In recent years, the fostering of discontinuous innovation based on use-inspired basic research has been a focus of attention as a source of sustainable competitiveness for the country.

○ Use-inspired basic research has the characters of both pure basic research - for pursuing the fundamental principles – and pure applied research – for realizing applications. As such, it can be pursued as concept-oriented research or task-defined research and this distinction should be borne in mind when use-inspired basic research is pursued by the government.

○ Concept-oriented research is led by researchers aiming to shed light on what could be possible in the

[5] Frascati Manual: Proposed Standard Practice for Surveys on Research and Experimental Development, 6th edition (2002) (OECD)
[6] Donald E. Stokes (1997), "*Pasteur's Quadrant - Basic Science and Technological Innovation*", Brookings Institution Press.
[7] "Pure basic research" and similar terms used in this report are defined basically according to this categorization.

future. It picks up from pure basic research and extends to the consideration of applications. It retains the pure basic research character of pursuing fundamental principles based on the internal motivations of the researcher, but aims to create not only scientific value but also social and economic value; it is basic research undertaken with the ultimate goal of social and market acceptance as new social and economic value.

○ Concept-oriented research results are intended to shed light on what could be possible in the future and have breadth. In addition, they generally require relatively long periods of time to emerge, and also spread out from the initial starting point.

○ Task-defined research, in contrast, is led by a Program Manager (PM) or Program Director (PD)[8] and, with the goal of solving a specific, extant challenge, seeks to create new knowledge and to mobilize existing knowledge as needed to achieve objectives. It picks up from pure applied research, which aims to achieve application, and extends to the pursuit of fundamental principles. Given the focus on a specific, extant challenge, targeted results can be pursued from the outset and require relatively short time to emerge; the research work converges to a single point.

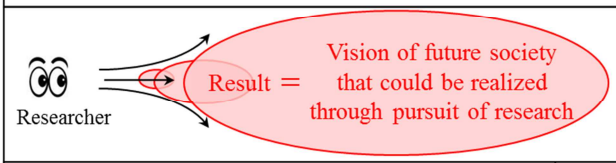
○ Results for concept-oriented research and task-defined research, therefore, differ markedly in terms of breadth and the processes for achieving them. “Result” is generally interpreted narrowly as a solution to an existing problem. For concept-oriented research, however, it is necessary to not be limited to the narrow definition of this word.

○ In Japan, innovation is viewed as technical innovation yielding economic benefits in a relatively short time, and debates on policy-making for task-defined research are lively. Building and developing an advanced society founded on scientific knowledge, and translating scientific knowledge into 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.

[8] People who identify social or economic challenges that need to be solved with the application of research results (Ordinarily, they are not a researcher for the program they are overseeing.)

(Comparison of Research Result Types)

Result for Concept-Oriented Research* * Research led by researchers to shed light on futures that could be possible through the pursuit of research		Result for Task-Defined Research* * Research led by a PM or PD and that is needed to solve a specific, extant challenge
		
Broad (How society should be in the future)	Result Scope	Focused (Clearly specified, extant challenge)
Results require relatively long time to achieve Spread out from the initial starting point	Realization of Results	Results require relatively short time to achieve Converge to a single point

(Current Conditions with regard to Concept-Oriented Research)

○ The JST's Strategic Basic Research Programs (CREST, PRESTO, ERATO and ACCEL for creating seeds of new technologies) are available as a system for funding concept-oriented research. In their top-down designated Strategic Objectives and Research Areas, research proposals are solicited from university and other researchers, time-limited research schemes (virtual research institutes) crossing the boundaries of organizations and disciplines are organized, and strategic basic research is pursued.

○ Research Supervisors, acting as directors of virtual research institutes, play the critical role of continually offering advice on the direction of the work being performed by researchers pursuing concept-oriented research. Interactions among researchers working on projects across a diversity of fields are encouraged and contribute to the formation of research teams optimal for pursuing concept-oriented research.

