INTERSESSIONAL PANEL OF THE UNITED NATIONS COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD)

Geneva, Switzerland
17-19 November 2021
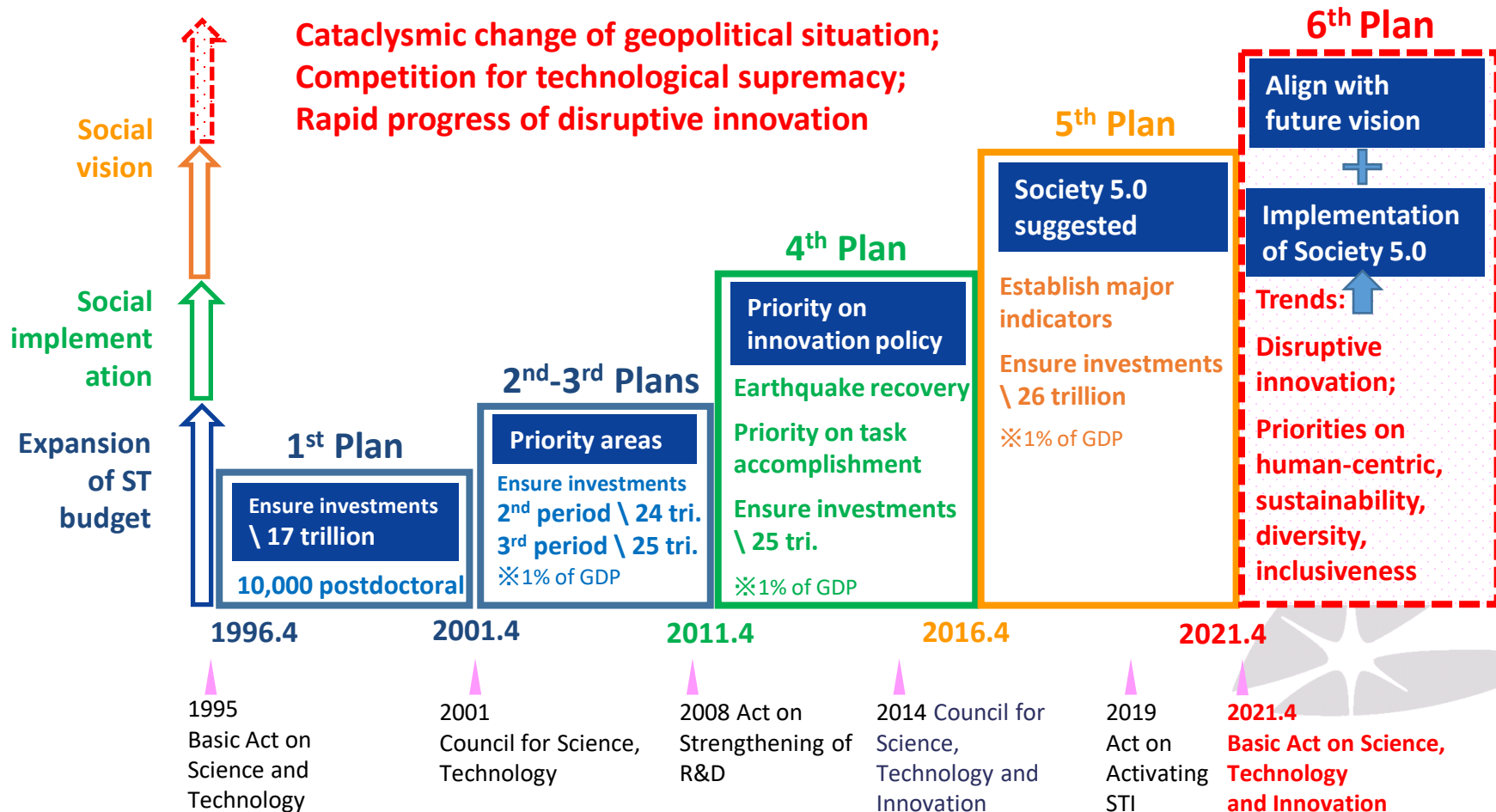
Contribution by Japan

to the CSTD 2021-2022 priority theme on "Industry 4.0 for inclusive development"

