INGSA #2, September 29-30,2016
“ How can foresight & horizon scanning better inform policy agendas? ”

Science Advice and Foresight under the Complex and Uncertain World

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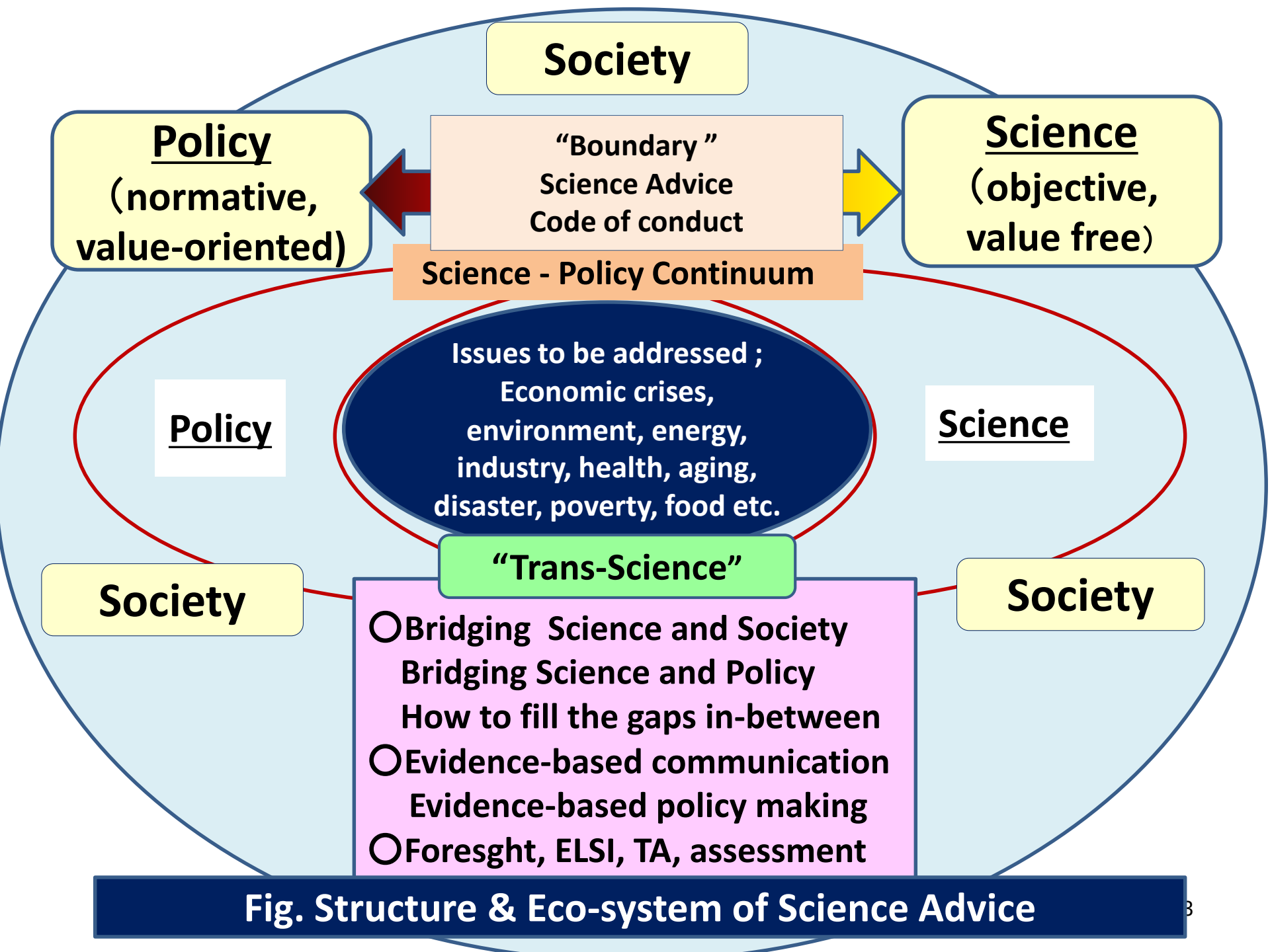
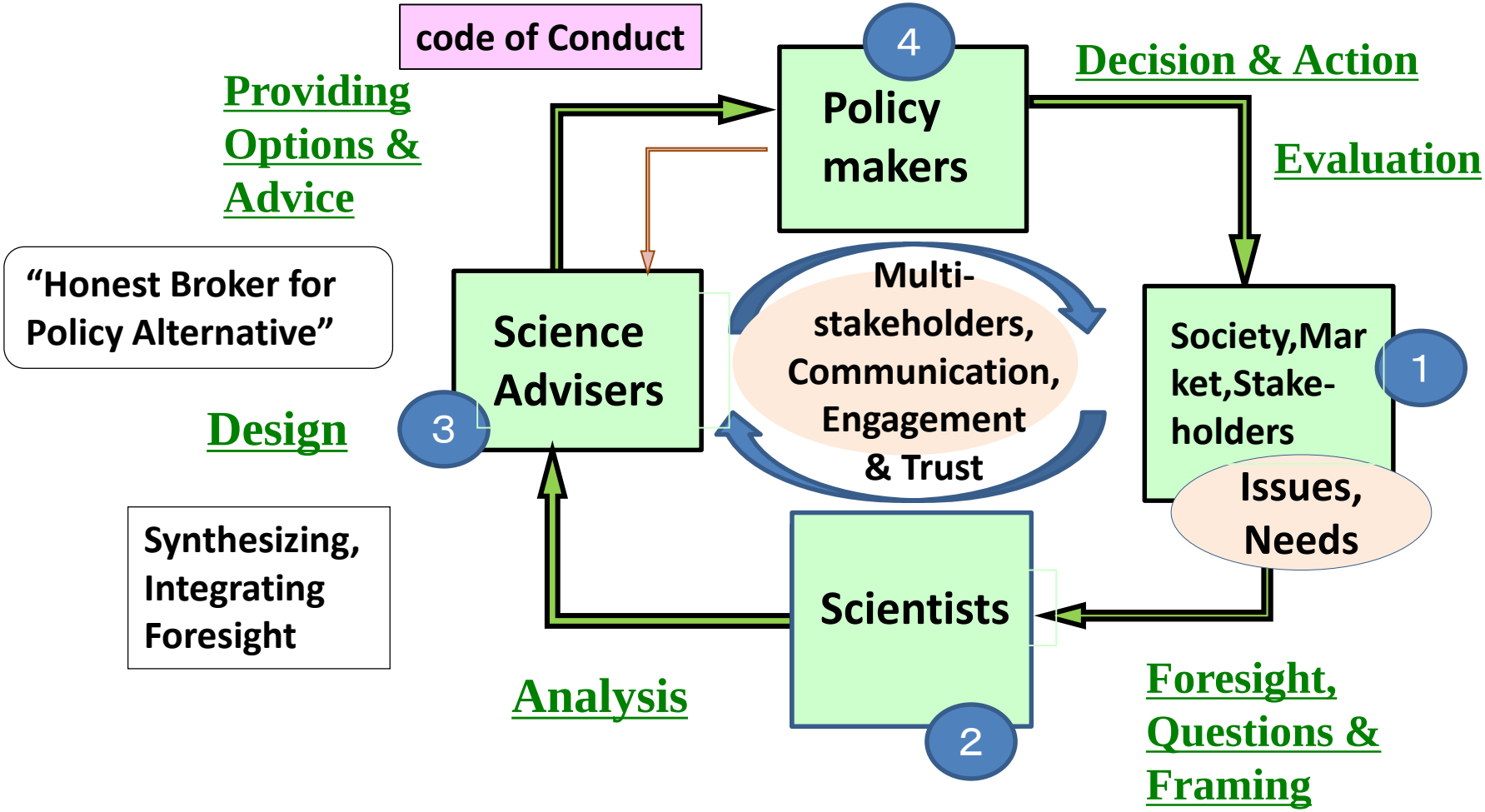