(The Need for Government Support for Concept-Oriented Research)

○ The new scientific knowledge reported in academic papers and other outlets as results of basic research are of public benefit, just as are the diplomatic, defense, police, fire and other services provided by government. Concept-oriented research, as distinguished from R&D performed by private-sector companies, is pursued to produce new knowledge for the public benefit and, consequently, cannot be adequately supported relying only on market principles. It is necessary for the government, therefore, to actively support and play a role in such research.

(Government Strategies Required for the Pursuit of Concept-Oriented Research)

○ Japanese researchers creating and developing outstanding scientific knowledge that can lead to the creation of social and economic value can further strengthen, and enable the sustainable development of, the country's social and economic activities. Given this view, it is essential that measures for funding concept-oriented research be effectively implemented.

○ Effectively funding concept-oriented research requires government strategies for formulating objectives that link the pursuit of fundamental principles based on the internal motivations of researchers, who lead the performance of research work, with policy significance in terms of creating social and economic value, and government strategies for creating schemes for the formulation of such objectives[9]. In this connection, it should be noted that the more specific the economic value becomes, in general, the weaker is its identification as a public benefit and as something requiring government support.

3. Envisioned Stated of Concept-Oriented Research

○ Given the character of concept-oriented research, wide-ranging searches of scientific knowledge generated by academic research and other sources, and the building of approaches for effective and efficient development of knowledge for the creation of social and economic value, are critical to its pursuit.

○ The Strategic Objectives designated by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) form the operational core of JST's Strategic Basic Research Programs (CREST, PRESTO, ERATO and ACCEL for creating seeds of new technologies) and so, considering the expected role of these programs, which embody the country's greatest accumulation of knowledge of concept-oriented research, it is necessary to provide establishment guidelines to ensure that Strategic Objectives with scopes and the directionality appropriate for the aims of concept-oriented research are designated. To ensure that establishment guidelines are effectively improved based on Strategic Objective assessments, it will be necessary to establish policy management cycles (PDCA cycles).

(1) Establishment of Guidelines for the Establishment of Strategic Objectives

◯ To ensure that the Strategic Objectives for JST's Strategic Basic Research Programs (CREST, PRESTO, ERATO and ACCEL for creating seeds of new technologies) are formulated in a manner consistent with the aims of concept-oriented research, and to enhance the transparency of the Strategic Objective formulation process, the Guidelines for the Establishment of Strategic Objectives

[9] Pure basic research is essentially undertaken based on the unfettered ideas and curiosity of individual researchers, and there is no expectation that the government would have any impact on the direction of the researcher's work. The direction for the allocation of resources to pure basic research are ideally formed basically through autonomous agreement within the research community, and this direction is considered in the advancement of funding policies. For pure applied research, however, applications are defined and government involvement is expected only in cases, for example, where research results have public value. Such cases always require policy judgments on the extent of government involvement, policy objectives, and approaches, and if these policy judgments are referred to as government strategy, then government strategy is required when the government is involved in pure applied research.

will be formulated as described below to provide a method for establishing Strategic Objectives.

(Overall Structure of the Guidelines for the Establishment of the Strategic Objectives)

○ The Guidelines for the Establishment of Strategic Objectives, in accordance with the aims of concept-oriented research, will provide for the formulation of Strategic Objectives via the following process:

1) Incorporate analyses using scientometric approaches to examine papers, results reports, and other information on directions being taken with regard to basic and other research inside and outside Japan,
2) Use the results of these analyses to gather input from organizations and researchers with knowledge of the latest research directions, and specify noteworthy research directions, and
3) Anticipate the social and economic impacts of pursuing research consistent with research directions specified, and specify Strategic Objectives in which both scientific value and social and economic value can be created.