Transition of Japan's Science, Technology and Innovation Policy

- Formulation of the Science and Technology Basic Plan every 5 years based on the Basic Act on Science and Technology (Advisory to the Prime Minister)
- **Expansion of S&T budget** prioritized in the 1st-3rd Plans; **Social implementation** prioritized in the 4th Plan; **Society 5.0** proposed in the current 5th Plan
- 6th plan will be the 1st **Science, Technology and Innovation Basic Plan** as a result of the revision of the Basic Act

Cataclysmic change of geopolitical situation; Competition for technological supremacy; Rapid progress of disruptive innovation

Social vision

Social implementation

Expansion of ST budget

6th Plan

Align with future vision

Implementation of Society 5.0

Trends:

Disruptive innovation;

Priorities on human-centric, sustainability, diversity, inclusiveness

5th Plan

Society 5.0 suggested

Establish major indicators

Ensure investments ¥ 26 trillion

※1% of GDP

4th Plan

Priority on innovation policy

Earthquake recovery

Priority on task accomplishment

Ensure investments ¥ 25 tri.

※1% of GDP

2nd-3rd Plans

Priority areas

Ensure investments 2nd period ¥ 24 tri. 3rd period ¥ 25 tri.

※1% of GDP

1st Plan

Ensure investments ¥ 17 trillion

10,000 postdoctoral

1996.4

2001.4

2011.4

2016.4

2021.4

1995 Basic Act on Science and Technology

2001 Council for Science, Technology

2008 Act on Strengthening of R&D

2014 Council for Science, Technology and Innovation

2019 Act on Activating STI

2021.4 Basic Act on Science, Technology and Innovation

What is "Society 5.0" ?

"Society 5.0" is a new society coming up after Information Society:

- Produced by sophisticated integration of cyberspace and physical space;
- Reconciles economic growth and resolution of social issues;
- Realizes a human-centered and inclusive society.

