

Innovation policy and foresight in Japan



November 19, 2007

The 3rd International Conference on Foresight

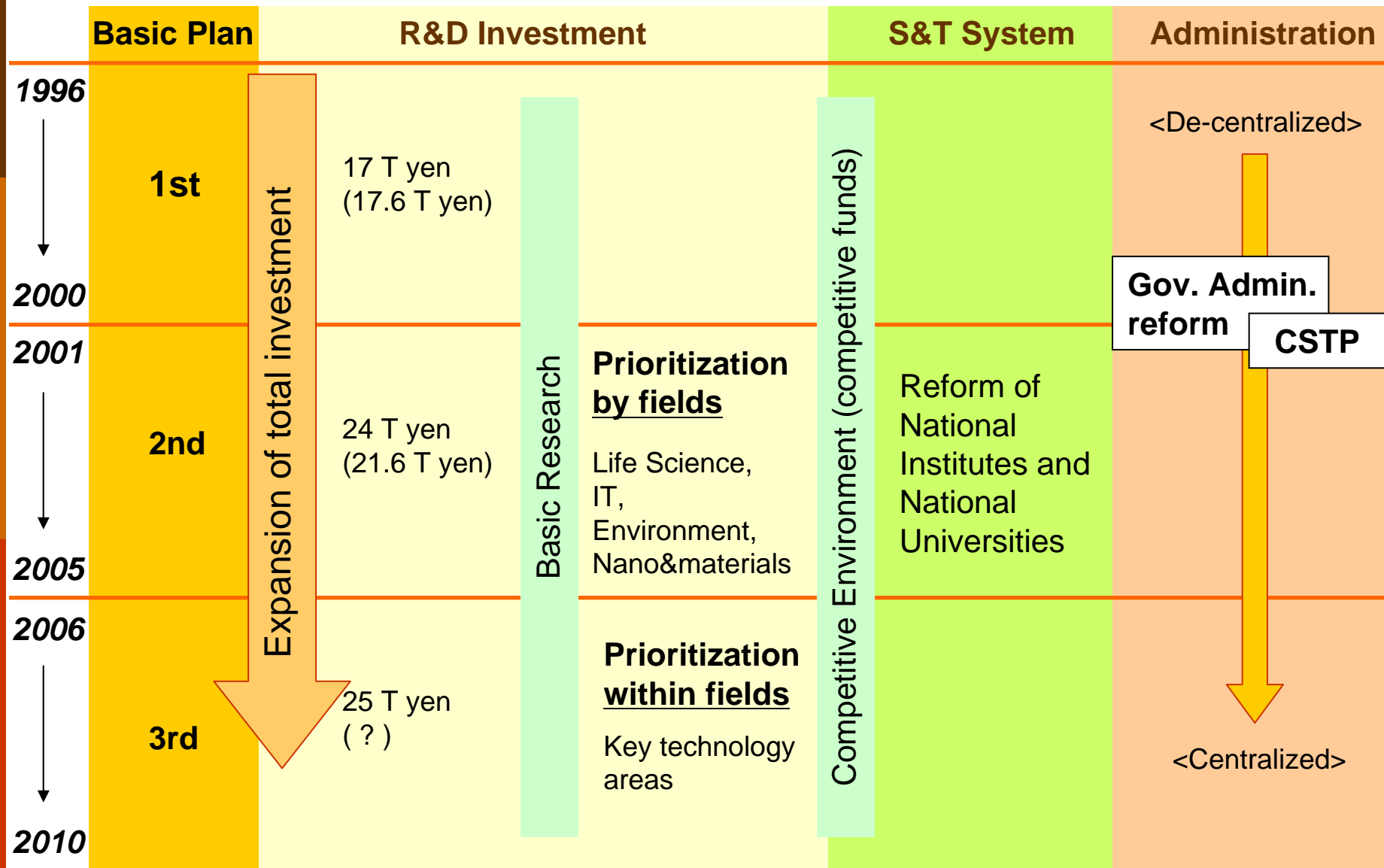
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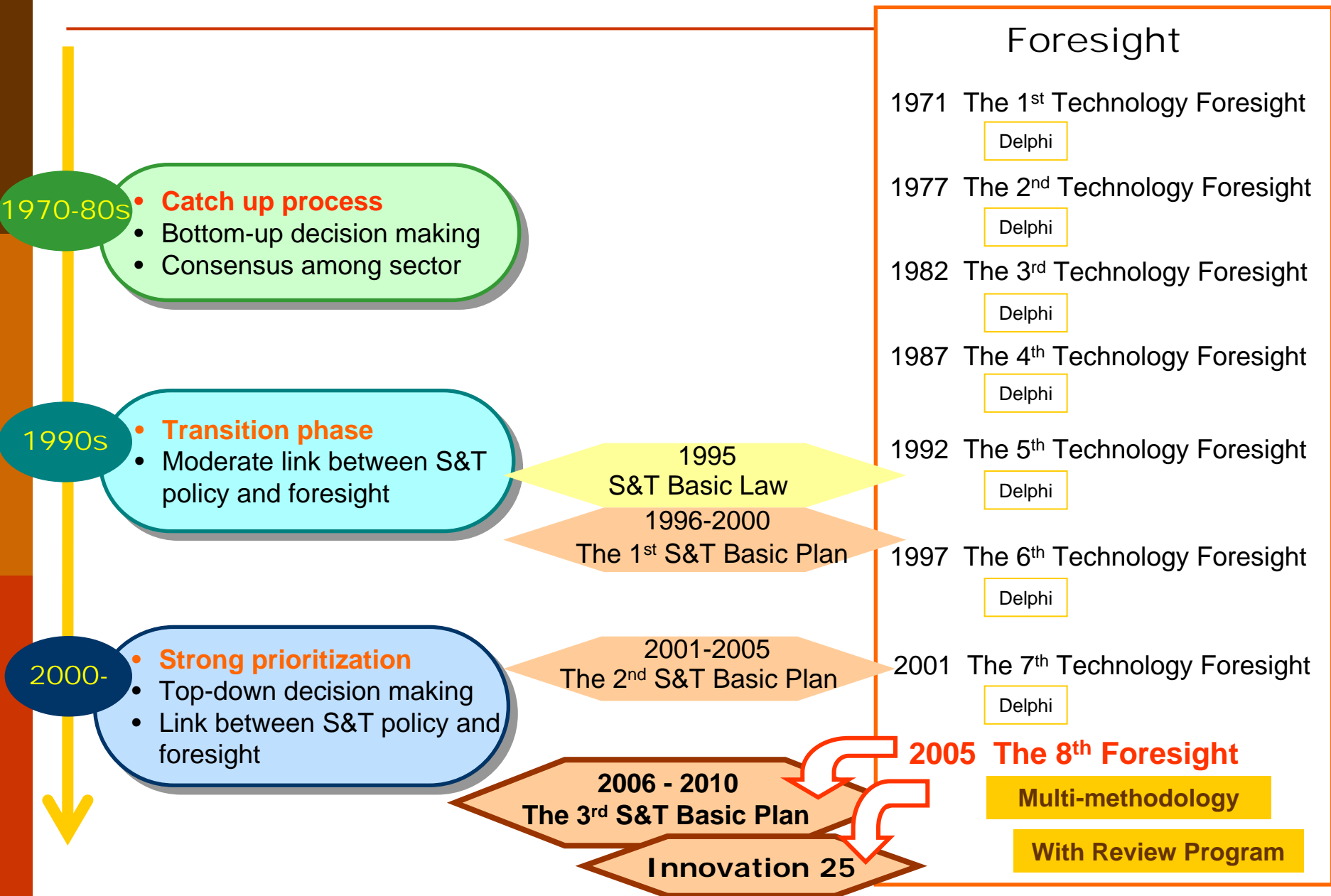
Outline

- ▣ S&T policy development
and history of foresight in Japan
- ▣ Contribution of the 8th foresight program
to the discussion for the 3rd S&T basic plan
- ▣ Contribution of the 8th foresight program
to the discussion for “Innovation 25”
- ▣ Grope for role and methodology of future foresight