Fig. Structure & Eco-system of Science Advice

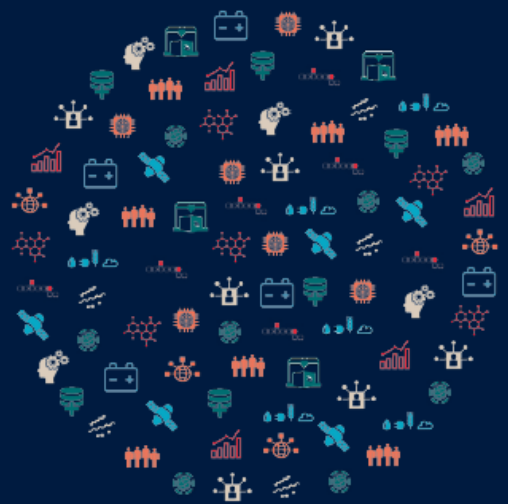
Dynamic Process of Science Advice Makin and Evaluation based on evidence;
Question → Data → Analysis → Design → Action → ・・・



Ref. Prof. H.Yoshikawa

2016

AN OECD HORIZON SCAN OF MEGATRENDS AND TECHNOLOGY TRENDS IN THE CONTEXT OF FUTURE RESEARCH POLICY



GLOBAL TRENDS 2030:

ALTERNATIVE WORLDS

a publication of the National Intelligence Council

US National Intelligence Council

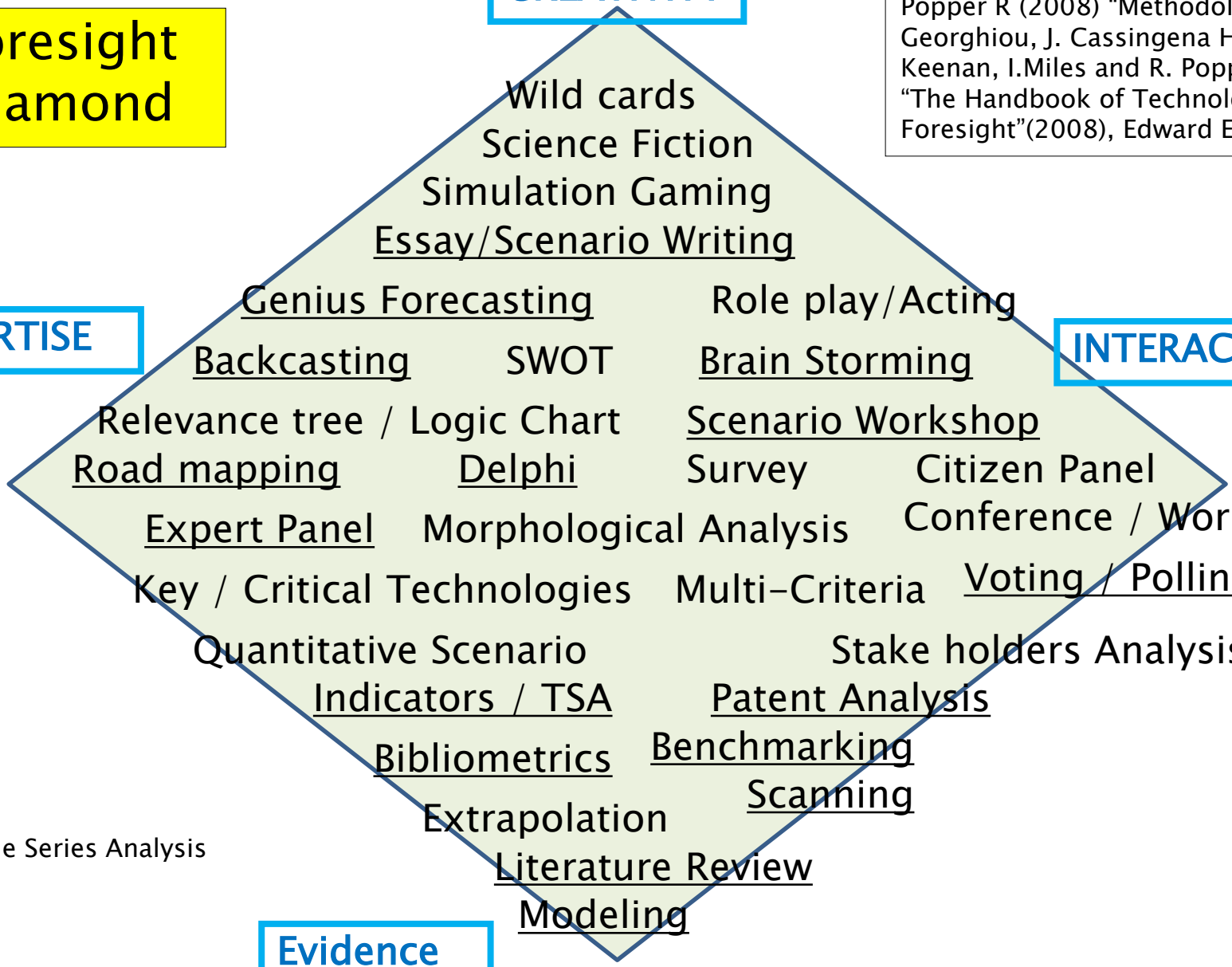
EXECUTIVE SUMMARY

This report is intended to stimulate thinking about the rapid and vast geopolitical changes characterizing the world today and possible global trajectories during the next 15-20 years. As with the NIC's previous Global Trends reports, we do not seek to predict the future—which would be an impossible feat—but instead provide a framework for thinking about possible futures and their implications.

"We do not seek to predict the future – which would be an impossible feat – but instead provide a framework for thinking about possible futures and their implications."

Foresight Diamond

Popper R (2008) "Methodology" in L. Georghiou, J. Cassingena Harper, M. Keenan, I.Miles and R. Popper (eds) "The Handbook of Technology Foresight"(2008), Edward Elgar



TSA: Time Series Analysis

Varieties of Functions of Foresight for Science Advice

* Orienting policy formulation and decisions.
* Encouraging strategic and futures thinking.
  Generating visions and images of the future.
* Triggering actions and promoting public debate.
* Recognizing key barriers and drivers of STI for;
  economic, political, technological, social and ethical barriers.
* Supporting STI strategy and priority setting.
* Identifying research/investment opportunities.