Society 5.0
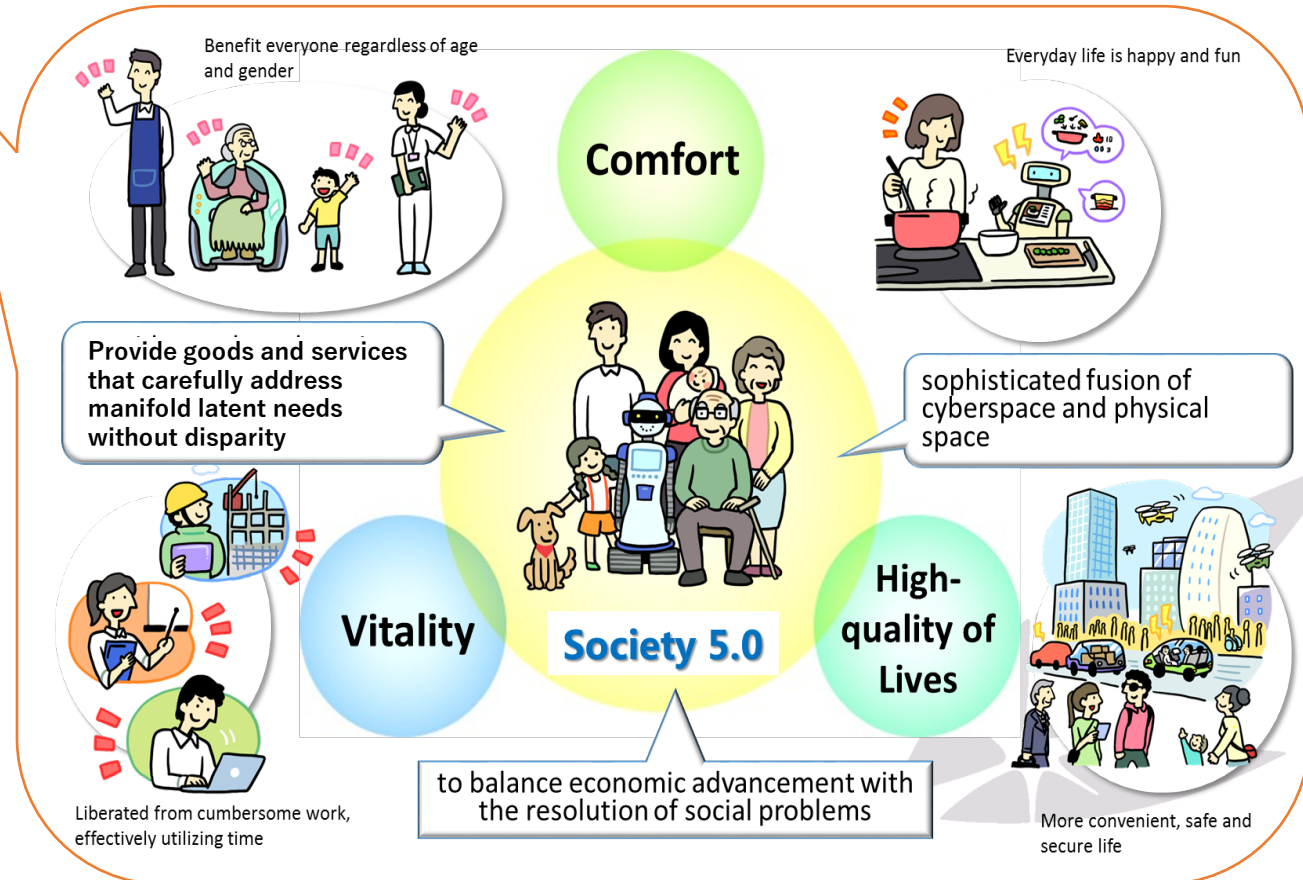
↑

4. Information Society

↑

3. Industrial Society

↑

2. Agrarian Society

↑

1. Hunter Society

Benefit everyone regardless of age and gender

Everyday life is happy and fun

Comfort

Provide goods and services that carefully address manifold latent needs without disparity

sophisticated fusion of cyberspace and physical space

Vitality

Society 5.0

High-quality of Lives

to balance economic advancement with the resolution of social problems

Liberated from cumbersome work, effectively utilizing time

More convenient, safe and secure life

Building "Society 5.0" towards a Sustainable Society
even under pandemic of COVID-19 and extreme natural disasters

Online medical care / Tracing / Robot-supported caregiving

Extending healthy life expectancy/ Reducing the social cost
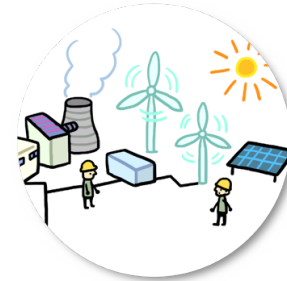
Energy diversification/ Local production

Stable supply of energy/ GHG emission reduction

Society 5.0

Remote work / Remote construction/ Remote education

Increasing productivity and resilience

Automatic production and delivery / Optimal value chain

Promotion of sustainable industrialization/ Eliminate labor shortage

Outline of the 6th Science, Technology, and Innovation Basic Plan

Changes in the Situation at Home and Abroad

Accelerate

Expansion of the Novel Coronavirus Infection

Review of STI policies

- ✓ The battle for supremacy between countries centered on advanced technologies (AI, quantum, etc.) has become sharper
- ✓ Manifestation of threats such as disasters that are more serious due to climate change
- ✓ Information monopoly by IT platformers and uneven distribution of great wealth

- ✓ Rapid social changes in order to prevent the spread of the infection and to maintain economic activities
- ✓ Reviewing the sustainability and resilience of its economy as supply chains are about to be disrupted
- ✓ Drastic changes in the environment of daily life, such as working from home and online education