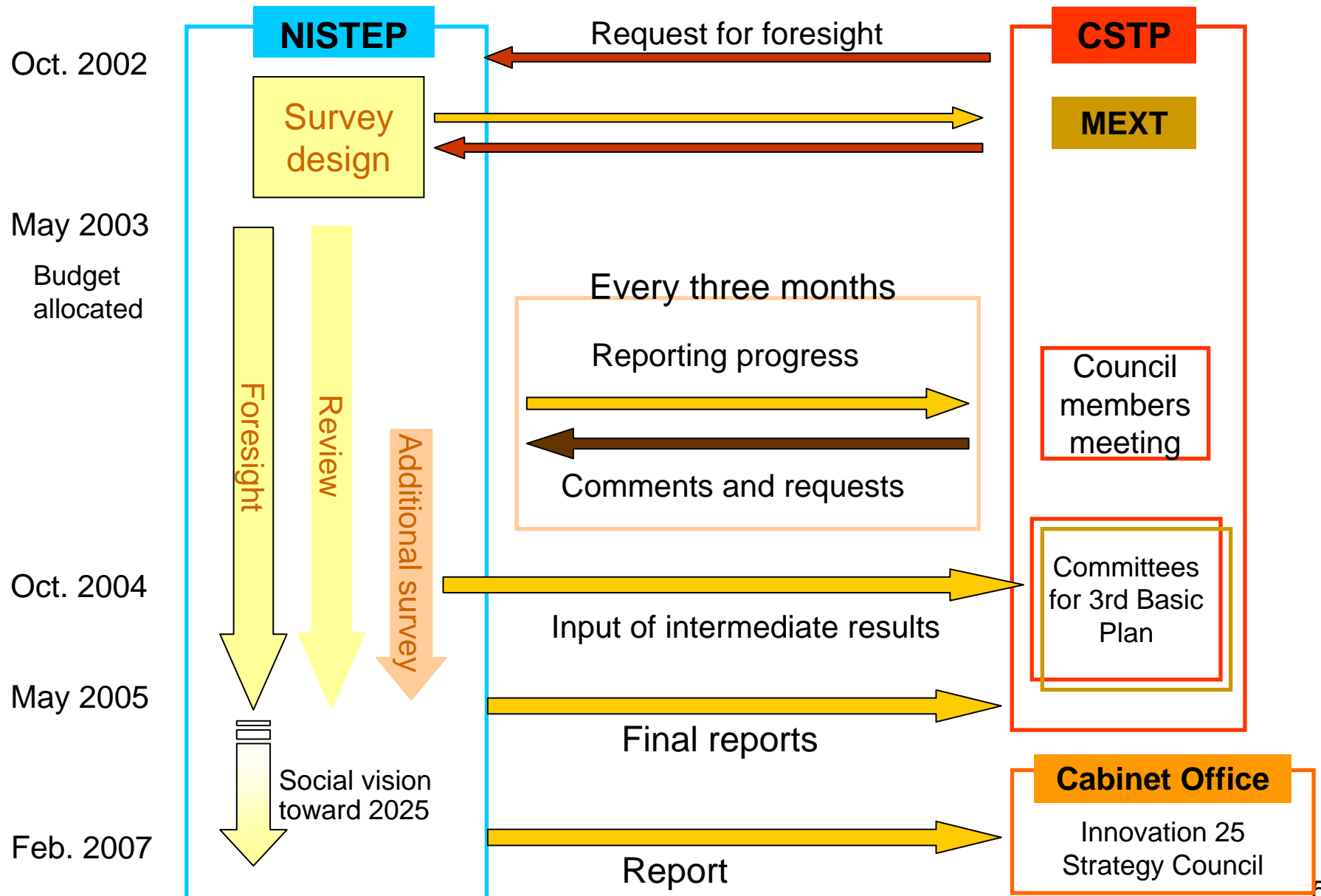
Development of S&T Basic Plan in Japan



Development of National Foresight in Japan



Linkage between foresight and policy making



The 3rd Plan : Contents

Chap.1 Basic Ideas

Chap.2 Strategic priority setting

- basic research
- priority fields
- Strategic prioritized S&T

Chap.3 S&T system reforms

- human resource development
- creating scientific development and persistent innovation**
- reinforcement of foundation
- promotion of international activities

Chap.4 S&T to be supported by society and the public

Chap.5 Role of the CSTP

The 8th foresight program

Multi-methodology Foresight

with Review program

Two research projects
conducted by NISTEP

(supported by Special Coordination Funds
for Promoting S&T in FY 2003-2004)

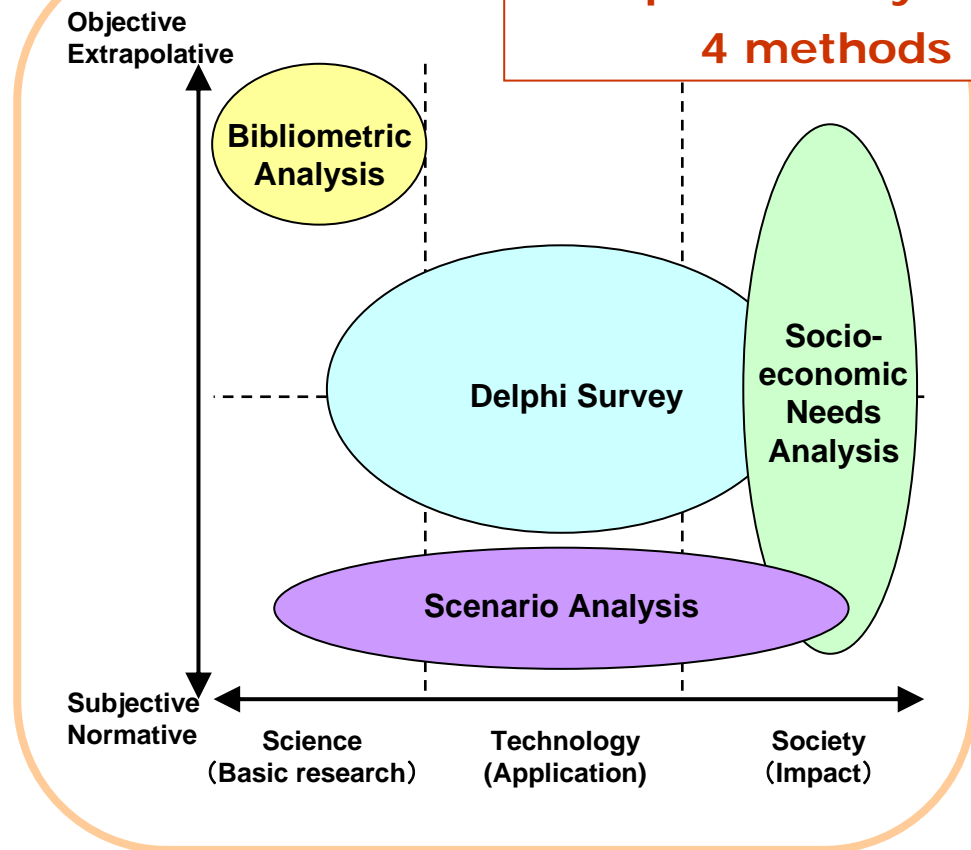
Review of the past
(during 1st & 2nd S&T Basic Plans)

S&T Indicators
Evaluation of achievements
Benchmarking
Impact study etc.