Outline of STI Policy Framework in Japan

"Science and Technology Basic Law ": enacted unanimously in 1995

1st Basic Plan (FY1996 to 2000)

Total Budget: 17 trillion JPY

Construction of new R&D system

2nd Basic Plan (FY2001 to 2005)

3rd Basic Plan (FY2006 to 2010)

Total budget: 2nd Plan: 24 trillion JPY 3rd Plan: 25 trillion JPY

Promotion of R&D in prioritized areas

4th Science and Technology Basic Plan (FY2011 to 2015)

Total budget: 25 trillion JPY

- Promotion of R&D to address

socio-economic issues

The 5th Basic Plan is focused on enhancing "STI measures" for Super smart society

The 5th S&T Basic Plan

FY2016 to 2020

Total budget: 26 trillion JPY

- Realizing "**Super smart society**" (Society 5.0)
- Defining performance indicators and numerical targets

(Source) Cabinet Office, Revised by NISTEP

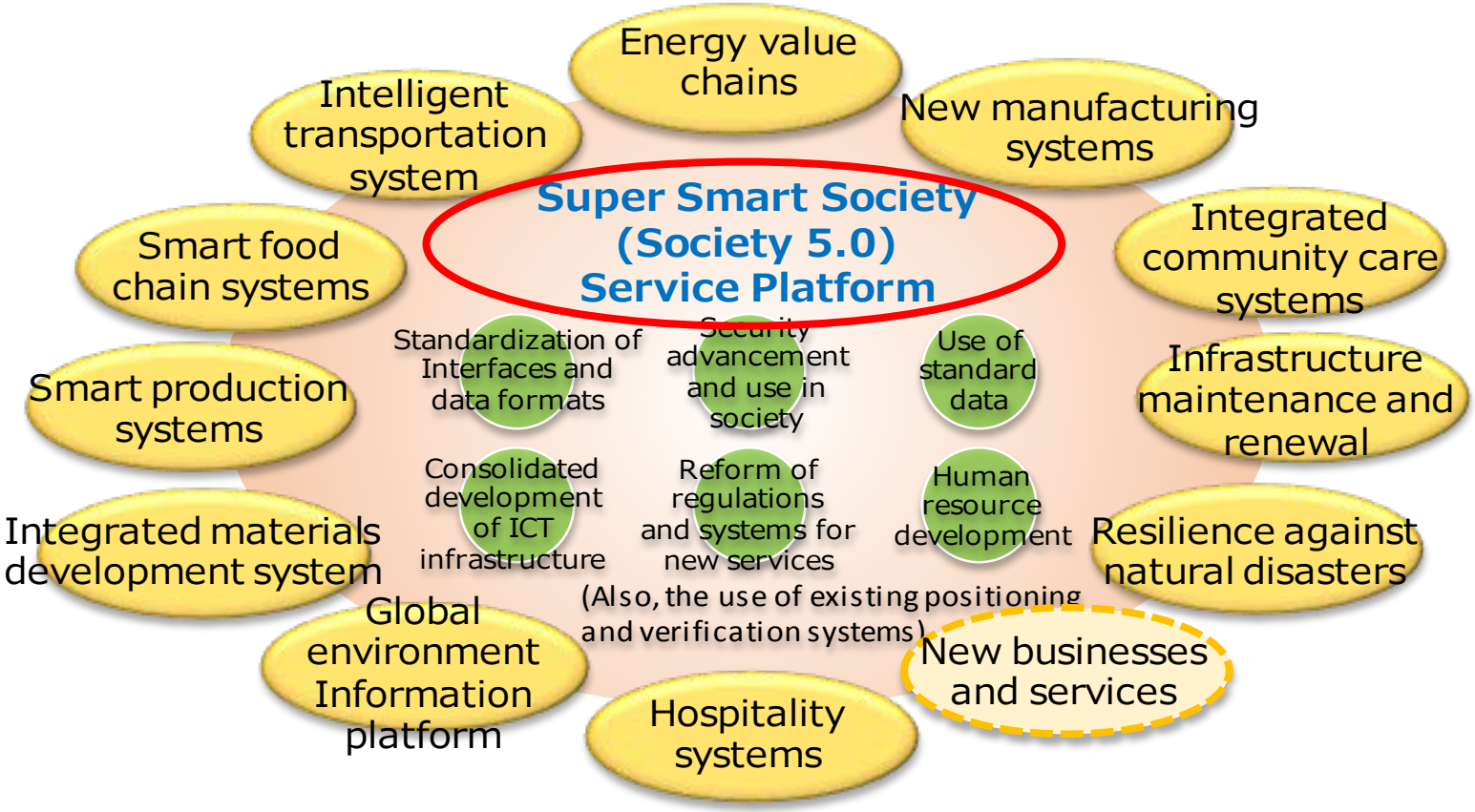
Features of the 5th S&T Basic Plan

Jan 2016, the Cabinet of GOJ

- Focus on "innovation policy" more than past Basic Plans. The 5th Plan is drawn up based on discussion with various stakeholders in society including academic and industry.
- Propose new acting for preparing uncertain future
  - "Society 5.0"; formulates common framework for "**Super Smart Society**", which is characterized by the integration of cyberspace with physical space, to create data-driven innovation and social changes.
  - Focus on fundamentals of STI (such as human resources, knowledge creation) to enhance diversity and flexibility
- Propose two kinds of schemes as R&D promotion measures
  - **Issue-oriented prioritization** (13 socio-economic & global challenges + Ocean & Space)
  - **Technology-oriented prioritization** (14 key-technologies for "Super Smart Society")
- Promote openness and globalization strategically for functioning STI systems and creating innovation speedily
- Focus on reform and enhance of the function of organization
  - Promote the reform of administration and human resource system in **universities and National R&D Agencies**
- Challenge for making **effective follow-up system (PDCA cycle system)** of 5th Plan
  - Set **the numerical targets and the key indicators**
- Write the **government R&D investment target** clearly (1% of GDP, 26 trillion yen)

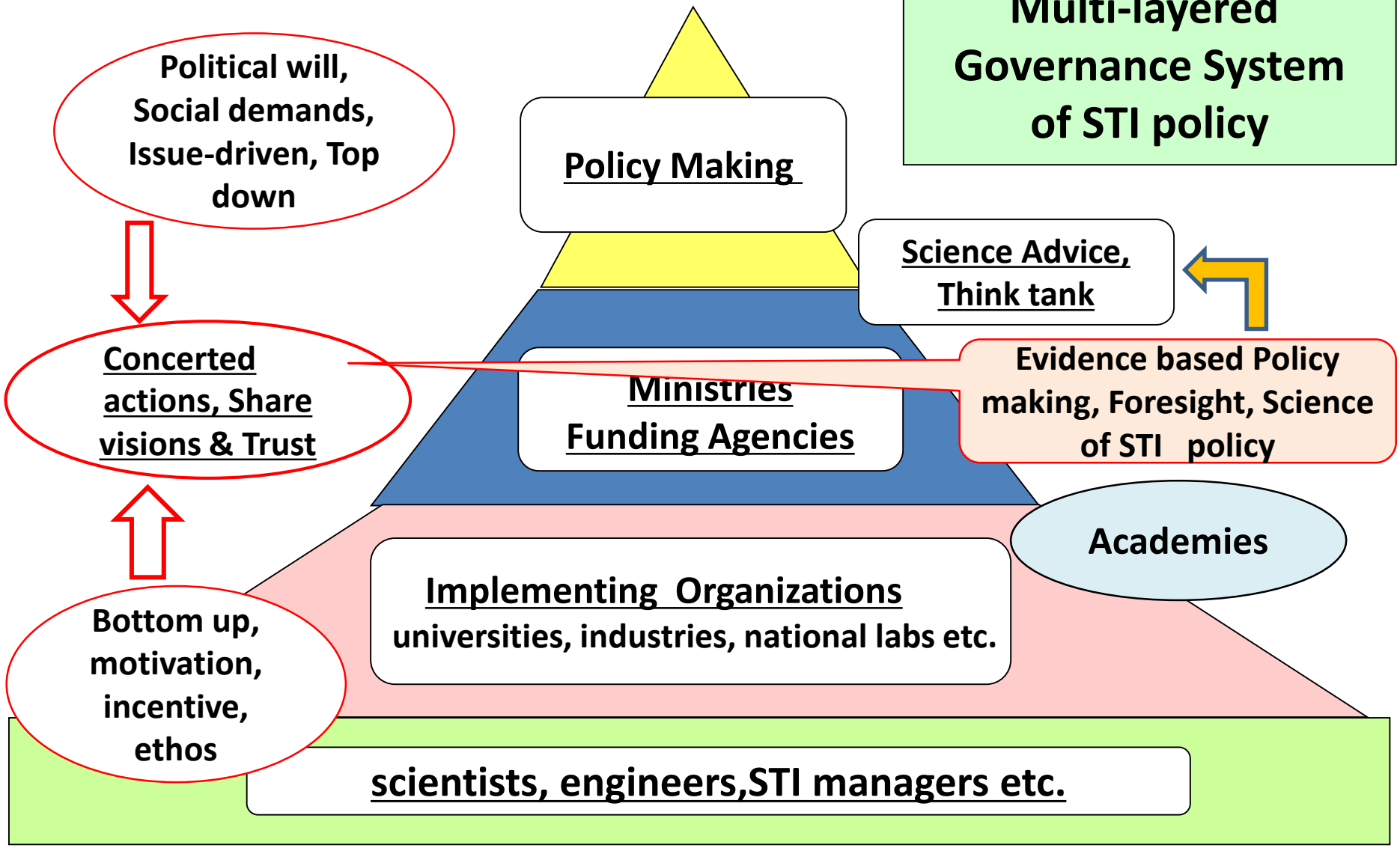
Society 5.0: “super smart society”

