

Science Integrity: Japanese Lessons

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Japan Science and Technology Agency(JST)

What is Japan Science and Technology Agency(JST)?

Japan's Science Administration

Prime Minister

Cabinet Office

Council for S&T Innovation (CSTI)

- (1) Investigation and deliberation on basic policy relating to S&T
- (2) Investigation and deliberation concerning the policy for allocation of S&T related budget, human resources, etc.
- (3) Evaluation of nationally important R&D

Ministry of Education, Culture, Sports, S&T (MEXT)

Ministry of Internal Affairs and Communications (MIC)

Ministry of Health, Labor and Welfare (MHLW)

Ministry of Agriculture, Forestry and Fisheries (MAFF)

Ministry of Economy, Trade, Industry and Tourism (METI)

Ministry of Land, Infrastructure and Transport (MLIT)

Ministry of the Environment (MOE)

Universities

National R&D Agencies

- Japan Agency for Marine Earth Science and Technology (JAMSTEC)
- Japan Aerospace Exploration Agency (JAXA)
- **Japan Science and Technology Agency (JST)**
- National Research for Earth Science and Disaster Prevention (NIED)
- National Institute for Material Sciences (NIMS)
- The National Institutes for Quantum and Radiological Science and Technology (QST)

Japan Agency for Medical Research and Development (AMED)

Independent Administrative Institutes

- Japan Society for the Promotion of Science (JSPS)



Overview of JST

▪ JST is one of the major funding agencies responsible for the implementation of science and technology policy in Japan.

1 USD = 100 Yen

Total Operating Expenses in FY2016: 1.19 Billion USD
(Block Grants from Government: 1.01 Billion USD)

Number of Staff: 1,227 (including about 200 Ph. D.)

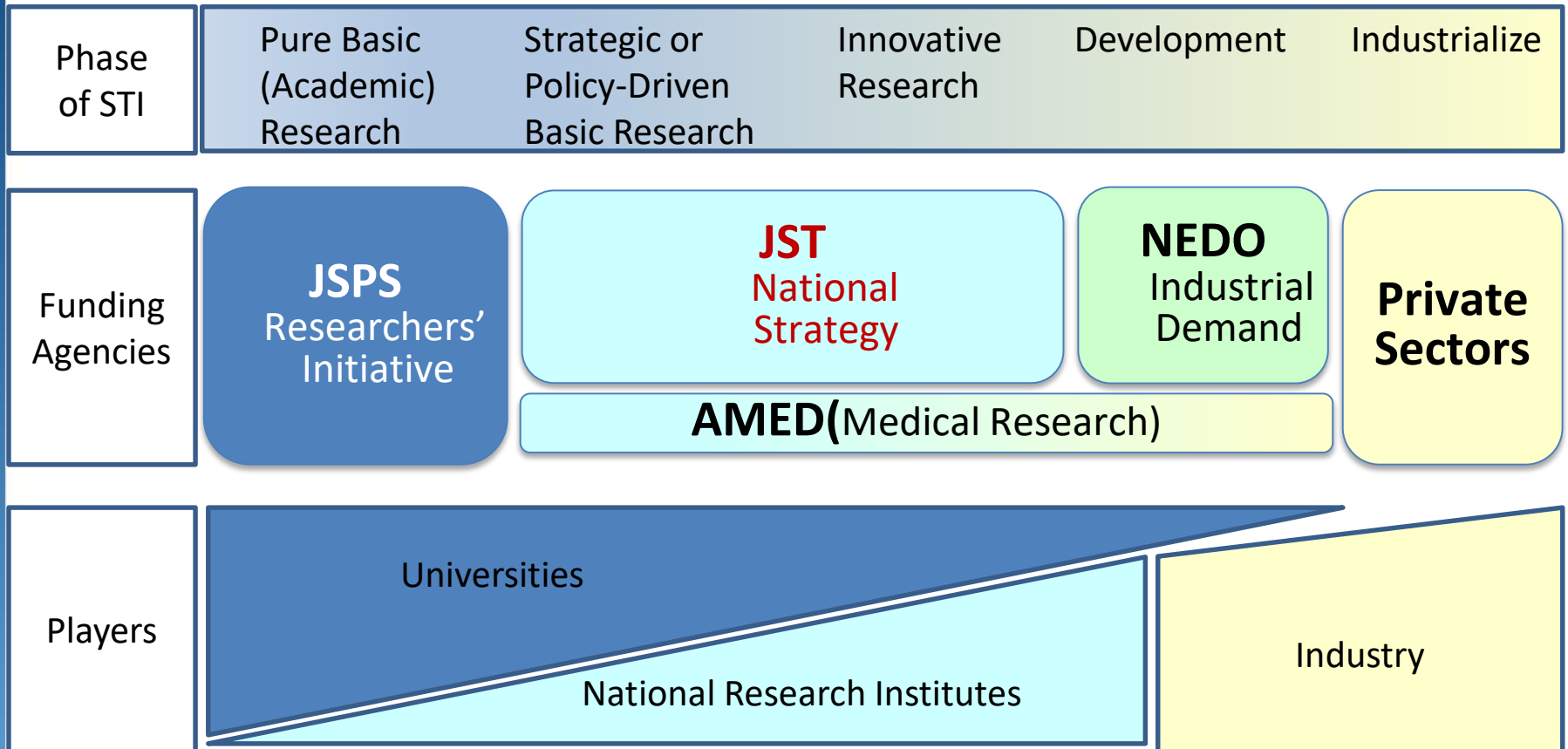
Primary Functions:

- Establishing R&D Strategies
- R&D Funding
- Building S&T Infrastructure
- Fostering Next-Generation Scientists
- Promoting Science Communication

Nobel Laureates Supported by JST

Dr. Ryoji Noyori (2001, Chemistry)
Dr. Shinya Yamanaka (2012, Medicine)
Dr. Serge Haroche (2012, Physics)
Dr. Isamu Akasaki (2014, Physics)
Dr. Hiroshi Amano (2014, Physics)
Dr. Shuji Nakamura (2014, Physics)

JST is the funding agency, but not simple.



JST - Major Operation & Budget

R&D Strategy

R&D Strategy Planning

Center for R&D Strategy (CRDS)
0.6(0.6) billion yen

China Research and Communication Center (CRCC)
0.4(0.4) billion yen

Center for Low Carbon Society Strategy (LCS)
0.3 (0.3) billion yen

Strategic Basic Research

Innovative Research

Promoting Creation of Science, Technology and Innovation

Strategic Promotion of Basic Researches 53.6(53.8) billion yen

R&D based on University-Industry Collaboration 23.4(22.9) billion yen

Promotion of International S&T Joint Projects 2.8(2.8) billion yen

Promotion of the Utilization of University IP 2.3(2.5) billion yen

Promotion of ImpACT, SIP

S&T Infrastructure

Establishing an infrastructure to drive the generation of innovation
- Soft infrastructure to support innovation -

Knowledge Infrastructure
6.0(6.2) billion yen

Next-Generation Development
3.9(4.2) billion yen

Science Communication
2.5(2.6) billion yen

*FY2016(FY2015)