+

Multi - methodology foresight

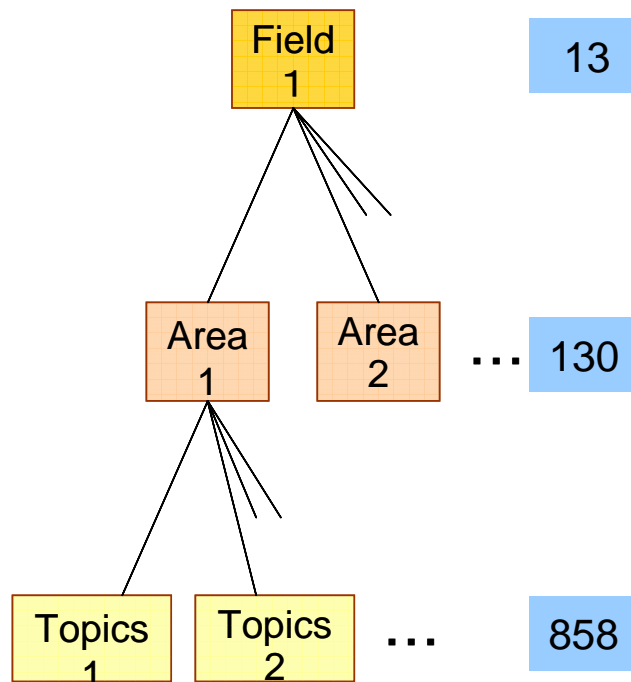
**Complementary
4 methods**



• • *More “political” message by coupling of review and foresight*

Improvements in Delphi survey

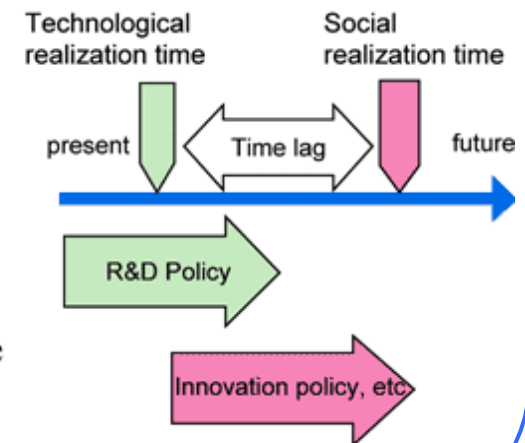
1. Structure of layers of Fields-Areas-Topics



2. Two different stages of the realization time of each topic

- Technological realization
 - Time
 - Promoting measures
- Social realization
 - Time
 - Promoting measures

- When will the technology (topic) be technologically feasible?



- When will the technology have socioeconomic impact?

Contribution of the 8th Foresight results to the discussion for The 3rd Basic Plan

1. Enhancement of Intellectual assets

- a: Contribution to enhancement of Intellectual assets on the interested area itself
- b: Contribution to progress of other areas

2. Economic Effects

- c: Contribution to developments of existing industries
- d: Contribution to creations of new industries and businesses

3. Social Effects

- e: Contribution to securing safety and security
- f: Contribution to improvement of quality of life and social vitality

Measure for evaluation: "Large (10)", "Largish (7.5)", "Moderate (5)", "Small (2.5)", "Non" (0)

Definition of impacts

S&T impact → Max (a, b)

Economic Impact → Max (c, d)

Social Impact → Max (e, f)

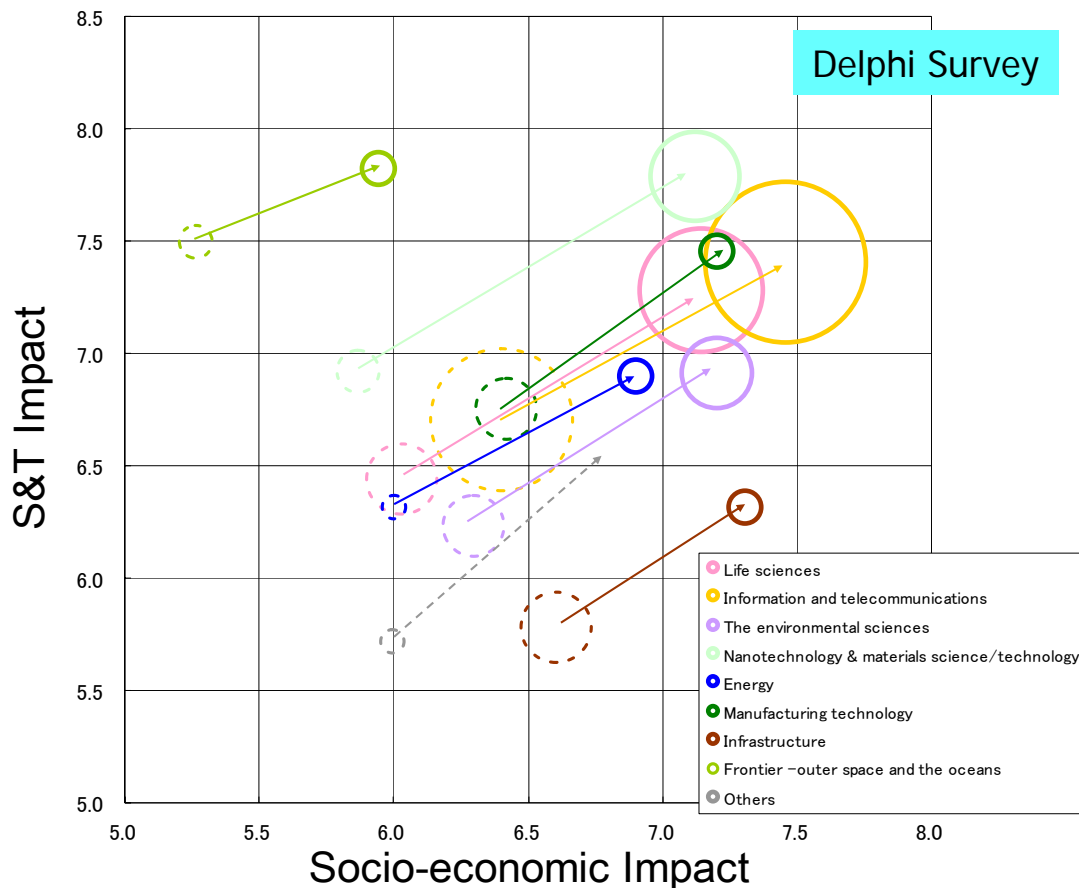
Socio-economic Impact
→ { Max (c, d) + Max (e, f) } / 2

Total Impact
→ { Max (a, b)² + Max (c, d)² + Max (e, f)² }^{1/2}

Total impacts of Prioritized fields

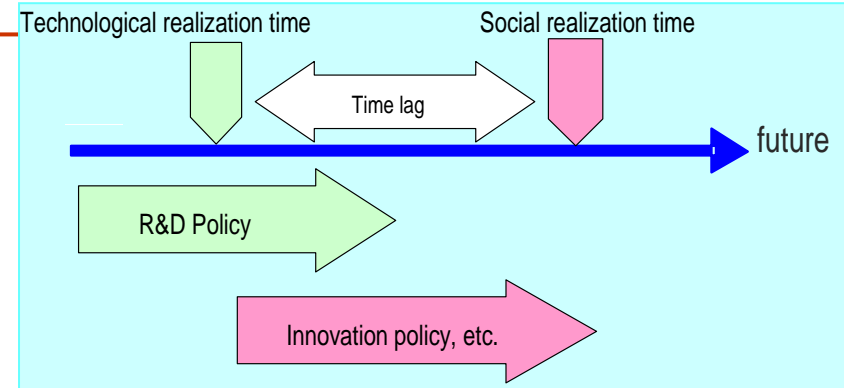
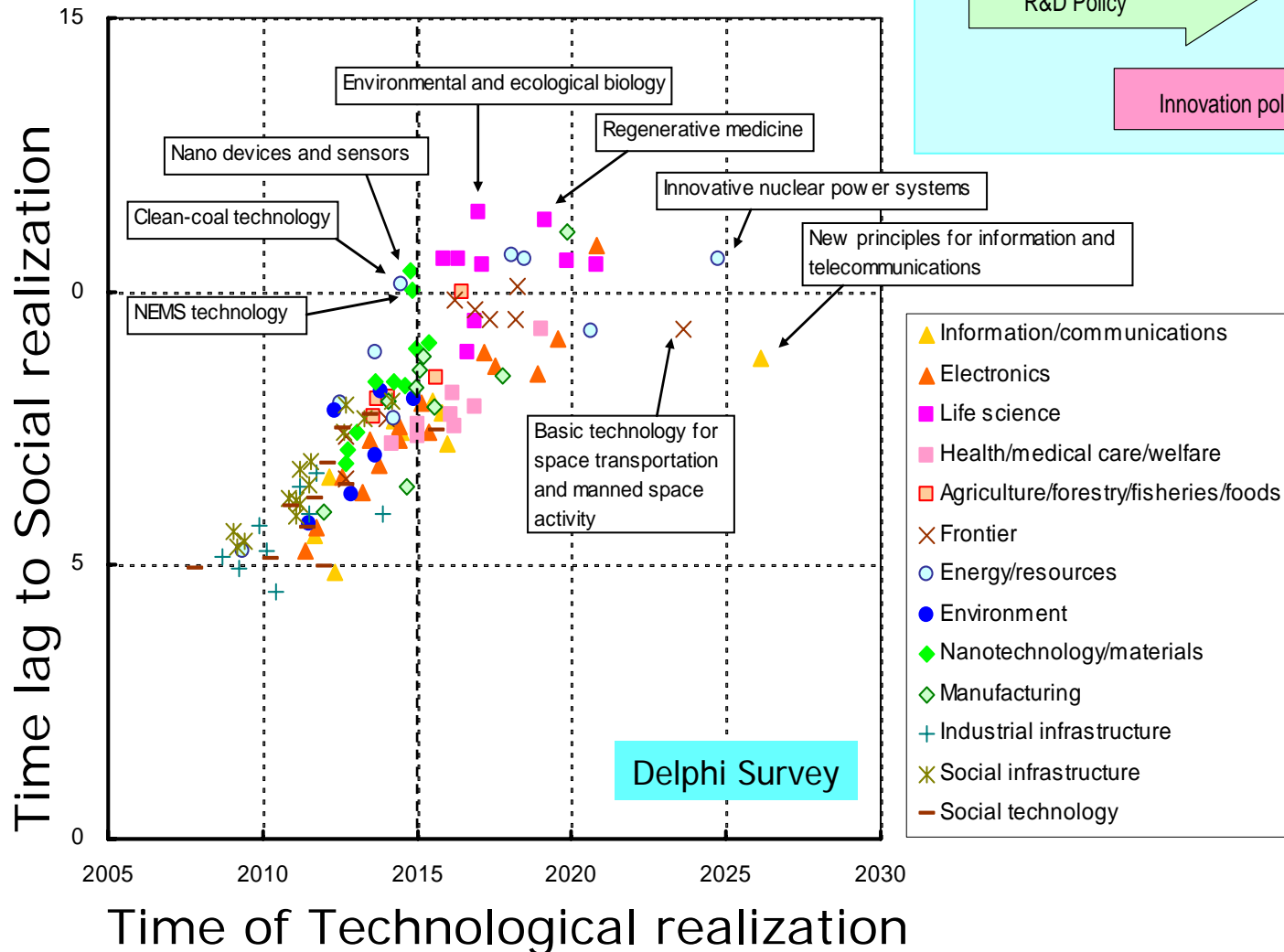
*1: Impacts of each field are evaluated by average of areas which belong to the interested field.