A society where the various needs of society are finely differentiated and met by providing the necessary products and services in the required amounts to the people who need them when they need them, and in which all the people can receive high-quality services and live a comfortable, vigorous life that makes allowances for their various differences such as age, gender, society, nation.



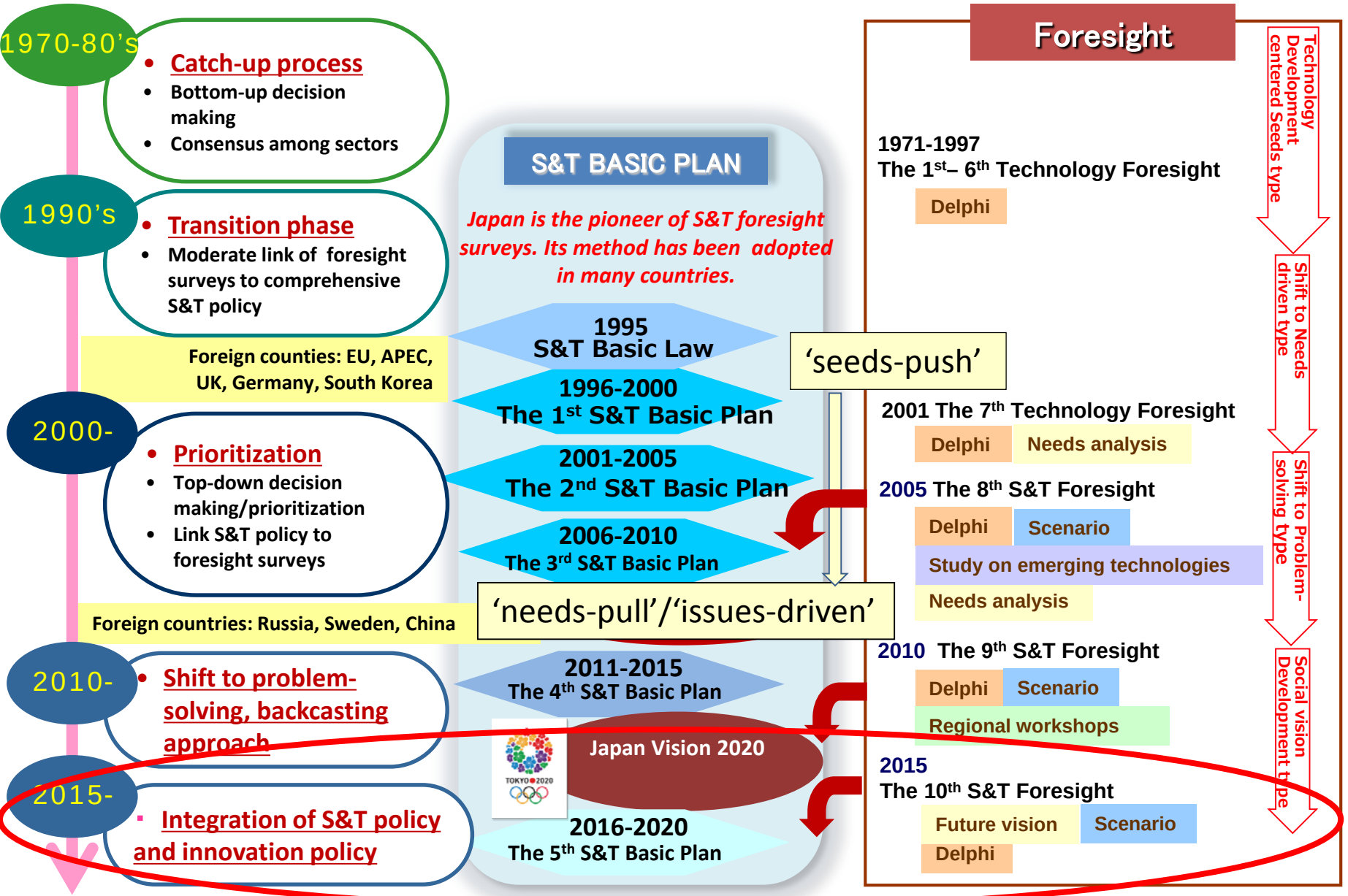
Integration of cyberspace with physical space (“the real world”)

Multi-layered Governance System of STI policy



Reshaping STI system to meet changing world

Brief History of Japan's Foresight Activities



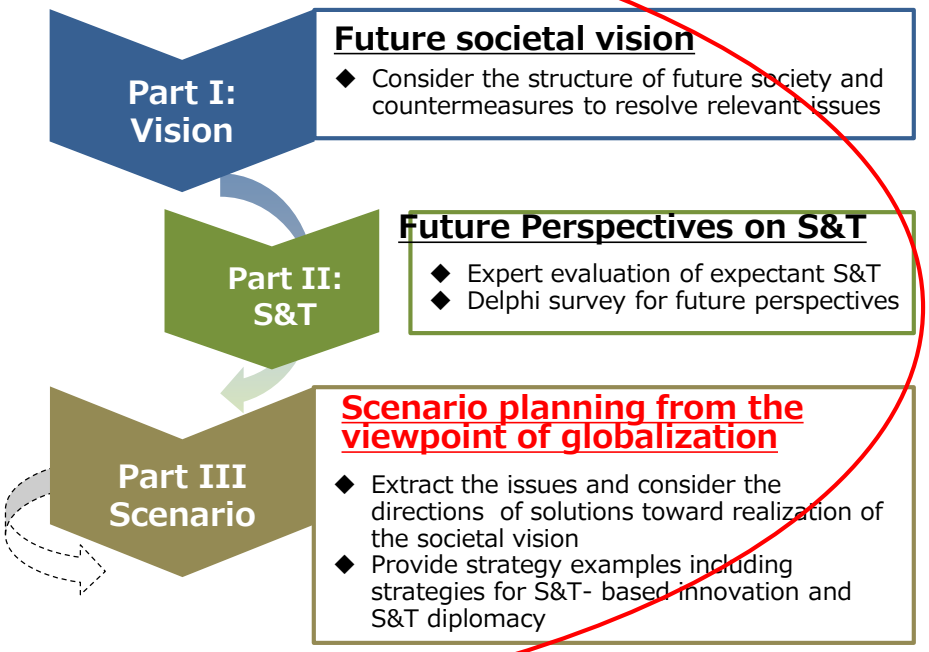
Outline of the Japan's 10th (2015) S&T Foresight

Background

- In Japan, a large-scale S&T Foresight has been carried out every 5 years since 1971, to overlook the med- to long-term S&T development. NISTEP has become the implementing entity of the survey since the 5th survey (1992).
- The 10th S&T Foresight was started in 2013, envisaging the science and technology development spanning to 2050, with year 2030 being the midpoint.