- ✓ Purposed digitization and continuous decline in research capacity
  - Digitization is mainly to improve the efficiency of existing work
  - Decline of international share of papers
  - Increase of young researchers with tenure
- ✓ Revision of the Basic Act on Science and Technology
  - Addition of "promotion of the humanities and social sciences"
  - Addition of "creation of innovation"

"Response to global issues" and "Reform of social structures in Japan" are essential

Society That Japan Aims for (Society 5.0)

Ensuring the safety and security of the people by being sustainable and resilient

Realization of diverse happiness (well-being) for each individual

[Securing Sustainability]
- ☐ Sustain the global environment
- ☐ Realize a society where current and future generations can live in affluence

[Securing Resilience]
- ☐ Realization of comprehensive security against various threats, including disasters and infectious diseases

[Realization of Economic Affluence and Qualitative Affluence]
- ☐ Enable everyone to develop their abilities and work in various ways
- ☐ Life-long and active participation in society
- ☐ Continue to dream, affirm their own existence, and be active

Realize Society 5.0* by combining this vision of society with Japan's traditional values of "Trust" and "Sharing"

Communicate to the global community and attract human resources and investment from around the world

※In the 5th Basic Plan period, Society 5.0 is defined as "a human-centered society that achieves both economic development and solutions to social issues through a system that highly integrates cyberspace and physical space"

Outline of the 6th Science, Technology, and Innovation Basic Plan

- Realization of Society 5.0 requires a virtuous cycle of "social transformation through comprehensive knowledge" and "investment in knowledge and people".
- The three pillars of the policy are (1) social structural transformation, (2) fundamental strengthening research capacity, and (3) development of human resources to support a new society.
- Draw up policies based on convergence of knowledge (the integrating of natural science, social science and humanities) and evidence, and flexibly improve them through evaluation.
- Aim for a total government R&D investment of approximately 30 trillion yen and a total public-private R&D investment of approximately 120 trillion yen for 5 years.

STI Policy for the Realization of Society 5.0

(1) Transformation into a sustainable and resilient society through the fusion of cyberspace and physical space (social structural reform premised on digital utilization).
- Promotion of digitalization of government through launching the Digital Agency, and implementation of the Public-Private Data Strategy
- Transition to a circular economy, such as realization of carbon neutral (Green Fund, etc.)
- Building of a resilient, safe and secure society
- ⇒ Support for startups, development of smart cities, social implementation by the next SIP※ and Moonshot Research, and promotion of international expansion
  ※ Cross-ministerial Strategic Innovation Promotion Program

(2) Creation of "knowledge" as a source of value creation by designing a new society (strengthening research capacity)
- Strengthening support for doctoral students and young researchers; promoting the activities of female researchers
- Promotion of basic and academic research, the humanities and social sciences; create "comprehensive knowledge"
- Creation of a 10 trillion yen university fund and university reform (transformation into a management entity)

(3) Development of human resources to support a new society (strengthening of "ability to explore" and "attitude to continue learning")
- Promotion of STEAM education※ and GIGA school concept from elementary and secondary education stages
- Fostering an environment/culture to promote recurrent education (re-learning/re-education)
  ※ Science and mathematics and creative education method (Science, Technology, Engineering, Arts and Mathematics)

Specific Initiatives in the 6th Basic Plan
(1) Transformation into a Sustainable and Resilient Society

Redesigning the society of our country to solve global issues ahead of the world, Ensuring the safety and security of the people so that every citizen can enjoy Diverse Happiness

Transformation into a Sustainable and Resilient Society through the Fusion of Cyberspace and Physical Space

(1) Creating New Value through Fusion of Cyber Space and Physical Space

- Digitization of government, establishment of the Digital Agency, completion of data strategy (Development of base registry, etc.)
- Development and R&D of next-generation infrastructure such as Beyond 5G, supercomputers, space systems, quantum technology, semiconductors, and data/AI utilization technologies

Contributing to Global Issues using Infrastructure   **Reforming the domestic system utilizing infrastructure**

(2) Promoting social transformation and innovation to overcome global challenges

- Carbon neutral by 2050

- Formulating an action plan for the Green Growth Strategy and promoting social implementation of innovative new technology (Utilization of the **2 trillion Yen Fund**)

