（tentative）

Progress of the next Cross-ministerial Strategic Innovation Promotion Program (SIP)

Secretariat of Science, Technology and Innovation Policy
Cabinet Office

Council for Science, Technology and Innovation (CSTI)

1. Functions

The CSTI is regarded as the "place of wisdom" to support the Prime Minster and his cabinet. It provides a comprehensive vision covering science and technology as a whole in Japan, and is responsible for planning and determining comprehensive and basic science and technology policies and for overall coordination at a position higher than individual ministries and agencies. CSTI was set up in the Cabinet Office as one of the policy councils on key policy fields in January 2001 under the Act for Establishment of the Cabinet Office (it was called the Council for Science and Technology Policy (CSTP) before May 18, 2014).

2. Roles

1) CSTI investigates and discusses the following matters in response to the inquiries from the Prime Minster or cabinet members:
a. Basic policies for promoting science and technology in a comprehensive and planned manner.
b. Policies for the allocation of science and technology budgets and resources such as human resources, and other key issues for promoting science and technology.
c. Key issues on the comprehensive environmental improvement for promoting the creation of innovation through practical application of R&D outcomes.
2) Evaluation of nationally important R&D including large-scale R&D on science and technology.
3) Provision of advices to the Prime Minister, if required, without receiving an inquiry, specifically regarding a., b. and c. in 1).

3. Structure

Chaired by the Prime Minister, the council consists of 14 members including 1) Chief Cabinet Secretary, 2) Minister of State for STI Policy, 3) Ministers of related ministries (MIC, MOF, MEXT and METI) designated by the Prime Minister, 4) head of a relevant administrative office designated by the Prime Minister (President of SCJ), and 5) academic experts (7 persons) (3-year term (2-year term for those who took charge before May 18, 2014), could be reappointed).

CSTI Expert Members (assigned by Prime Minister with the consent of both houses)

Takahiro Ueyama
(Full-time member)
Former Prof. and VP of GRIPS
(3.6,'16～3.5.'19)
(Since 3.6.'16)

Yumiko Kajiwara
(Part-time member)
Corporate Executive Officer, Fujitsu Ltd.
(3.1.'18～2.28.'21)
(Since 3.1.'18)

Yasuhiro Sato
(Part-time member)
Member of the Board of Directors, Mizuho Financial Group.Inc
(3.1.'21～2.29.'24)
(Since: 3.1.'21)

Hiromichi Shinohara
(Part-time member)
Chairman of the Board, NTT
(3.6.'19～3.5'22)
(Since 3.6.'19)

Hiroaki Suga
(Part-time member)
Professor, The Department of Chemistry, The University of Tokyo
(3.6.'22～25.3.5)
(Since:3.6.'22)

Mutsuko Hatano
(Part-time member)
Professor, School of Engineering, Tokyo Institute of Technology
(3.6.'22～3.5.'25)
(Since:3.6.'22)

Teruo Fujii
(Part-time member)
President, University of Tokyo
(3.1.'21～2.29.'24)
(Since: 3.1.'21)

Takaaki Kajita
(Part-time member)
President, Science Council of Japan
[Head of related administrative agencies]

Enhancement of the headquarters function of CSTI

1. Strategic formulation of overall governmental science and technology budget

CSTI will give guidance to ministries and agencies as early as the phase of estimating budgets request based on the revised “Action Plan for Important Measures of Science and Technology,” etc. This is a New Mechanism, whereby CSTI takes lead role in prioritized budget allocations for the whole government. (The Minister of state for Science and Technology policy holds the director-general level Science and Technology Budgeting Strategy Committee.)

2. Cross-ministerial Strategic Innovation Promotion Program (SIP)

CSTI allocates budgets beyond the framework of ministerial organizations and science and technology areas to promote overall efforts from basic study to the exit (practical application, commercialization).

3. Public/Private R&D Investment Strategic Expansion Program (PRISM)

The PRISM was set up in FY2018 with the aim of directing R&D measures of ministries and agencies to the “R&D investment target areas” in expectation of significant effects on the induction of private R&D investment for expanding public and private R&D investment and streamlining the efficiency of fiscal spending.

4. Moonshot R&D Program

Aiming at creating destructive innovation originating in Japan, challenging R&D (moonshot) is promoted based on audacious ideas which are not found in the extension of conventional technologies. With ambitious goals being set, innovative research outcomes will be discovered and developed by gathering wisdom and insight from all over the world while allowing failures.

Program Outline

＜Features of SIP＞

○ CSTI's top-down decision on programs, essential for society and critical for Japanese economy and industrial competitiveness, program directors (PDs) and budgets.