Outline of 10th Foresight Process

- To contribute to deliberations on S&T / innovation policies and strategies, consider the development of S&T towards realizing the societal vision.
- Carrying out (I) Consideration on future societal vision and issues to be resolved and (II) S&T foresight by specific discipline from S&T perspective. Then, consolidating the results of (I) and (II), and (III) Extracting the issues in future society and considering the directions of possible solutions with time-axis.



Challenges and Opportunities for Foresight in the future

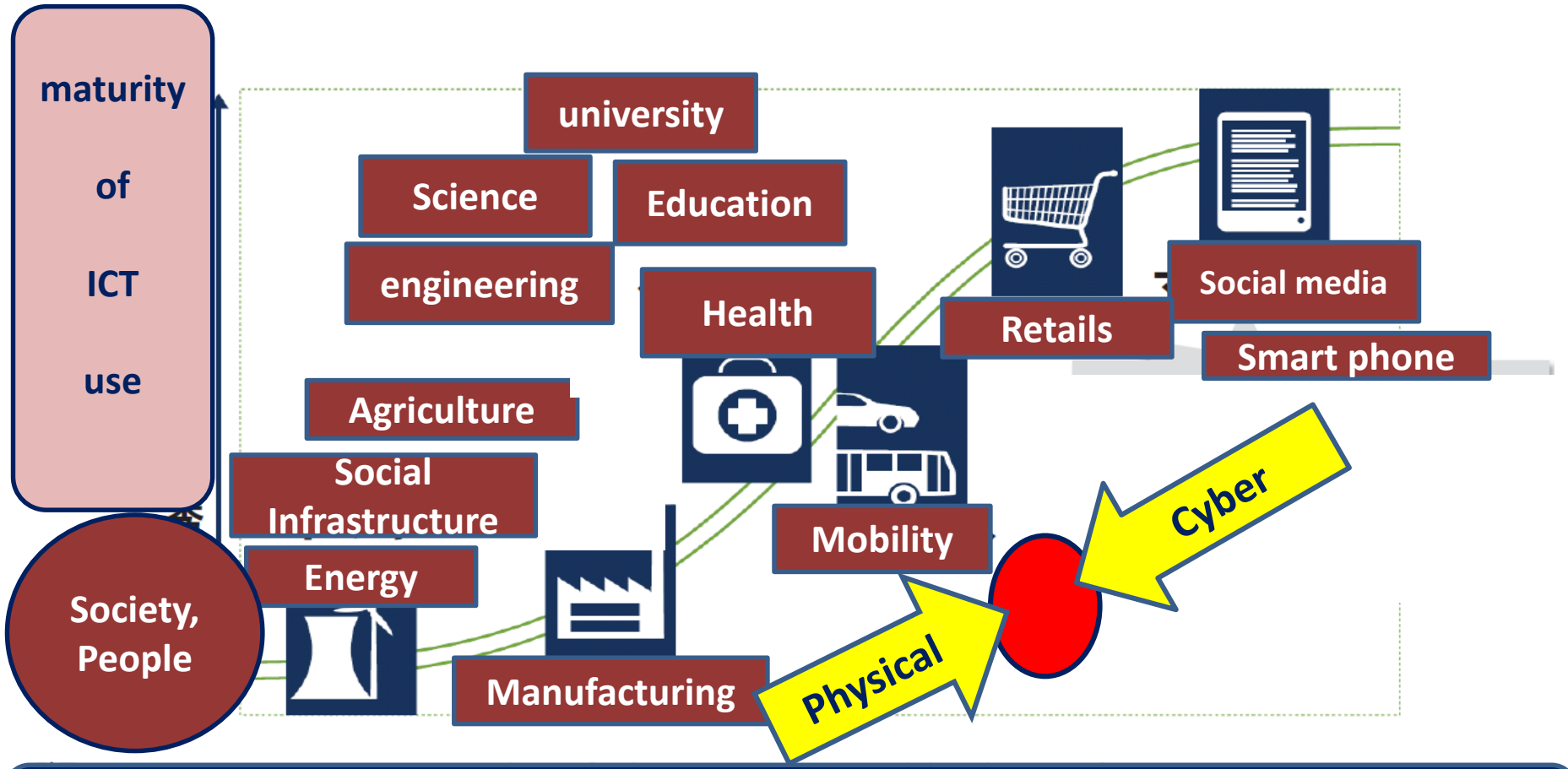
* Need to further timely (shorten and reiterate the cycle of) foresight practice (from 5 years as before.)

* Need to detect emerging signals for sensing changes of society and S&T as early as possible, in order to effectively respond to them in a timely manner.

* Considering these requirements we need to focus more on horizon scanning process, in addition to the conventional foresight practices.

* Close collaboration with international partners both from multilateral (OECD/GSF, EU, APEC, ASEAN etc.) and from bilateral context, and also with domestic partners / stakeholders such as academic associations and industry groups.

Transforming modern society system ; people, community, politics, industry, SME, government, academia, through Cyber Physical System(CPS)