*2: Radius of each circle shows the number of areas with top 1/3 total impacts in each field



Contribution of the 8th Foresight results to the discussion for The 3rd Basic Plan

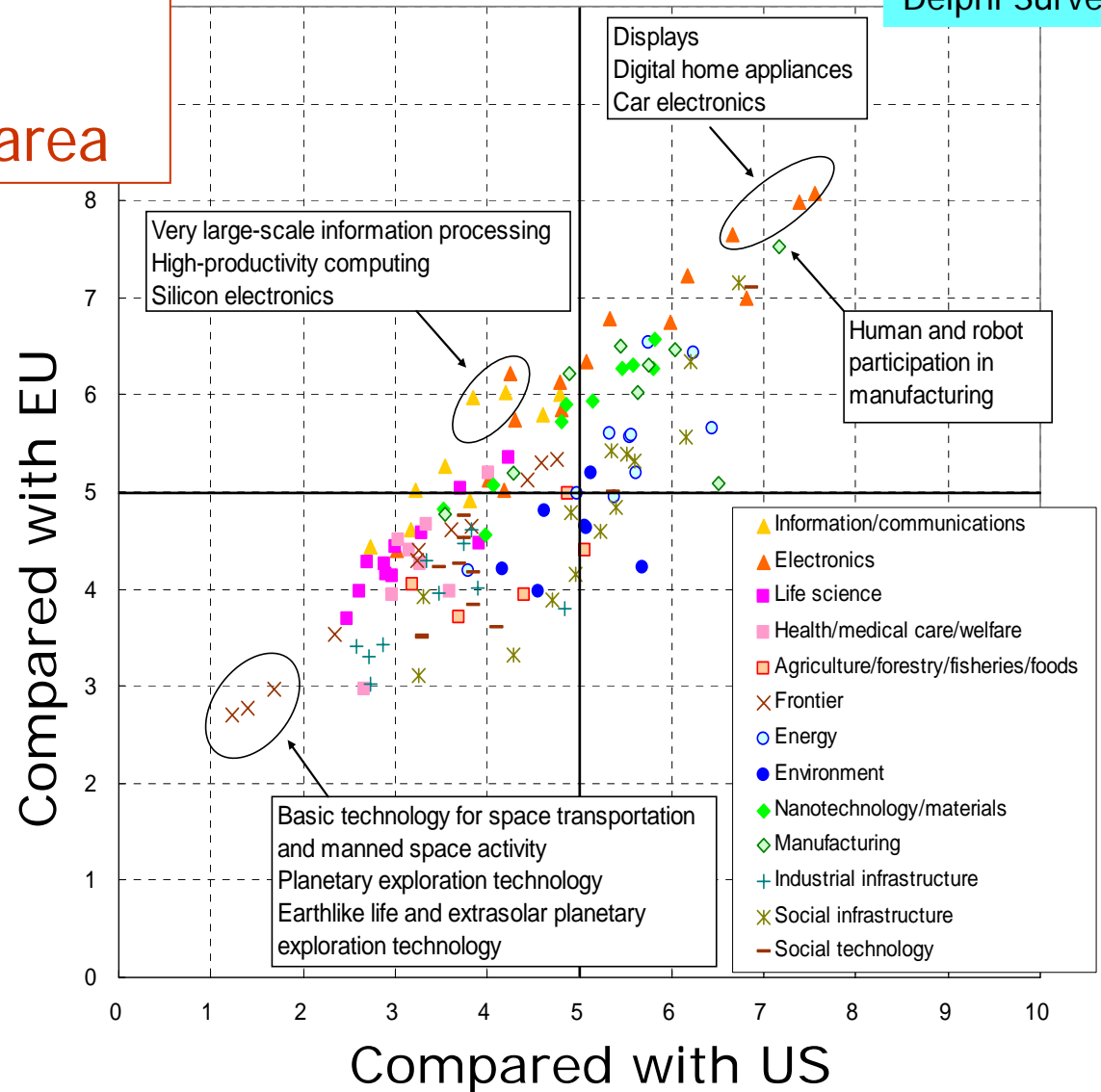
Time Lag to Impact in Society



Contribution of the 8th Foresight results to the discussion for The 3rd Basic Plan

International
Competitiveness
of R&D in each area

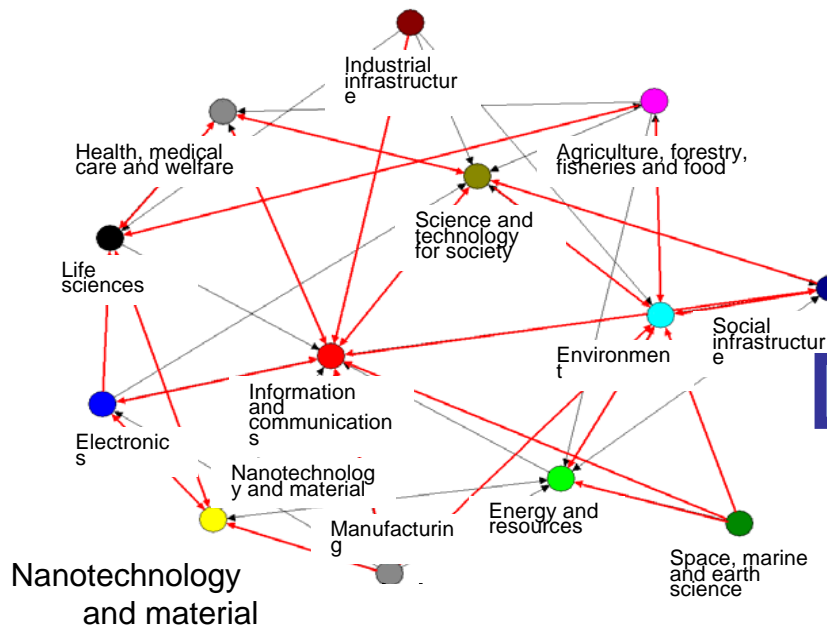
Delphi Survey



Contribution of the 8th Foresight results to the discussion for The 3rd Basic Plan