○ Cross-ministerial efforts through industry, academia and government cooperation.

○ Focused, end-to-end R&D from basic research to practical application and commercialization. Utilize results in reform of regulations and/or systems, special wards, government procurement, etc. Significant for international standardization.

○ Intellectual property management system facilitating strategic corporate use of R&D outcomes.

＜Budget＞

○ 32.5 billion yen was allocated as budget in FY2014 for Expenditure on Science, Technology and Innovation Promotion.* (28 billion yen in FY2018 to FY2022).

* 17.5 billion yen was allocated as adjusting expenses for medical R&D besides the above expenses.

Program Structure

＜Implementation Structure＞

○Select directors for each program (PD)

(assigned by Prime Minister with the consent of Governing Board(hereinafter referred to as GB)).

○ PDs break through ministerial silos, managing programs from a cross-ministerial perspective. The promoting committee chaired by the relevant PD and composed of related ministries, etc. was therefore set up.

○ The GB consisting of CSTI expert members is held as necessary to provide evaluation and advice for all programs.

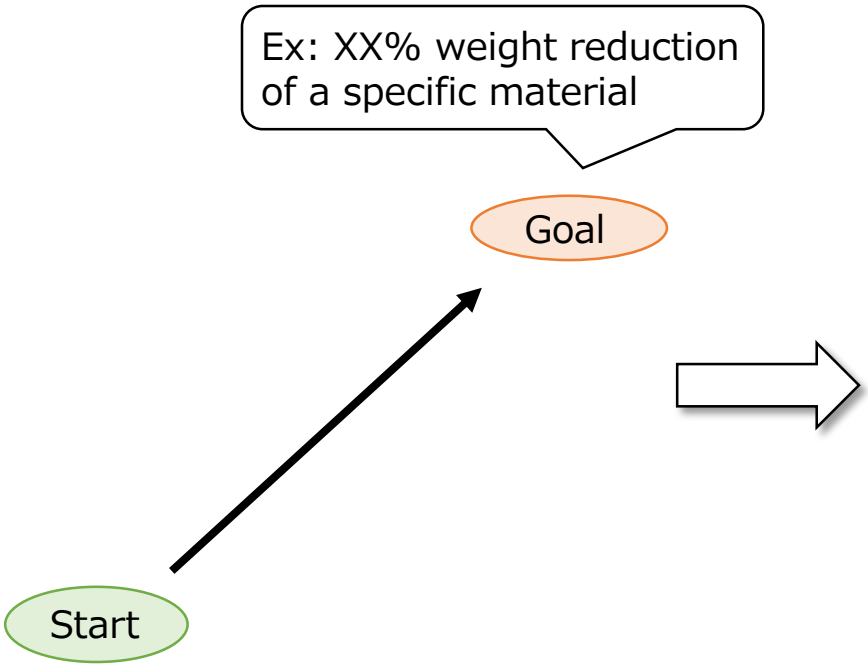
○ The executive director was posted to support the GB (from FY2018).

Agile, comprehensive approach to solving social issues

A more agile and comprehensive approach to solving social issues is needed as technological development and the business environment change more rapidly than in the past.

Conventional

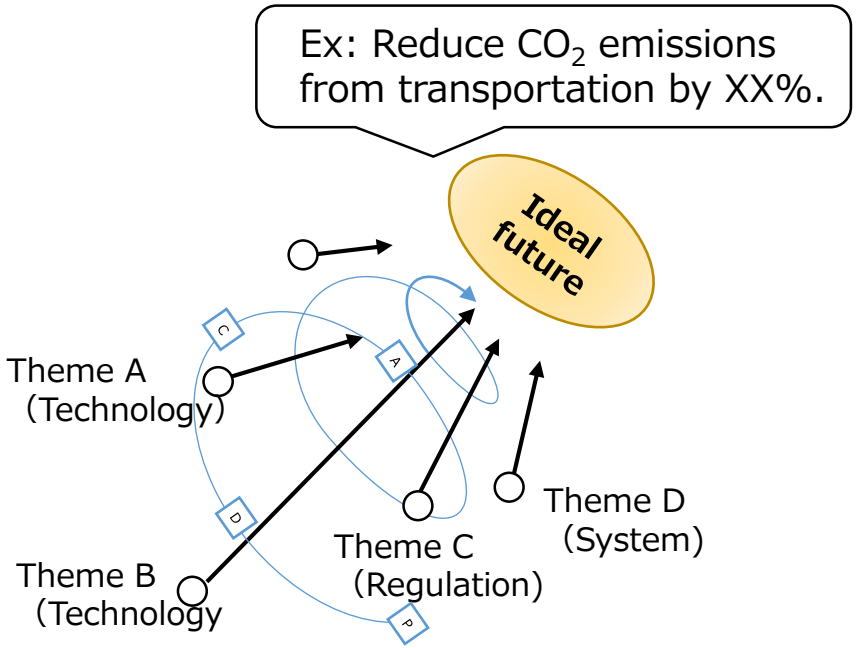
Linear development model by a single ministry