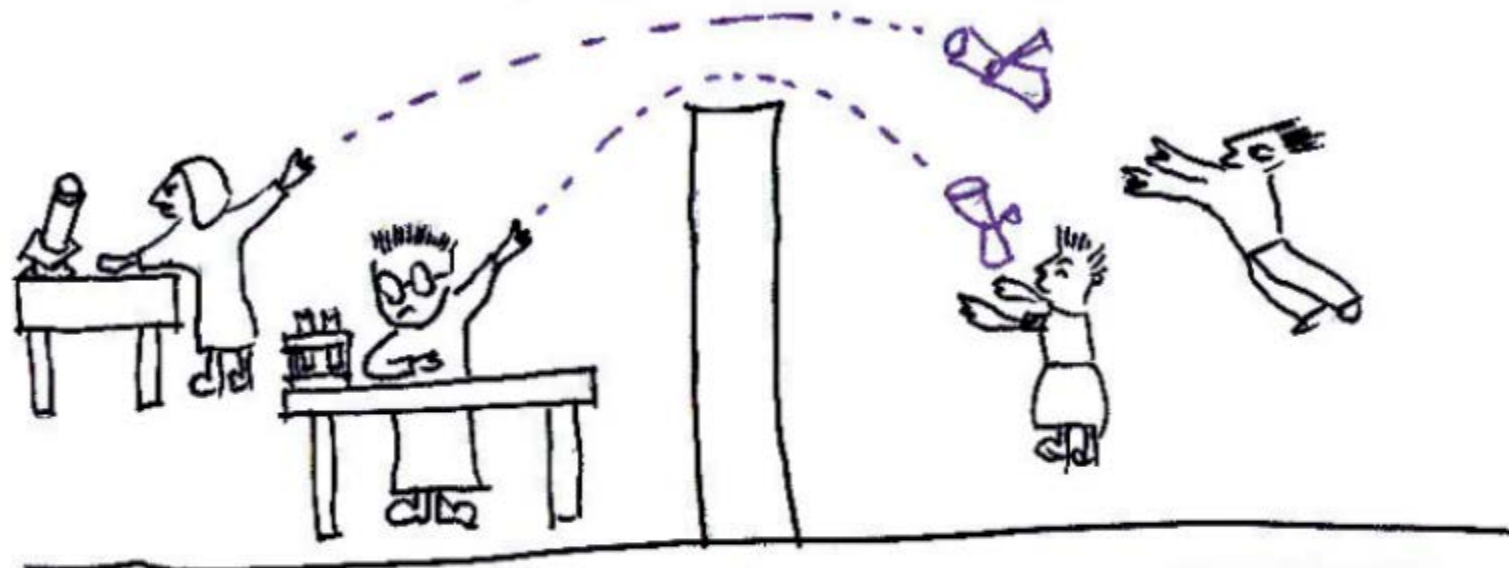
Relation between Science and Society

Science and Society, A long, long time ago, in a country far, far away...

- * Historically speaking, science and the way of scientific thinking was “imported” from Western World some 150 years ago.
- * Scientists treated as special existences, maybe living outside society: Science was thought as a genius’s job.
- * A scientist was respected highly just he or she was a scientist!

Traditional Relation between Science and Society in Japan (One way and separated)