(Strategic Objective Establishment Steps 1, 2, and 3)

○ Step 1: Prepare an overview of trends with regard to basic and other research

・ Overview of domestic research trends

In preparing an overview of trends with regard to basic and other research in Japan, it is necessary to broadly identify the scientific knowledge generated by Japanese researchers. It is especially important to draw on the knowledge of the Japan Society for the Promotion of Science (JSPS) to accurately identify the results of Grants-in-Aid for Scientific Research, which are a wealth of outstanding research seeds.

Toward that end, MEXT will identify research trends in Japan by commissioning JST to undertake an analysis using scientometric methods to examine data from the Funding Management DataBase (FMDB), a database that can be used for broad searches of papers by Japanese researchers and reports on the results of Grants-in-Aid for Scientific Research. In performing this analysis, it will be important to also identify and analyze the timing of changes in research trend. More specifically, it is important to identify developments such as positive and negative turns of events in research activities, the emergence of new research concepts, and progress in efforts to link or fuse research undertakings.

・ Overview of international research trends

As in the case of the overview of research trends in Japan, it is necessary to identify international research trends with regard to basic and other research. The National Institute of Science and Technology Policy (NISTEP) has created the "Science Map[10]" which provides an excellent

[10] The Science Map is a visual representation of research areas based on the top 1% of research papers. It is created by structuring research areas through clustering based on co-citation relationships and then building a gravitational model in

bird's-eye view of international scientific research endeavors, so MEXT will apply this in preparing an overview of global research trends. Here, too, it will be important, just as in preparing the overview of research trends in Japan, to analyze developments such as positive and negative turns of events in research activities and to develop understanding of Japan's involvement in the international research trends.

○ Step 2: Identify noteworthy research trends based on gathered input

・ Gathering of input from organizations and researchers with knowledge of the latest research trends

Since the overview of research trends prepared in Step 1 is based on research papers, reports of results, and other documentation, it is possible that it does not accurately represent developments too recent to be documented. In addition, there may be Research Areas in which research trends are not always reflected in documentation.

To resolve this issue and gather information necessary for identifying noteworthy research trends, the analysis results from Step 1 will be used as objective bases, and research on trends[11] in Strategic Proposals and science and technology conducted by the JST's Center for Research and Development Strategy (CRDS) will be referenced, to collect input from organizations[12] and researchers with knowledge of the latest research trends. More specifically, MEXT will draw on information from JST, which has connections to numerous researchers, and, using the analysis results from Step 1 as objective bases, pose questions on research trends, such as those given below, to gather information necessary for specifying noteworthy research trends based on knowledge of most recent research trends.

・ Going forward, what will be noteworthy research trends among those indicated by the analysis results?

・ Going forward, can innovative results be expected from the linking of research areas related to the research trends indicated by the analysis results?

・ Identification of noteworthy research directions

Based on the results of input collected from organizations and researchers with knowledge of the latest research trends, MEXT will develop a list of noteworthy research trends. Afterward, it will prepare an overview, consider noteworthy research trends based on the attention being

---

which correlations are reflected by using degrees of co-citation to represent repulsion and gravitation. It should be noted that while there are fields in which the announcement of research results takes place mainly in research papers, there are also fields, such as computing, software, and robotics, where greater weight is given to presentations at international symposia, etc., rather than to research papers.

[11] Examples include NISTEP's Science and Technology Foresight and Science and Technology Trends, CRDS' Panoramic View Rreport, the JSPS Research Center for Science Systems's Gakujutsu Doko to ni kan suru Chosa Kenkyu Hokoku (Survey Research Report on Academic Trends), the Science Council of Japan's Report: Japanese Master Plan of Large Research Projects, and reports of the survey of technology trends in industry.

[12] Examples include CRDS and the JSPS Research Center for Science Systems.

focused on individual research trends, development potential, and other perspectives, and then produce a final list.

○ Step 3: Decide on strategic objectives in which both scientific value and social and economic value can be created

・ Anticipation of possible social and economic impacts

In setting objectives for advancing concept-oriented research, it is important to anticipate the possible social and economic impacts of pursuing research along noteworthy research trends.