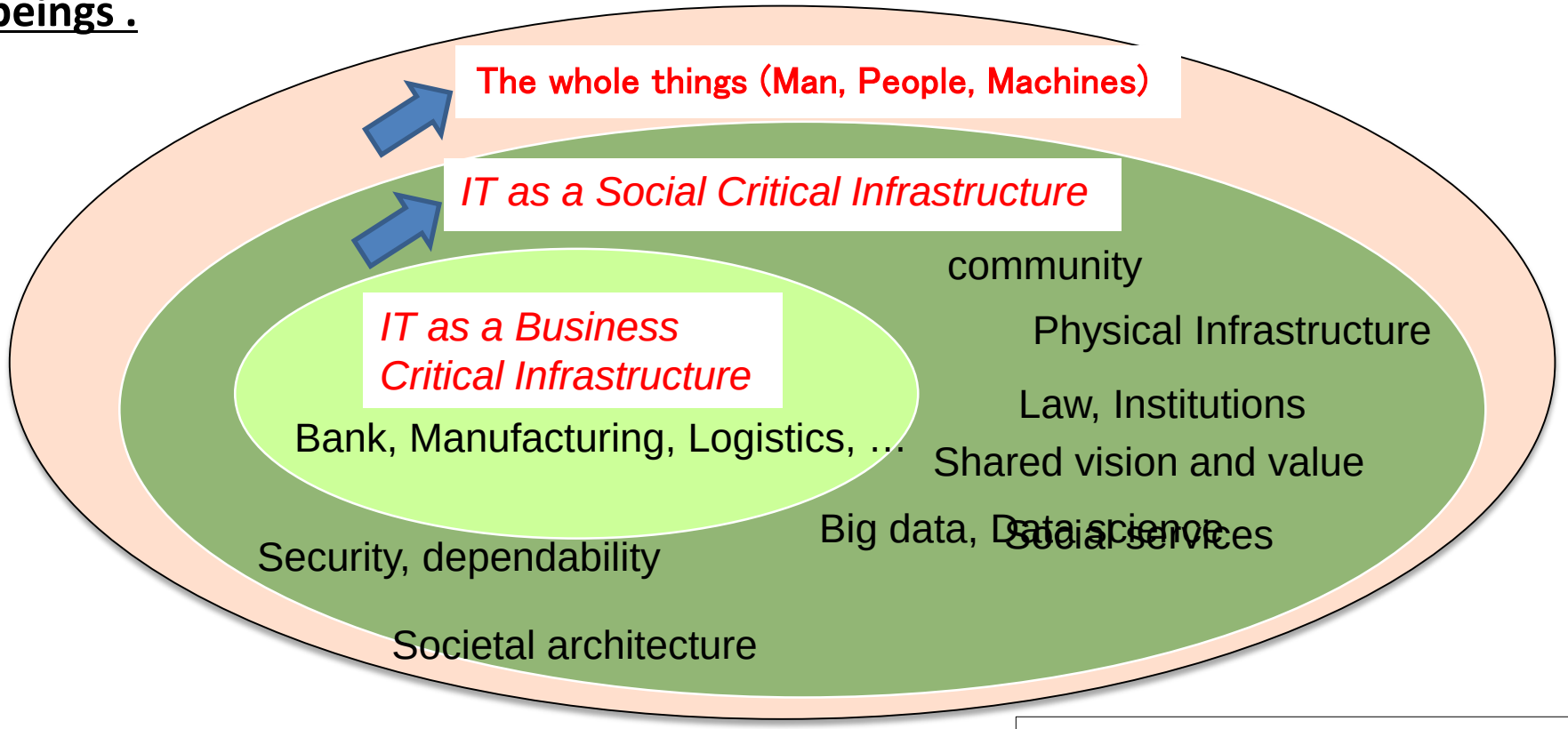


Building sustainable & inclusive socio-economic system in the 21st century

Frontier of Information Technology

Sources of public / private / business values are shifting: Things → Services → ecosystems

Establish new relationship among the whole things, in particular, People and Machines, and create new values. Importance of SSH(social science & humanities and ELSI(ethics, legal & social implication) at the age of fusion of physical & cyber beings .



CRDS/JST IT Unit, Dr.Iwano

Transforming Social Science

World Social Science Report 2013:
"Changing Global Environments" by ISSC

The *World Social Science Report 2013* issues an **urgent call to action to the international social science community to collaborate more effectively with each other, with colleagues from other fields of science, and with the users of research to deliver solutions-oriented knowledge on today's most pressing environmental problems. It calls for a transformative social science that is bolder, better, bigger, different:**

- **bolder** in reframing and reinterpreting global environmental change as a social problem
- **better** at infusing social science insights into real-world problem-solving
- **bigger** in terms of having more social scientists to focus on global environmental change
- **different** in the way it thinks about and does research that helps meet the vexing sustainability challenges faced today.

Resolution by the General Assembly, September 2015
” Transforming our world: the 2030 Agenda for Sustainable Development ”

1st Multi-stakeholder Forum on Science, Technology and Innovation for SDGs, on 6-7 June 2016, NY

Sustainable Development Goals (SDG)

Goal 1. End **poverty** in all its forms everywhere

Goal 2. End **hunger**, achieve **food security** and improved nutrition and promote sustainable agriculture

Goal 3. Ensure **healthy lives** and promote **well-being for all at all ages**

Goal 4. Ensure inclusive and equitable **quality education** and promote lifelong learning opportunities for all

Goal 5. Achieve **gender equality** and empower all women and girls

Goal 6. Ensure availability and sustainable management of **water and sanitation** for all

Goal 7. Ensure access to **affordable, reliable, sustainable and modern energy** for all

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Goal 10. Reduce inequality within and among countries

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

Goal 12. Ensure sustainable consumption and production patterns

Goal 13. Take urgent action to combat climate change and its impacts*

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Varieties of Functions of Foresight for Science Advice

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Thank you very much for your attention

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INGSA #2, Parallel session II:
"Brokers and boundary-crossers: Developing the practice of science advice"

The practice of science advice to public policy requires a new set of skills that are neither strictly scientific nor policy-oriented, but a hybrid of both. Negotiating the interface between science and policy requires translational and navigational skills that are often not acquired through formal training and education and which may differ in different parts of the world. In addition, new techniques are being developed, e.g. in foresight and horizon scanning, which may increase the impact of science on policy. What are the considerations in developing these unique capacities, both in general and for particular contexts?

" How can foresight & horizon scanning better inform policy agendas? " INGSA 2016, Brussels

○Intro remarks

- Foresight is important because observations are always about the past, decision-making is always about the future.
- Many definitions, but in broad terms Foresight means structured, explicit, thinking about uncertainties about future outcomes. Done well gives potential better to debate the evidence and consequences of policy. Examples of flood risk models or conflict management in the world.
- Many definitions of horizon-scanning. Often refers to the explicit process of looking for weak signals. Can be about risks, national, regional, global?

○Panel and discussion

- What makes for successful foresight studies?
- For what types of science and policy issue does foresight work and why?
- What are the biggest challenges to having impact?
- What makes for successful horizon scanning?
- For what types of science and policy issue does horizon scanning work and why?
- What are the biggest challenges to having impact?

○Possible questions for panel and plenary discussion

- Is foresight "just" a way of framing uncertainty?
- How does foresight relate to modelling? To thinking about complexity? Or systems? Is narrative on its own ever useful?
- When does public dialogue have a role in Foresight (or Foresight in public dialogue)?
- Is Foresight always about scenarios?

OECD/GLOBAL SCIENCE FORUM (GSF)
"SCIENTIFIC ADVICE FOR POLICY MAKING: THE ROLE AND RESPONSIBILITY OF SCIENTISTS"

* Project approved (Apr 2013) : Co-chairs (JPN,NLD,DE,ITA).
  Project membership : 14 countries and EU.
* Interviews with over 60 advisory experts, legal experts and decision-makers
* Review of literature and existing frameworks
* Tokyo and Berlin workshops (Oct 2013 and Feb 2014)
* Final report published April 2015
* OECD-CSTP ministerial meeting (Oct 2015) ⇒ Further works

Findings / Highlights

* Current landscape of advisory systems
* Advisory processes :
  ①Framing of the question, ②Selecting the advisors,
  ③Producing advice, ④Communicating & using the advice,
  ⑤Assessing the impact
* Responsibility and potential liabilities
* Providing science advice in crisis situations
* Emerging issues : ①Global societal challenges,
  ②Growing involvement of civil society

The process is as important as the innovation strategy

The process of making an innovation strategy is perhaps more important than the product

- **Animates a discussion among stakeholders regarding priorities => might help building consensus**
- **Improves the co-ordination of other policies that impact on innovation**
- **The process can reveal problems and barriers and challenge the status quo!**

by Dirk Pilat, Deputy Director,Directorate for Science, Technology and Innovation,Nov.2014

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Newly reinforced “Council for Science, Technology and Innovation (CSTI)”

“Revitalizing Japan’ economy and industry”
Under Abe Adm(LDP) Dec 2012～

Economic & Industrial policy and STI policy
Politics and Science

Three priorities:

1. Excellent science
2. Industrial leadership
3. Societal challenges

"Vilnius Declaration" - The value and benefits of integrating Social Sciences and Humanities -

The European Union (EU) expects research and innovation to be the foundation for its future growth. Horizons 2020, an initiative running from 2014 to 2020 with a budget of a little more than €70 billion, is the EU's new program for research and innovation and is part of the drive to create new growth and jobs in Europe. In September, a two-day conference was held in Vilnius, Lithuania, to address how socio-economic sciences and humanities can be incorporated into Horizons 2020. The result is the Vilnius Declaration on Horizons for **Social Sciences and Humanities** (SSH), September 24 2013.