(3)

Building a resilient, safe, and secure society

Ecosystems support value creation

(4) Formation of an Innovation Ecosystem as a foundation for creating new industries based on collaborative value creation

Compiling the above initiatives

(5) Urban and regional development to be passed on to the next generation (Development of Smart Cities)

Supporting the above initiatives and responding to various social issues

(6) Promoting of R&D and social implementation and utilizing convergence of knowledge to solve various social issues

- Consideration of the **Next SIP** and candidate research topics
  (Identifying social issues that CSTI should address in the mid-term based on the implementation structure and sectoral strategies to utilize "knowledge")
- Market acquisition with intellectual property and standards
- Strategic Promotion of **Science and Technology Diplomacy**
  (Securing and expanding the system to enable Japan to play a leading role in international consensus building and formation of frameworks/rules related to science and technology innovation, strengthening the system for cross-ministerial cooperation, and reinforce the infrastructure for collecting and disseminating information)

Restoring world-class research capabilities that continue to create "knowledge" with diversity and excellence

Designing a new social system and creating "knowledge" as a source of value creation

(1) Rebuilding an environment that fosters diverse and outstanding

- **Improvement of treatment for doctoral students and expansion of career paths for postdoctoral fellows** (internal scholarships and fellowships, RA expenses, university funds, and long-term paid internships)

- **Securing positions for young researchers**, promoting the activities of female researchers, encouraging **basic and academic research**, promotion of humanities and social sciences, and creating convergence of knowledge

  [Major Goals]
  - Increase the number of doctoral students receiving living expenses by 3 times (Equivalent to about 70% **of students advancing from master's programs**)
  - **Increase by 10%** the proportion of stable employment among full-time faculty members aged 35-39 at research universities

Accelerate research and increase impact

(2) Establishment of a new research system (Promotion of open science, data-driven research, etc.)

- Management and utilization of research data based on open and close strategy

- Acceleration of research using smart labs, AI, etc., and maintenance/sharing of research facilities, equipment, and devices

- Fostering a new research community and environment pioneered by Research DX

Integrating knowledge and human resources to drive research

(3) Promotion of university reform and expansion of functions for strategic management

- Establishment **of a 10 trillion yen university fund**

  (By utilizing investment income, the fund will provide long-term and stable support for the development of shared facilities, data collaboration infrastructure at universities that conduct world-class research and development, and the development of young human resources, etc. Participation in the fund will require a commitment to university reform with autonomous management and responsible governance, as well as financial contributions to the fund.)

To transform Japan as a whole into Society 5.0, we will develop human resources who can pursue diverse happiness and confront challenges

Development of human resources to support a new society

Strengthening "Ability to explore"

Strengthening "Attitude to continue learning"

Enhancing **problem-finding and problem-solving learning** with the support of society as a whole

A diverse and unique group of universities encourages **Individual Self-Realization**

Realize new challenges and diverse happiness in an **environment of lifelong education**

Elementary and Secondary Education Stage	**Higher Education Stage**	**Working Adult Stage**

☆ **Strengthen the ability to explore** through learning based on curiosity with the participation of diverse actors
- Percentage of students at the elementary and junior high school levels who find math, science, and arithmetic " fun": **Increase with a view to achieving an internationally competitive level**

☆ Individuals find "what they want to do" and **continuously improve their abilities and qualities** to achieve it
- Number of adult participants in recurrent education at universities: **1 million**

- Enhancement of development of inquiry ability by promoting **STEAM education**

- Promotion of DX in the education field (e.g., GIGA school concept) and reduction of teachers' workload

- Participation and utilization of external human resources and resources in learning

- roviding a variety of curricula and programs at universities and colleges of technology

- **Fostering an environment and culture that encourages society/companies to continue learning**

- Promotion of human resource mobility and **enhancement of learning for career change and career advancement**

- Co-creation of knowledge and enhancement of science and technology communication through participation of diverse entities such as citizens