MEXT, therefore, will attempt to anticipate the possible social and economic impacts of pursuing research along noteworthy research trends by drawing on information from JST, which has connections to researchers and industry figures, to hold workshops and other events for researchers with involvement in noteworthy research trends; experts with knowledge of industry inside and outside Japan, and development of venture capital and other new markets; and experts on public needs.

More specifically, in workshops and other events, participants will first be asked to describe society as they expect it could develop 20 and 30 years in the future based the results that could be achieved roughly 10 years in the future from pursuit of research along the research trends being focused on. Next, participants will be asked to anticipate the scale and breadth of possible social and economic impacts of pursuing research along the research trends being focused on, given the envisioned futures of society. And lastly, participants will be asked to consider ways in which research must be pursued along the research trends being focused on to bring about the envisioned futures of society[13].

・ Determination of Strategic Objectives

MEXT will summarize the results of the workshops and other events, and prepare a Strategic Objective proposal covering the research trends focused on, descriptions of the future society to be obtained by pursuing the subject research, and directions for advancing the subject research.

Afterward, MEXT will prepare an overview, considering matters such as the innovativeness of the scientific knowledge that could be generated by pursuing research along the research trends focused on, the scale and breadth of the possible social and economic impacts, and the probability of the envisioned future society being realized, and then determine Strategic Objectives.

(Matters to Consider in Establishing Strategic Objectives)

○ In establishing Strategic Objectives, it is necessary to consider that the leaders of concept-oriented research are researchers, and to refer to past Strategic Objective scopes and set objectives that maintain researcher motivation.

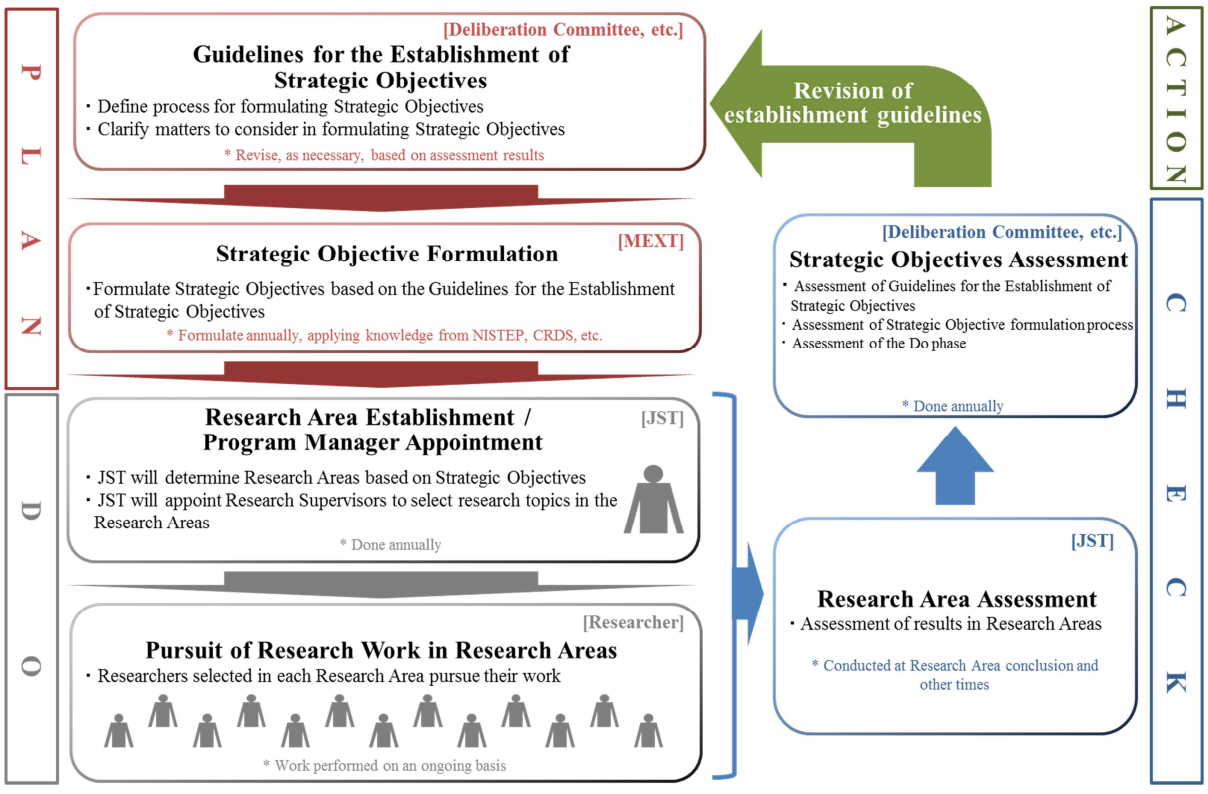
[13] It is assumed that the impacts of pursuing research will not always be positive; negative impacts are also anticipated. Maximizing the positive impacts of pursuing research will naturally require measures to address negative impacts.