The Declaration issues the following statements:

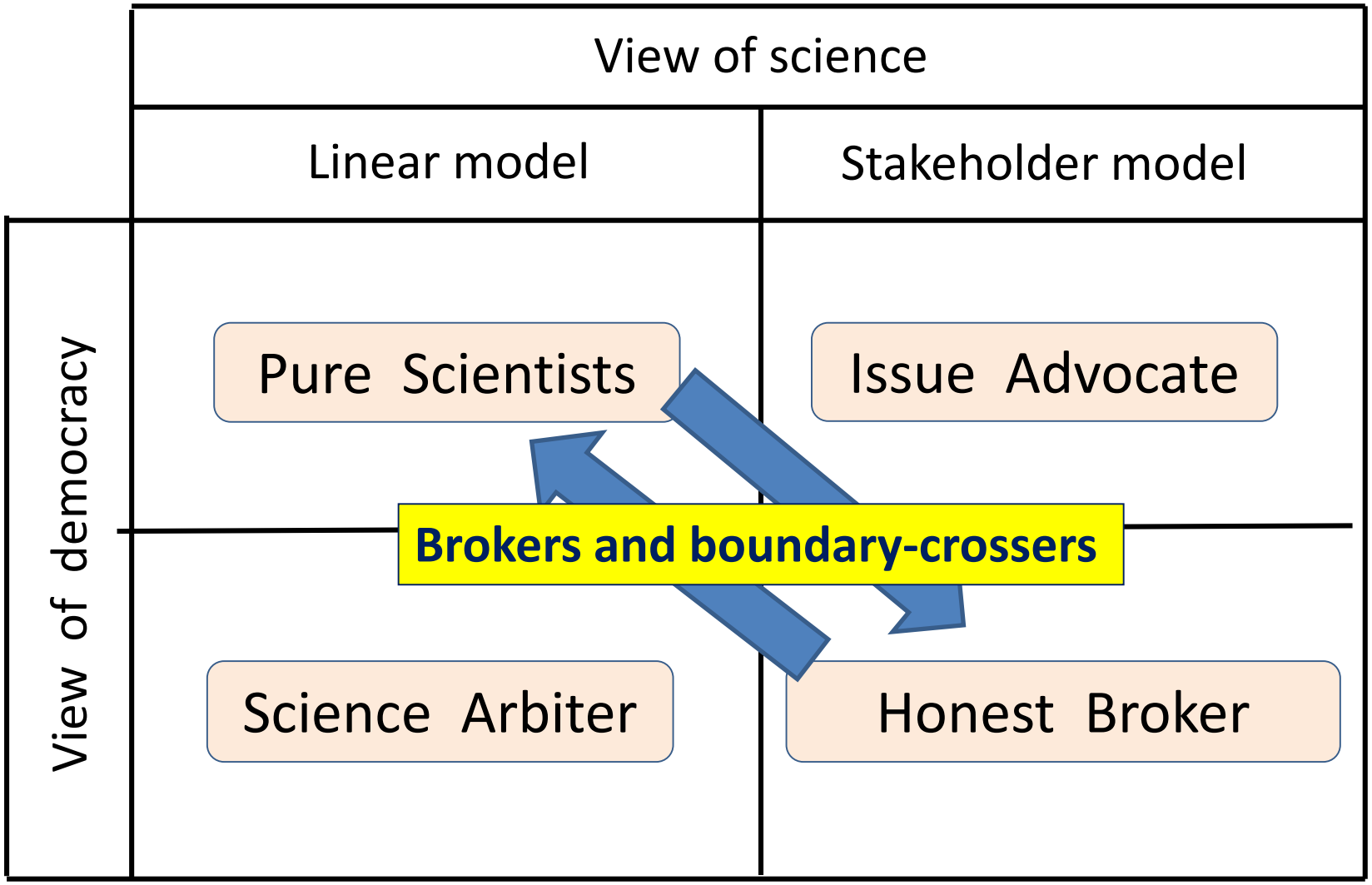


Fig. Efforts to connect science to policy and politics under the Stakeholder model resulting in honest broker ? From

"The Honest Broker – Making Sense of Science in Policy and Politics " by Roger A. Pielke,Jr. 2007

“LEITLINIEN POLITIKBERATUNG”,

by Berlin-Brandenburgische Akademie der Wissenschaften

”Wissenschaftliches Beratungswissen ist dabei nicht mit wissenschaftlichem Wissen gleichzusetzen. Es geht über dieses hinaus, da es sowohl wissenschaftlichen Standards genügen, als auch politisch wirksam sein muss.”

In English;

“Knowledge in scientific advise is not equated with scientific knowledge. It goes beyond that, since it must satisfy scientific standards, and at the same time be politically effective.”

SciREX(Science of STI Policy) Center at GRIPS, Japan
established in August 2014

● Mission

- **Contribute to evidence-based policy making.**

  To make effective science, technology, and innovation policy, we develop new methodologies and summarize the evidence pertaining to science, technology, and innovation policy.

- **Promote co-evolution of policy formation and policy research.**

  To resolve issues related to science, technology, and innovation, we bridge between the worlds of policy formation and policy research.

- **Provide space for discussion with multi-stake holders**
- **Education & training program for people in diverse sectors.**