Management of technology development to achieve predetermined goals

SIP approach (Image assuming basic case)

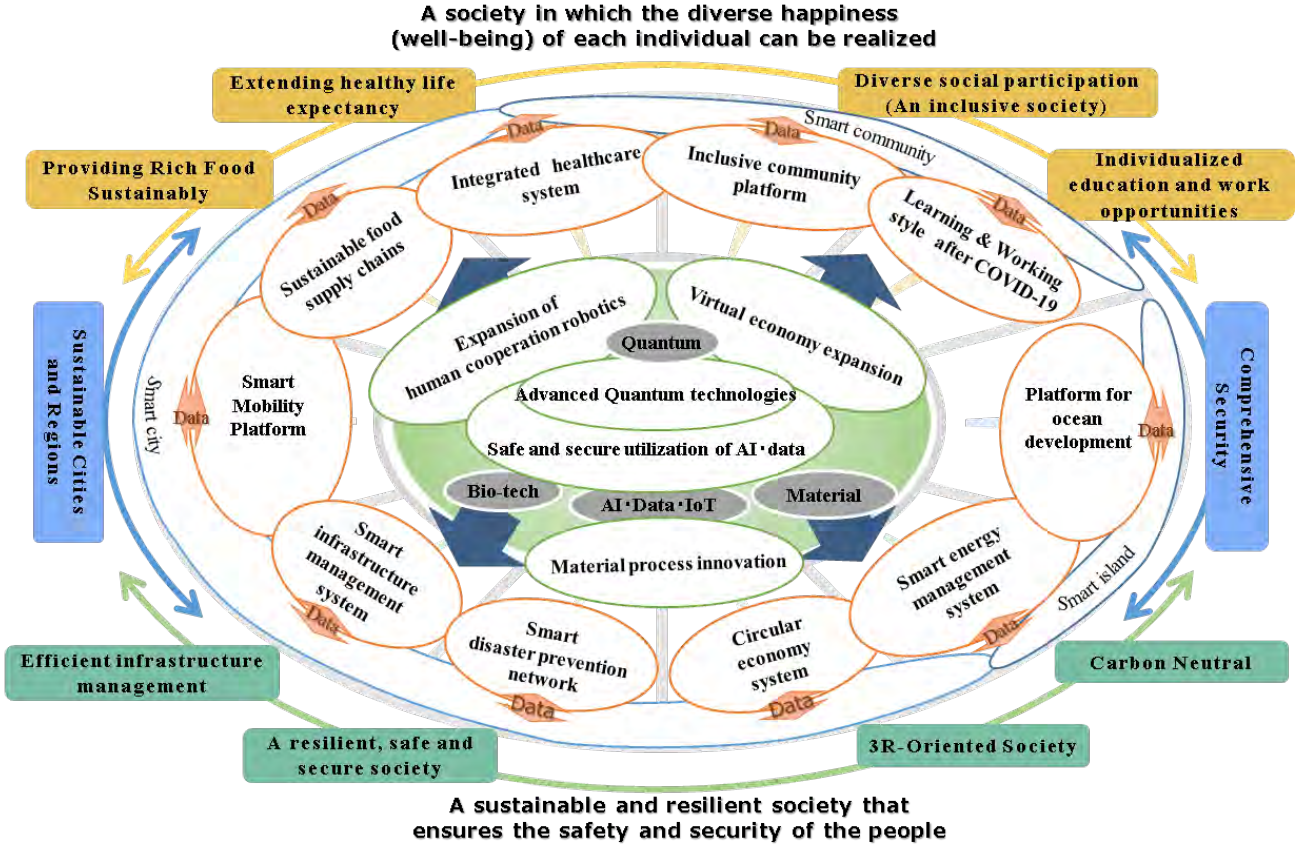
Mission-oriented agile development model with ministry collaboration



A program director flexibly and comprehensively modify the plan based on PDCA cycle.