○ For example in establishing a Strategic Objectives, it is necessary to provide objectives that appropriately communicate policy intents to researchers but to also bear in mind that basic research entails a high degree of uncertainty and avoid stymying research by presenting excessively narrow objectives.

(2) Establishment of a Policy Management Cycle

○ It is necessary to establish a policy management cycle (often referred to as a PDCA cycle[14]) to bring about even greater transparency for the Strategic Objectives formulation process within the JST's Strategic Basic Research Programs (CREST, PRESTO, ERATO and ACCEL for creating seeds of new technologies) and enable ongoing improvement based on Strategic Objectives assessments. A policy management cycle, therefore, will be established as described below.

(Policy Management Cycle (PDCA Cycle) Overview)



○ In the "Plan" phase of the policy management cycle, the Guidelines for the Establishment of Strategic Objectives will be established to provide a formulation process for Strategic Objectives. Furthermore,

[14] The PDCA (Plan, Do, Check, Act) cycle was originally a management method used in various operations in the manufacturing and other industries. In this report, "PDCA cycle" refers to a scheme in which the formulation of Strategic Objectives is repeatedly improved to become a better process.

MEXT will formulate Strategic Objectives based on these Guidelines for the Establishment of Strategic Objectives.

○ In the "Do" phase of the policy management cycle, JST will establish Research Areas under the Strategic Objectives specified in accordance with the Guidelines for the Establishment of Strategic Objectives, and appoint Research Supervisors. Furthermore, research proposals will be solicited from university and other researchers, and time-limited research schemes (virtual research institute) crossing the boundaries of organizations and disciplines will be organized, and strategic basic research pursued.

○ In the "Check" phase of the policy management cycle, assessments of the formulated Strategic Objectives along the following dimensions will be performed.

<Assessment Dimensions>

- At the time of assessment, are the Guidelines for the Establishment of Strategic Objectives optimal for formulating Strategic Objectives in which the creation of both scientific, and social and economic, value can be pursued equally well? [Assessment of Guidelines for the Establishment of Strategic Objectives]
- Have the Strategic Objectives been formulated in accordance with the Guidelines for the Establishment of Strategic Objectives? [Assessment of the Strategic Objective formulation process]
- Given conditions with regard to the generation of results, are the Strategic Objectives and Research Areas appropriate? [Assessment of the "Do" phase] [15]

○ In the "Act" phase of the policy management cycle, the Guidelines for the Establishment of Strategic Objectives will be revised as necessary, based on the Strategic Objective assessment results.

(Necessary Arrangements)

○ Given that use-inspired basic research embodies two sides of the same coin – the quest to discover fundamental principles and the realization of applications – it is necessary to arrange a forum where experts from academia and industry can consider revisions of the Guidelines for the Establishment of Strategic Objectives for concept-oriented research.