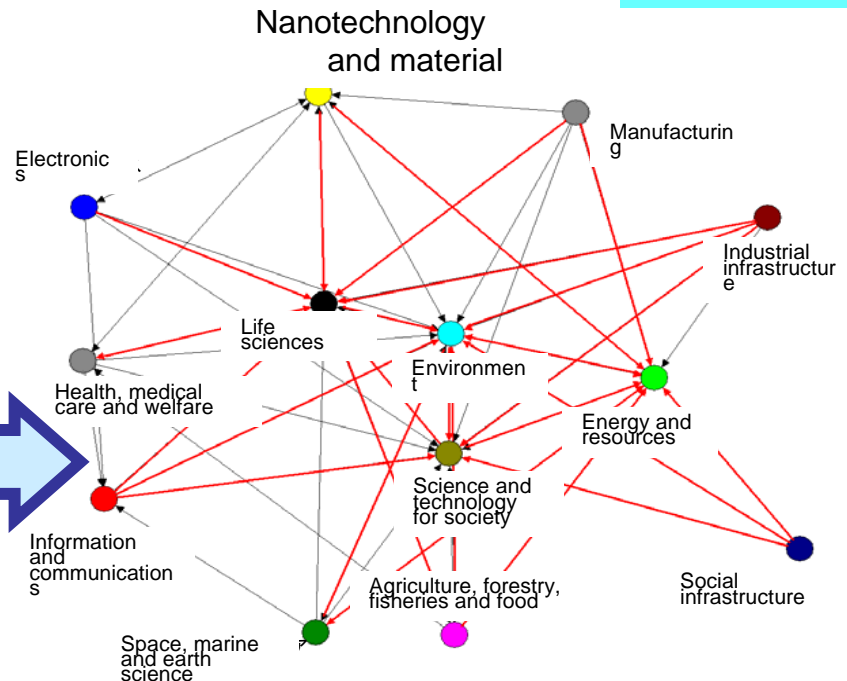
Necessity of collaboration
among fields

2005- 2015



2015-2025

Delphi Survey

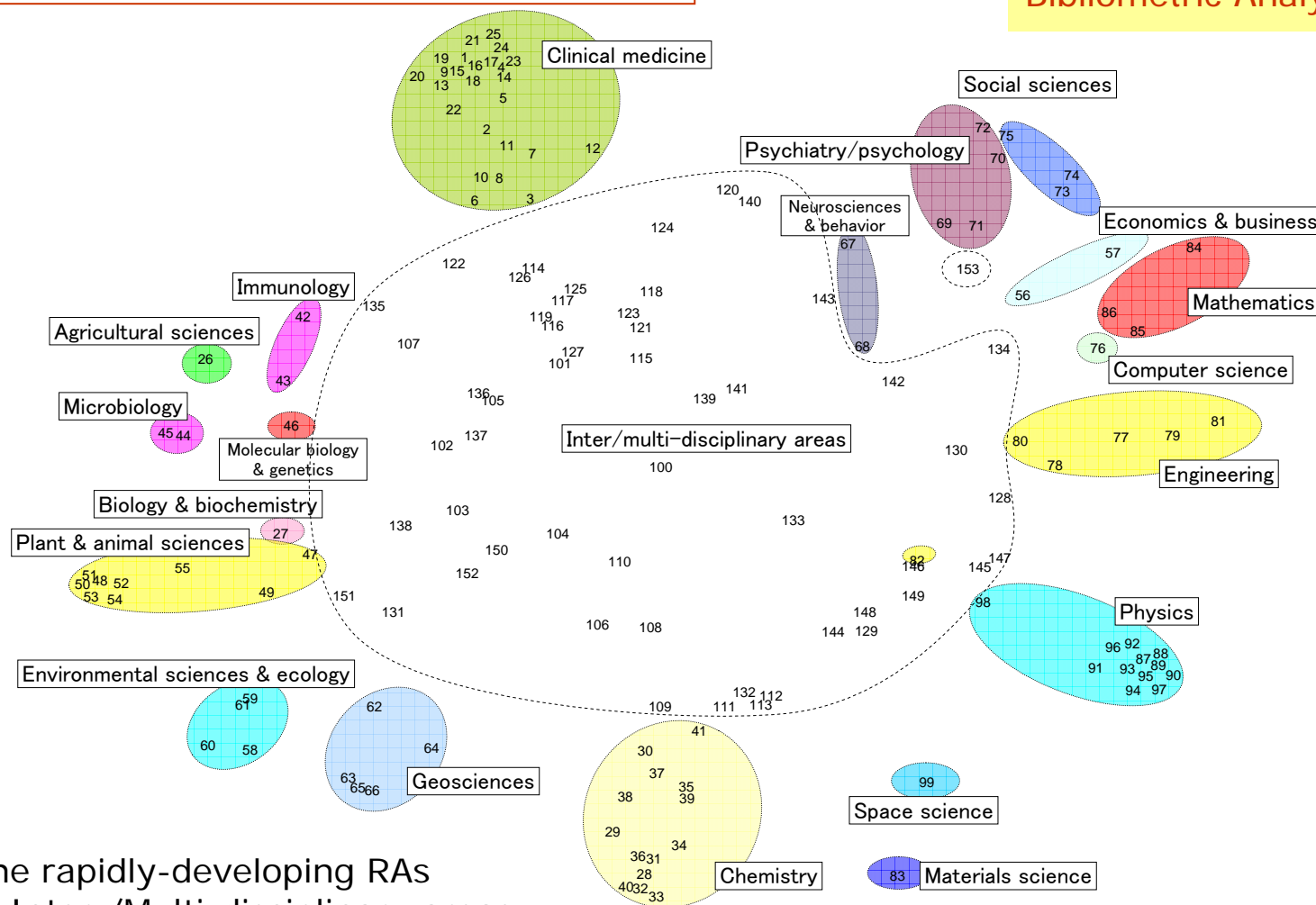


- *1 Respondents chose at most three fields to cooperate.
- *2 Black arrow indicates that 30% to 50% of respondents.
- *3 Red arrow indicates that more than 50% of respondents.

Contribution of the 8th Foresight results to the discussion for The 3rd Basic Plan

Necessity of Inter-/Multi-disciplinary R&D for new areas

Bibliometric Analysis



* 1/3 of the rapidly-developing RAs
are from Inter-/Multi-disciplinary areas.

Contribution of the 8th Foresight results to the discussion for The 3rd Basic Plan

Roadmap in emerging technology

Theme : Life support robotics

<Progressive scenario>

The development of lifestyle support robotics will be at Stage 1 from now until about 2015, with technology for “mechanical robots” and “communications robots” developing separately. Beginning about 2016, Stage 2 will likely see the development of integrated technology. Development during Stage 1 is likely to progress as follows.