Target areas in the next SIP to realize "Society 5.0”

- Cabinett office setted up target areas where the development and diffusion of innovative technologies and reform of social systems are required beyond the boundaries of conventional industries and fields, in order to realize "Society 5.0” in the next SIP.
- For each area, there have been related efforts by relevant ministries and agencies, industry, and academia. Therefore, the next SIP will not comprehensively address these areas, but will serve as a hub for ministry-industry-academia-government collaboration based on a basic framework, and will work on the development of fundamental technologies, the establishment of common systems, rules and regulations.
- Rather than working independently in each area, the program will work toward the realization of Society 5.0 through the development of an integrated promotion system, data collaboration among areas, the development of common indicators related to cross-cutting social issues such as well-being and carbon neutrality, and the use of comprehensive knowledge for the construction of social systems.



Five readiness levels (indicators) for social implementation

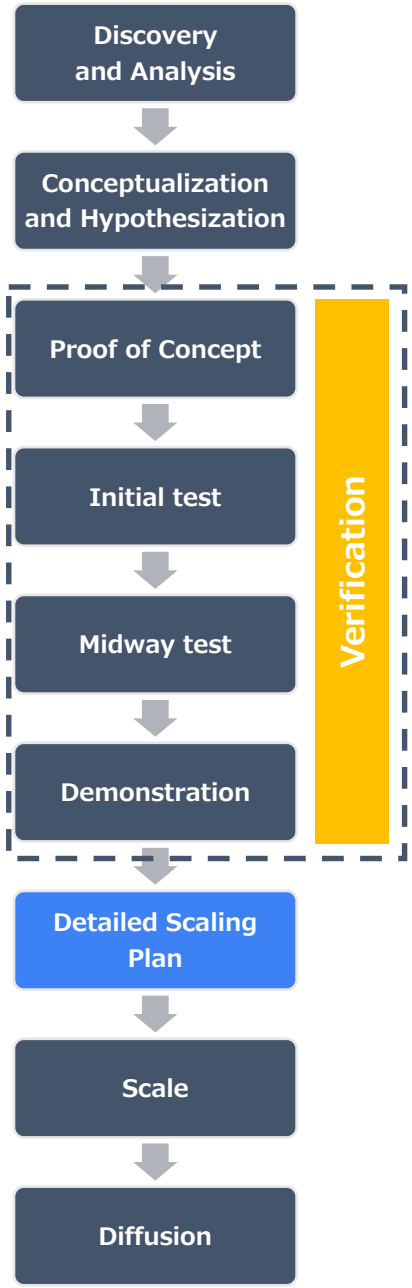
The readiness levels (XRL: X Readiness Level) are defined in terms of five essential perspectives for social implementation.

Five readiness levels (indicators) for social implementation	
TRL (Technology Readiness Level) －Development of a necessary technology－	Technology readiness level indicates the stages at which a “certain technology” reaches the maturity level of technological requirements.
BRL (Business Readiness Level) －Sustainability as a business－	Business readiness level indicates the stages at which a "business using created values†" reachs the maturity level for a stable business.
GRL (Governance Readiness Level) －Development of regulation and rules－	Governance readiness level indicates the stage until the necessary rules and regulations are in place for market growth.
S(C)RL (Social (Communal) Readiness Level) －Social acceptability for the values－	Social readiness level indicates the stages at which the goods or services created by the technological innovation becomes more acceptable to community for a certain diffusion level.
HRL (Human Resources Readiness Level) －Necessary human resources for implementation－	Human resources readiness level indicates the states for the development and utilization of human resources necessary for the market growth of the goods created by the technological innovation

† Created values : A generic term for new technologies, goods and services to be created in the future from the SIP

Note: Since governance, social acceptability, and human resources are important factors for commercialization, BRLs often include GRLs, SRLs, or HRLs for consideration, but the SIP has more detailed indexes for social implementation toward Society 5.0.

Basic design of rediness levels for social implementation



Point 1 Basic flow of the readiness levels

The TRLs (Technology Readiness Levels) are commonly used to show maturity of an innovation in the private sector. The basic flow for each readiness level is set to the general level setting shown on the left figure.

Point 2 Step-by-step verification process

Readiness levels are clearly expressed to show the process of "trial and error“ (hypothesis ⇔ verification/demonstration), which is considered to be essential for social implementation. The figure on the left shows four levels of verification, but the stages can be flexibly.

Point 3 Setting up baton zones

The series of processes (baton zone) is particularly important in social implementation, where the R&D sectors and the social implementer confirm the result and evaluate whether it can be scaled.

Although we have established a detailed scaling plan as the basic exit for the SIP, some program might have the exit of transferring to another project at some other stage.

Establish a 3-layers structure for management

- In order to efficiently and effectively utilize the functions of the Governing Board (GB), PD, and project management agencies, and to promote not only technological development but also efforts toward social transformation from multiple perspectives in the next SIP, we will establish a 3-layers structure for management.
- Each layer is not independently or unilaterally involved, but is related to each other and builds a system to proceed through communication.