○ In addition, since Strategic Objectives are formulated in each fiscal year, a policy management cycle in which assessments are performed each fiscal year and assessment results are reflected in revisions

[15] It is necessary to perform assessments that are consistent with the assessment system for National Research and Development Corporations, use of which followed implementation of the Act on Partial Revision of General Rules for Independent Administrative Agency (Act no. 66 of 2014), to apply the Research Area assessments (assessment of research progress from the perspective of contributions to Strategic Objectives and of research results and ripple effects) performed by JST, and to avoid redundancy in performing assessments.

of the Guidelines for the Establishment of Strategic Objectives will be established. Exercise of this policy management cycle requires that a permanent forum be established for that purpose.

(3) Considerations for Implementing Concept-Oriented Research

○ For science and technology to develop further and have significant social and economic impacts, Research Supervisors, mentioned earlier, have an important role to play in encouraging the formation of optimal research teams, given that concept-oriented research is performed as an extension of academic research based on the internal motivations of individual researchers.

○ Furthermore, as discussed earlier, the linking of basic research to the creation of social and economic value entails great uncertainty. In highly cited papers presenting research results, there are not a few reports documenting cases in which even the research processes themselves differed from initial plans and consequently led to innovative research results not originally anticipated – cases of serendipity[16]. It is important, therefore, to recognize that serendipity plays a significant role in concept-oriented research, as well, and to construct approaches that allow for it.

○ It is important, furthermore, for systems to be such that they inspire researchers by including a scheme for recognizing not only research results but also the very effort that went into achieving them, so that researchers can be motivated in undertaking their research.

○ Concept-oriented research, in actuality, is not pursued in isolation but with relationships and exchanges with task-defined and other types of research. As such, there is a need for project management that allows for overall optimization, bearing in mind relationships and exchanges with other types of research.

○ There is a need, for instance, for project management that is flexible enough to create opportunities for researchers pursuing concept-oriented research to experience the concept of task-defined research by engaging in exchanges with PMs leading task-defined research, and opportunities for the generation of more examples of applications of strategic basic research results through ties to policy finance and the tax system. Also necessary is project management that considers the need for facilitating the development of academic research in Japan by contributing to the generation of new scientific knowledge amid the advancement of concept-oriented research.

○ Given awareness of the issues discussed above, it is important to develop personnel who understand

[16] Knowledge Creation Process in Science： Basic findings from the large-scale survey of researchers in Japan, National Institute of Science and Technology Policy (NISTEP) Hitotsubashi University Institute of Innovation Research (IIR) Joint Research Team, November 2010.

the aims of concept-oriented research, are capable of identifying researchers who can advance concept-oriented research, and can provide appropriate, accurate advice. Furthermore, consideration should be given to assembling measures for developing personnel with program management capabilities and having them engage in exchanges with researchers leading concept-oriented research.

4. Actions Going Forward

(Measures for Advancing JST's Strategic Basic Research Programs (CREST, PRESTO, ERATO and ACCEL for creating seeds of new technologies) in the Immediate Future)

○ It is necessary to effectively and efficiently advance projects for the generation of scientific and technological innovation by applying the findings of this report to the utmost in JST's Strategic Basic Research Programs (CREST, PRESTO, ERATO and ACCEL for creating seeds of new technologies), which are among the most prominent funding avenues for concept-oriented research.

(Advancement Measures for Fiscal Year 2014)

○ Based on the Guidelines for the Establishment of Strategic Objectives established in this report, MEXT should proceed to formulate Strategic Objectives for fiscal year 2015.