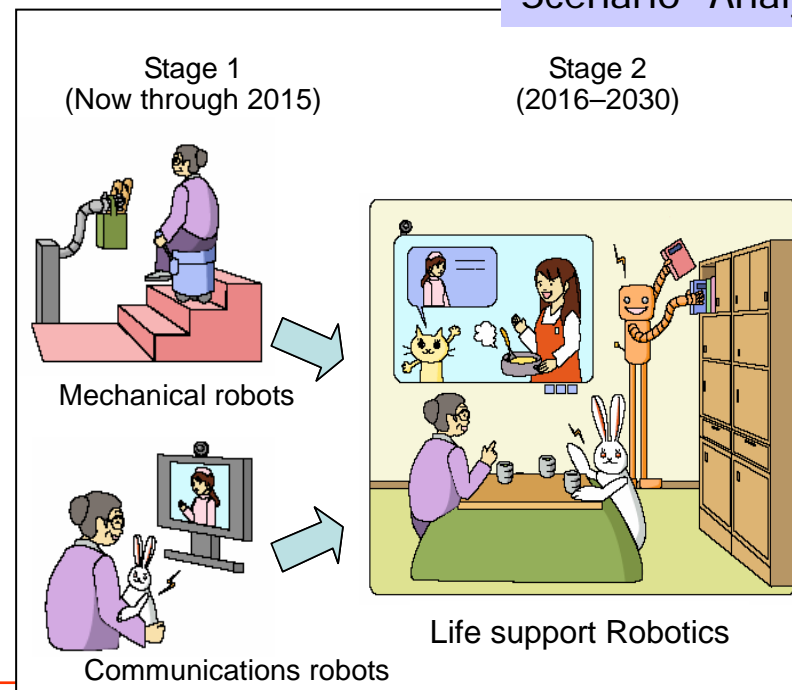
Single-function household robots

- Upgrading of functions through networks
- Coordinated service by networked robots

Actions Japan should take :

- ◆ Strategy 1: Connecting various robots to network information and communications infrastructure is the top priority.
- ◆ Strategy 2: Power-assist technology should be given priority for advancement.
- ◆ Strategy 3: Take initiatives on social intelligence (communication with human beings) rather than on individual intelligence.
- ◆ In particular, Japan should establish initiatives to actively advance collaborative research in social science, cognitive science, brain science, and other research fields related to robot-human interaction (research on social intelligence-utilizing robots)

Scenario Analysis



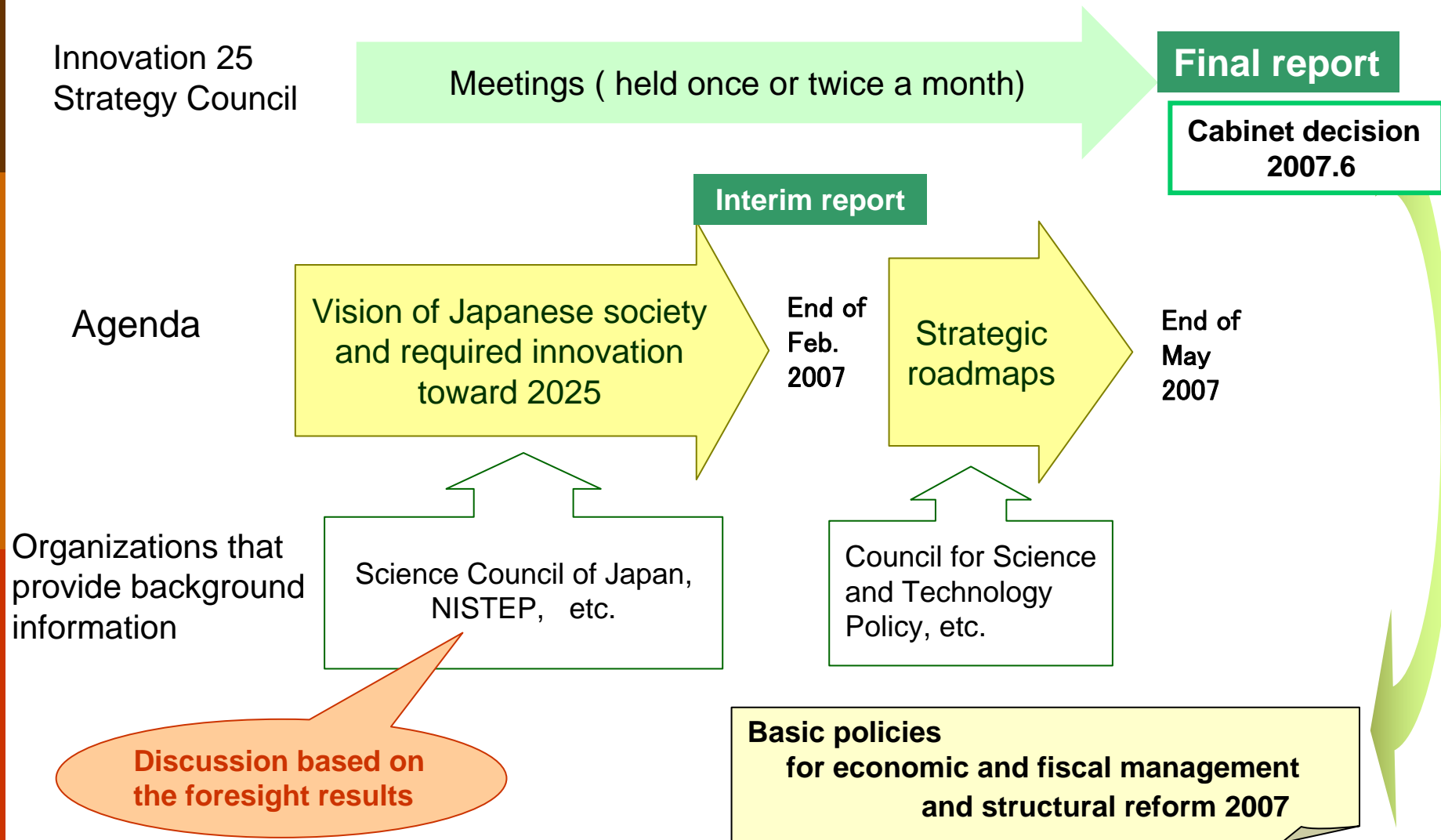
By Dr. Norihiro Hagita,
ATR Institute International

「 Innovation 25 」

- Cabinet decision on Jun.1, 2007
- long-term strategic guidelines up to 2025
- Integrated strategy for systemic renovation and technological renovation
- Contents
 - **Japan 2025 through innovation**
 - Policy roadmap
 - Strategies for social system reform
 - Technology innovation strategies

The long-term strategic guidelines "Innovation 25"

- Process until Cabinet Decision (2007.6) -

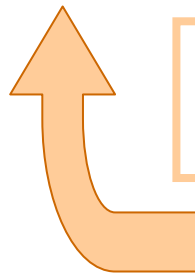


NISTEP's approach for Innovation 25

Interim report
by Innovation 25 Strategy Council



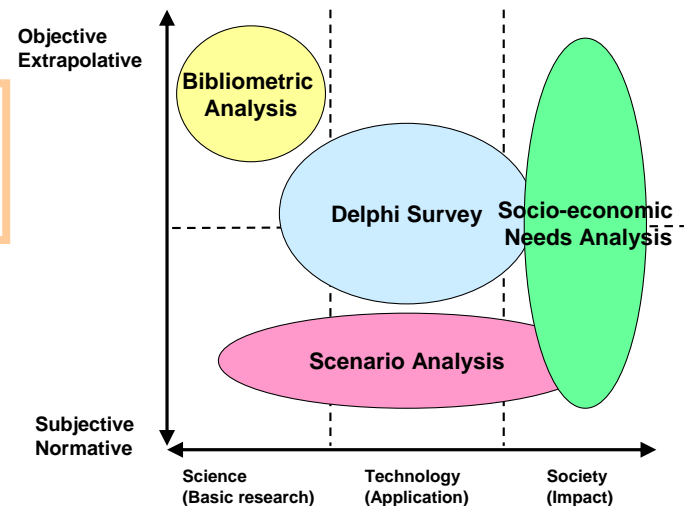
- ❑ **Vision of Japanese Society underpinned by technological feasibility**
- ❑ Social systems that will bring desirable future



Duration: 4 months
(Dec.2006 – Mar.2007)
with 300 participants

- survey results
- experts who have deep insights into technological developments and their future impacts on society

The 8th foresight program
conducted by NISTEP in 2003-2005



Around 2500 experts were involved.

Social Vision toward 2025

- Scenario Discussion based on S&T Foresight - (NISTEP Report No.101)

Steering committee

- consisted of a chair and 15 members including social scientists;
- had two meetings;
- supervised the progress.

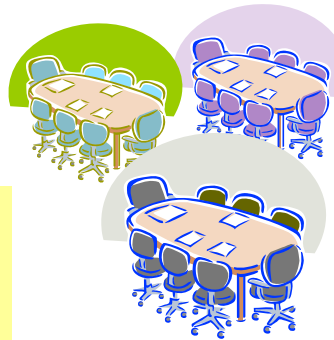
Experts panels by theme

Each panel

- consisted of a chair and around 10 members;
- had two meetings;
- looked toward the future of the relevant theme.