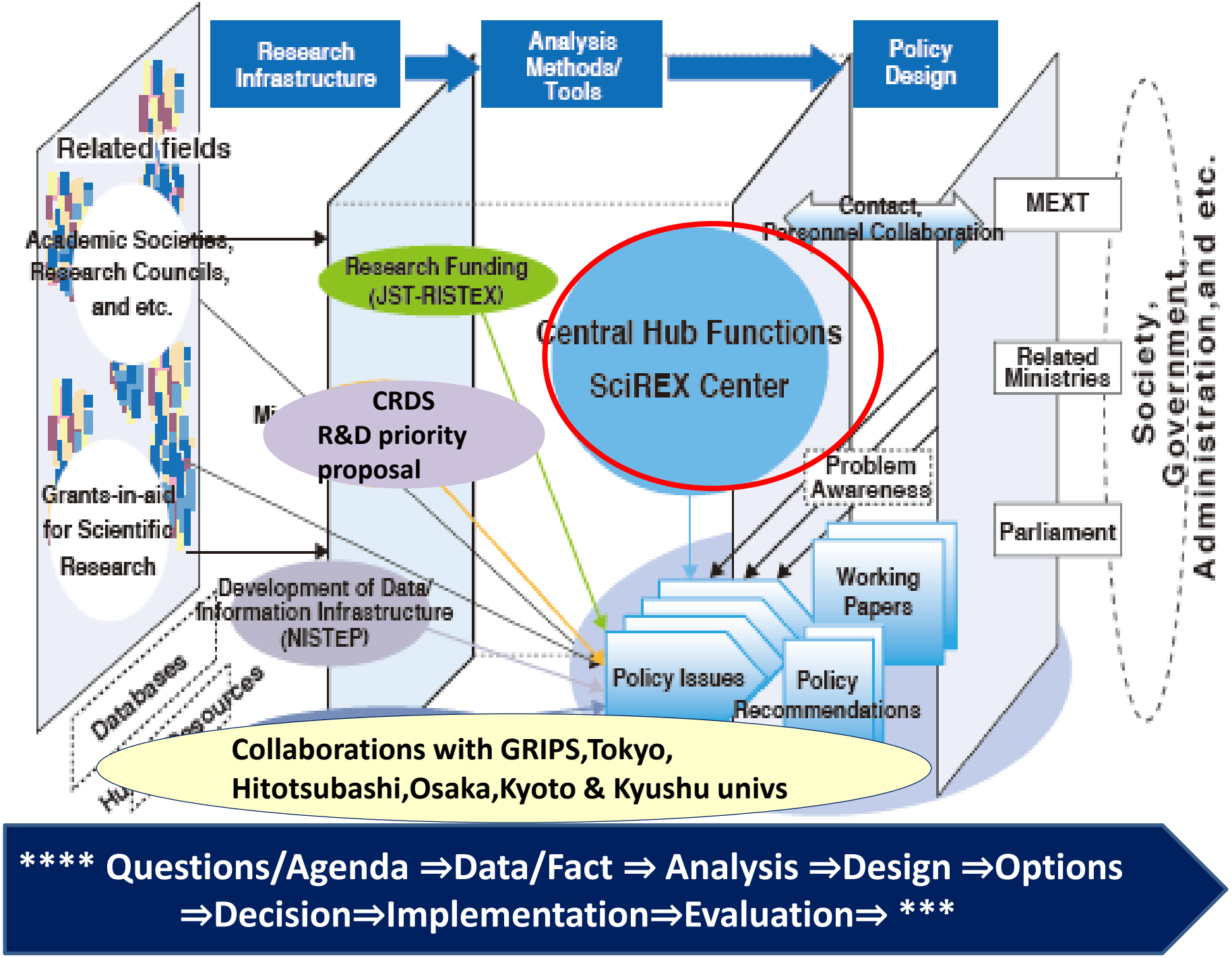
● Principles

- **Policy-driven research**
- **Evidence-based approach**
- **Discussion platform based on mutual respect and equal opportunity among stakeholders**
- **Multidisciplinary initiatives**
- **Independence and neutrality**
- **Collaboration with relevant institutions globally**

Policy Design Program

Policy Analysis and Impact Assessment Program

Policy-making Process Program



**** Questions/Agenda ⇒Data/Fact ⇒ Analysis ⇒Design ⇒Options ⇒Decision⇒Implementation⇒Evaluation⇒ ***

“Science 2.0: Science in Transition“

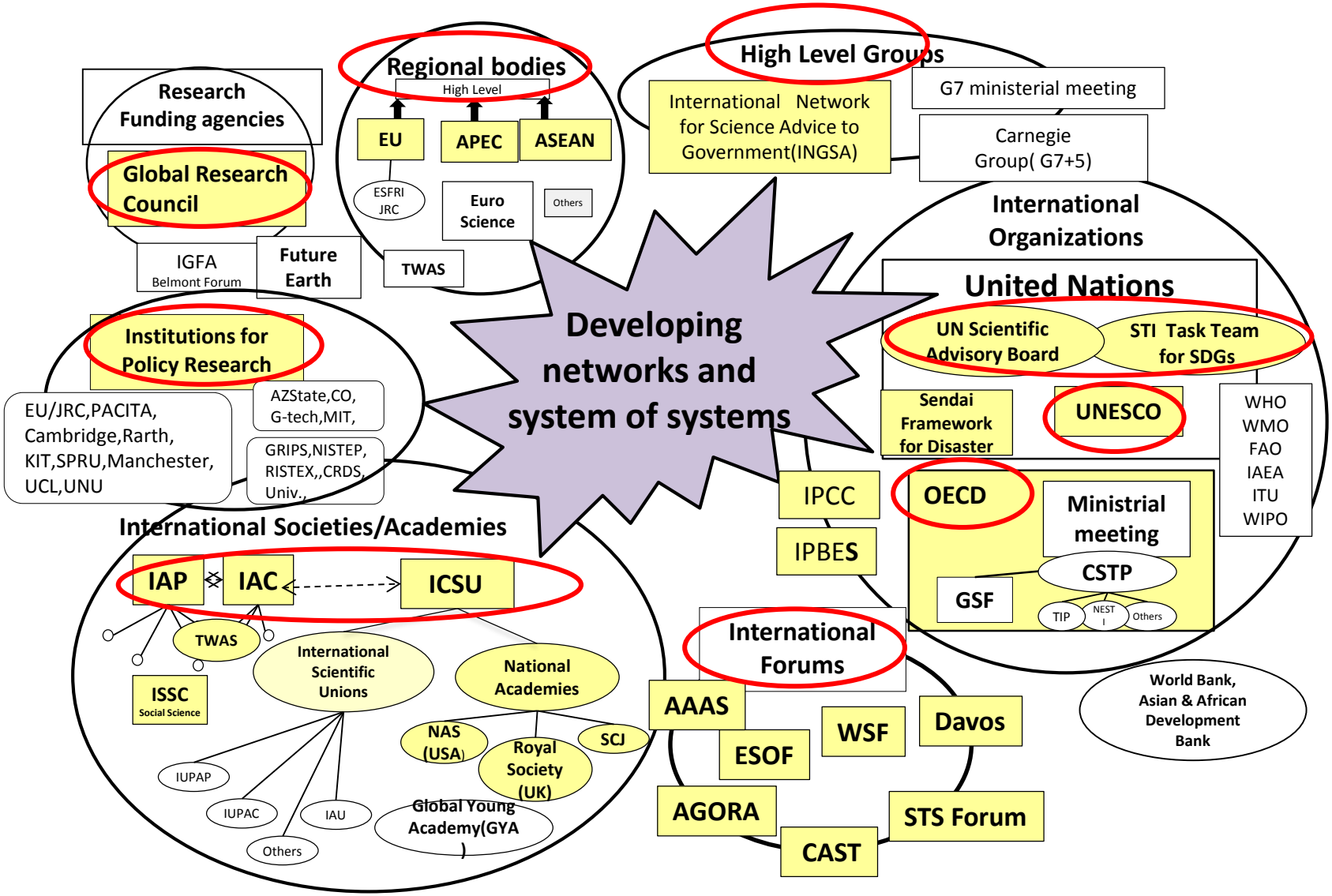
Summary of Proceedings

at 5th EU-Japan Science Policy Forum,

the Kyoto International Conference Center, on 4 October, 2014.

“Science 2.0’ describes the on-going evolution in the modus operandi of doing research and organising science. These changes in the dynamics of science and research are enabled by digital technologies and driven by the globalisation of the scientific community, as well as the need to address the Grand Challenges of our times. They have an impact on the entire research cycle, from the inception of research to its publication, as well as on the way in which this cycle is organised “ (European Commission 2014).

The International Landscape of Science Policy and Scientific Advice



Ref. "Five years after Fukushima: Scientific advice in Japan"
Y. Sato & T. Arimoto,Palgrave Communications, 7 June 2016.