○ However, because the current fiscal year is the initial fiscal year for determining Strategic Objectives based on the Guidelines for the Establishment of Strategic Objectives, implementation of each step provided in the guidelines must necessarily be undertaken on a trial basis. With regard to the FMDB, in particular, it will be fully operational in Fiscal Year 2015, so preparation of an overview of research trends in Japan, in Step 1, must be performed to the extent possible using approaches consistent with the Guidelines for the Establishment of Strategic Objectives.

○ In addition, concerning Strategic Objectives formulation, MEXT should provide the members of this expert panel with status reports on the formulation process, as appropriate, report formulation results, and request opinions on matters such as whether Strategic Objectives have been properly formulated and whether there are any aspects of the Guidelines for the Establishment of Strategic Objectives requiring improvement.

(Advancement Measures for Fiscal Year 2015)

○ From the perspective of reliably implementing a policy management cycle, a forum for ongoing consideration of relevant matters is needed. Such a forum, therefore, should be created within MEXT's Council for Science and Technology to consider matters concerning the management and assessment of strategic basic research, in order to establish an ongoing policy management cycle.

○ This forum will establish the Guidelines for the Establishment of Strategic Objectives anew, based on the fiscal year 2015 Strategic Objective formulation process, and, given that the FMDB will become fully operational in fiscal year 2015, MEXT should formally undertake the formulation of Strategic Objectives for fiscal year 2016 based on the Guidelines for the Establishment of Strategic Objectives.

○ In addition, after the Strategic Objectives for fiscal year 2016 have been formulated, the forum should move forward with an evaluation of the Strategic Objectives formulation process.

(Other)

○ It goes without saying that in implementing the contents of this report, MEXT and JST personnel must have appropriate capabilities and qualifications, and it is necessary for MEXT and JST to continue to improve the capabilities and qualifications of their personnel.

○ At the same time, knowledge concerning, and the ability to formulate, Strategic Objectives is not limited to MEXT personnel, and it is necessary to continuously improve measures for working with NISTEP, CRDS, and other public-sector thinktanks.

Expert Panel on the Envisioned State of Strategic Basic Research
History of Deliberations

April 22, 2014 First meeting of the Expert Panel on the Envisioned State of Strategic Basic Research
- Current status of strategic basic research
- Funding measures for strategic basic research

May 8 Second meeting of the Expert Panel on the Envisioned State of Strategic Basic Research
- Funding measures for strategic basic research

June 2 Third meeting of the Expert Panel on the Envisioned State of Strategic Basic Research
- Testimony from the National Institute of Science and Technology Policy and from Experts
- Summary of Deliberations (Discussion of provisional report outline)

June 27 Fourth meeting of the Expert Panel on the Envisioned State of Strategic Basic Research
- Summary of the committee report (Discussion of provisional report outline)

Expert Panel on the Envisioned State of Strategic Basic Research
Members

(Members: 12)

Koichi Abe	Executive Vice President and Representative Member of the Board, Toray Industries, Inc.
Mutsuhiro Arinobu	Comptroller, the University of Tokyo
Nobuhide Kasagi	Deputy Director-General / Principal Fellow, Center for Research and Development Strategy, Japan Science and Technology Agency
Kazunori Kataoka	Professor, Graduate School of Engineering, the University of Tokyo
Akihiko Kondo	Professor, Graduate School of Engineering, Kobe University
○ Shinichiro Ohgaki	President, Japan Water Research Center
Noriko Osumi	Professor, Tohoku University Graduate School of Medicine
Atsushi Sunami	Professor, National Graduate Institute for Policy Studies
Haruko Takeyama	Professor, School of Advanced Science and Engineering, Waseda University
Atsuko Tsuji	Editorial Writer, Editorial Department of “Opinion,” The Asahi Shimbun
Kumiyo Nakakoji	Professor, Center for the Promotion of Interdisciplinary Education and Research, Kyoto University
Shojiro Nishio	Professor, Graduate School of Information Science and Technology / Director, the Cyber Media Center, Osaka University

(Listed in alphabetical order of last names, ○ Chairperson)

(As of June 27, 2014)