Workshops by theme

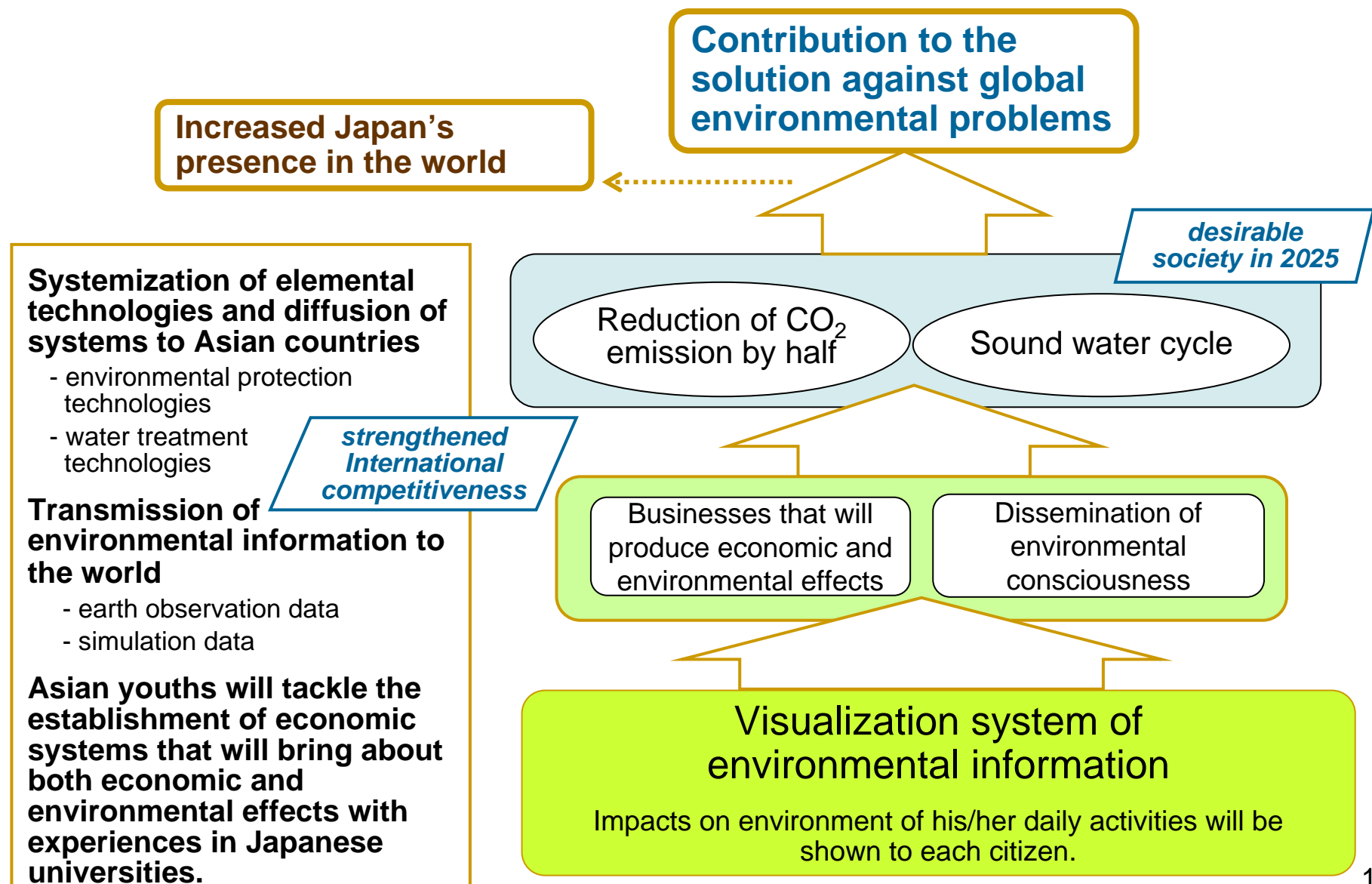
From 30 to 50 people joined each workshop. Participants were; S&T experts, social scientists, younger researchers, users, etc.



Theme 1	Staying healthy throughout your life
Theme 2	Information and telecommunications infrastructure to improve quality of life: benefit of ubiquitous computing
Theme 3	Assistance for activities of daily life based on the development of brain science
Theme 4	Safe and sustainable cities
Theme 5	Keeping yourself vigorous and open-minded: career choices, child-raising and diversification in seniors' lifestyles
Theme 6	Efforts against global environmental issues and toward coexistence in the world

*Around 300 experts joined the discussion.

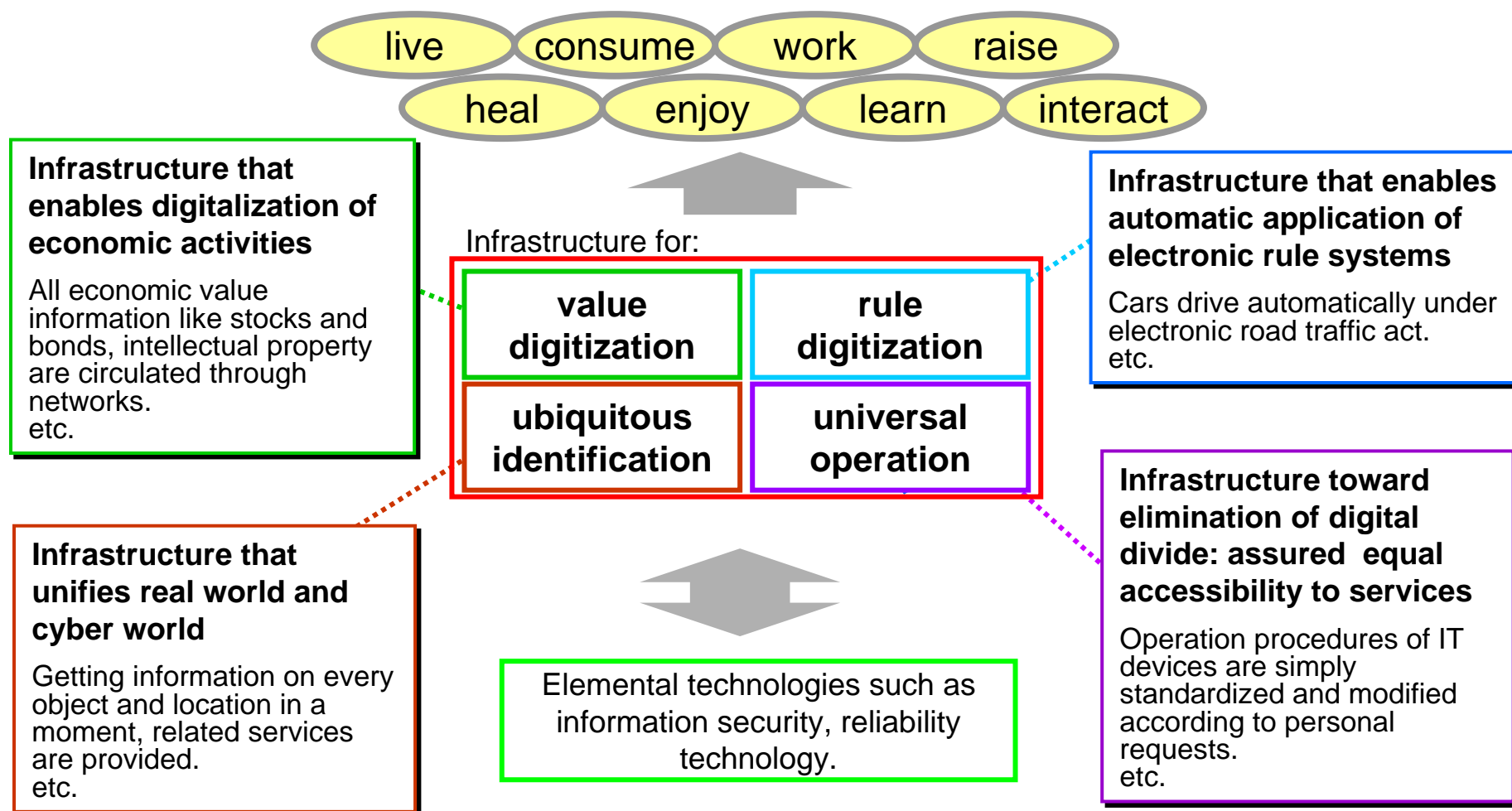
Theme 6: Efforts against global environmental issues and toward coexistence in the world



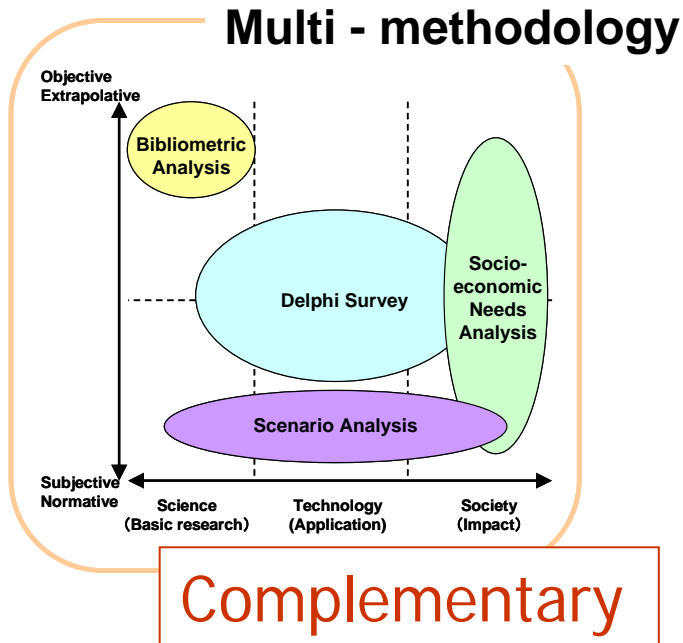
Theme 2: Information and telecommunications infrastructure to improve quality of life

The most important agenda is

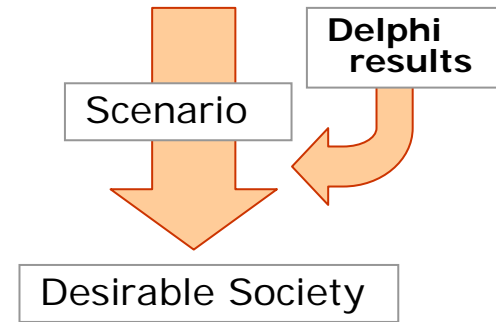
infrastructure improvement related to ICT, that will bring innovation.



Grope for evolution in methodology



Approach at NISTEP for Innovation 25

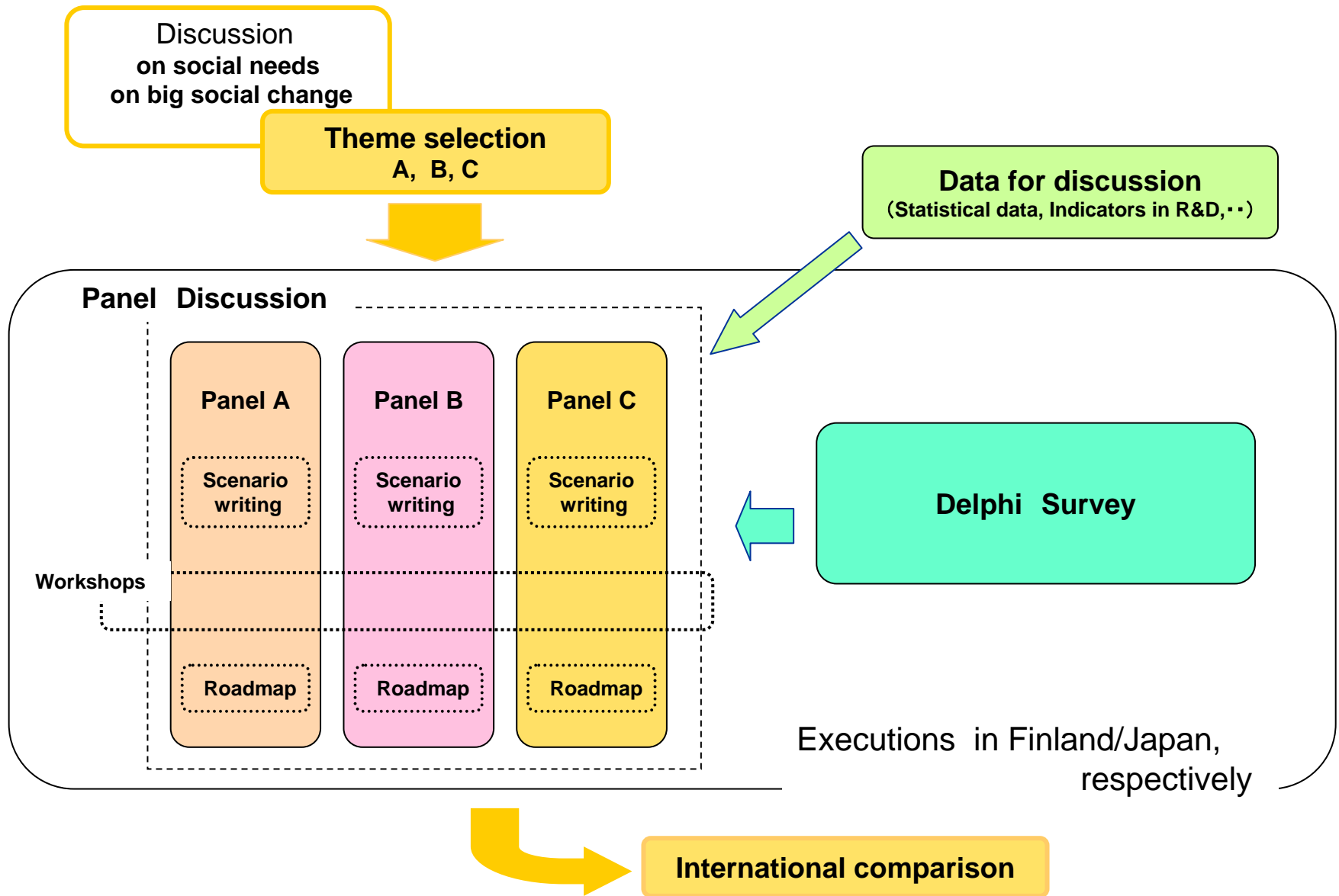


A good experience/hint for NISTEP to think about the next generation of foresight

Convergence ? Integration ?

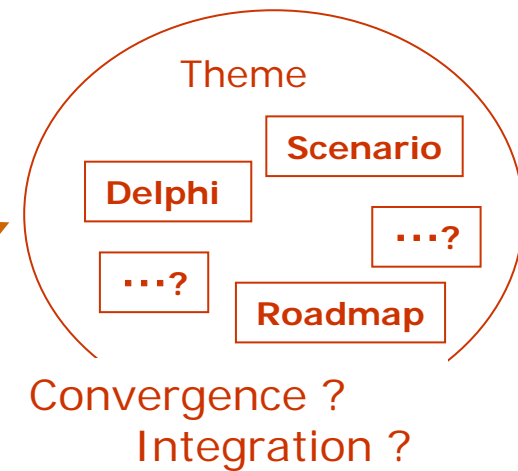
Japan-Finland collaborative research

A challenge for integrated multi-methodology foresight



Foresight to the discussion for the 4th Basic Plan

Basic Plan	S&T policy Goal	Strategic priority setting
1st	General	—
2nd	General	Prioritization by Fields
3rd	General + Detailed	Prioritization within Fields by Key-tech areas
4th ?	<div>Structured Goal ?</div> <div>Goal A</div> <div>Goal B</div> <div>Goal C</div> <div>.....</div> <div>.....</div>	<div>Prioritized Key-tech areas ?</div> <div>Key-tech area(s)</div> <div>Key-tech area(s)</div> <div>Key-tech area(s)</div> <div>.....</div> <div>.....</div>



Expected role of foresight

- ▣ Strong linkage with policy making
- ▣ S&T policy is increasingly innovation oriented.
 - Need for “outcome oriented” approaches



- ▣ Foresight should :
 - meet various policy making requirements
 - be outcome oriented
- ▣ Design of Foresight
 - Comprehensive Outlook with Multi-methodology
 - Convergence or Integration of Multi-methodology ?