Knowledge in scientific papers



Scientific community
= Discipline-divided research

Society
= Discrete use of knowledge
by people not possessing
an overhead view

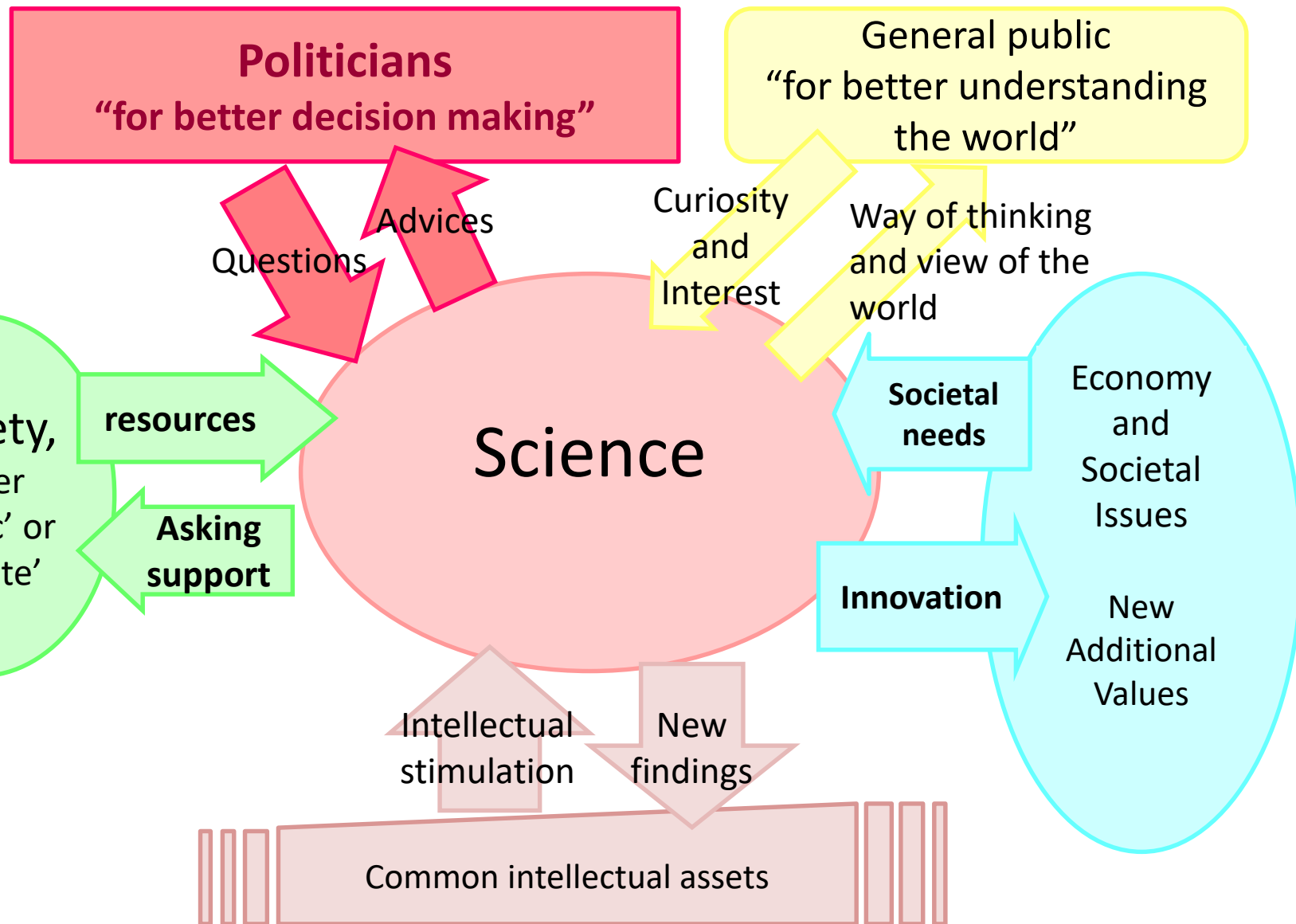
thick dividing wall

Science in transition

- * Today science exists and influences every aspect of people's life and societies;
 - * their outcomes used in almost all aspects of daily livings,
 - * their immediate and direct influence to society and
 - * progress of ICT enabling everybody access to science easily.
- * People are now aware that science brings both benefit and risk.
- * Science activities are supported by public or society.

Trust building between science and society come to be emerging issue.

Relation between Society and Science



Issues happened in Japan

- * 2006: Misuse of research fund
- * 2011: Great Earth Quake in East Japan:
 1. Earth quake beyond seismology theory happened.
 2. Nuclear plant accident happened though it was said safety.
- * 2014: Series of misconducts happened: Fabrication and Falsification

Example

1. Principal Investigator's pressure caused researchers to make fabrication and falsification.
2. Stimulus-Triggered Acquisition of Pluripotency cells were published with not enough evidence and data doubtful to be fabricated.

Counter Measures to the Misconducts(1)

- * Science Council of Japan (SCJ) summarized the recommendation “Measures to prevent fraud in research activities and post-action measures - to improve science integrity-” on 26th December 2013.
- * Ministry of Education, Culture, Sports, Science and Technology (MEXT) revised “Guidelines for Responding to Misconduct” on 26th August 2014.
- * Japan Society for the Promotion of Science issued the education program “For the Sound Development of Science -The Attitude of a Conscientious Scientist-” in 2015.

“Measures to prevent fraud in research activities and post-action measures” by SCJ

提言

研究活動における不正の防止策と事後措置
—科学の健全性向上のために—



平成25年(2013年)12月26日

日本学術会議

科学研究における健全性の向上に関する検討委員会

- * SCJ recommended to the Government, science agencies, science community and scientists;
- 1. Eradication of misconduct to maintain the trust of society to science
- 2. Early establishment of education program of science integrity
- 3. Completion of the program before application to the competitive funds
- 4. Counter measures and post action

“Guidelines for Responding to Misconduct in Research” by MEXT

Guidelines for Responding to Misconduct in
Research

Adopted August 26, 2014

by Ministry of Education, Culture, Sports, Science and Technology
(MEXT)

- * Guidelines indicated;
- * Basic Principle toward Misconduct in Research
- * Initiatives for Preventing Misconduct
- * Responding to Specific Research Misconduct (clarification of management responsibilities of organization)
- * Sanctions for Specific Research Misconduct and Management Responsibility
- * Surveys and Support by MEXT

Education Program “For the Sound Development of Science” by JSPS

[Text version]

For the Sound Development of Science
-The Attitude of a Conscientious Scientist-

Japan Society for the Promotion of Science
Editing Committee “For the Sound Development of Science”

The education program advises;

1. What Is a Responsible Research Activity?
2. Planning Research
3. Conducting Research
4. Presenting Research Results
5. How to Conduct Joint Research
6. Appropriate Use of Research Funds
7. Contributing to Quality Improvement in Scientific Research
8. For the Progress of Society

Counter Measures to the Misconducts(1)

- * All the public competitive research funding requires applicants to complete the education program of science integrity in prior to application to the fund.
- * JST made open the web role-role playing program “The Lab”.

Example of Requirement of Research Integrity in an Application Guideline

- Violation of the guidelines provided in this chapter or any other inappropriate behavior may result in withdrawal of approval for the research project or cancellation of the research; return of all or part of the project's research funding, and measures taken to publicize the facts of the matter.
- Violation of related laws or guidelines, etc., in conducting research may result in cancellation of your research funding allocation or withdrawal of the research funding allocation decision.

6.1 Enrolling in and Completing the Educational Program for Research Integrity

The research project applicant must complete the educational program for research integrity as a prerequisite for application. Note that if completion of the program cannot be confirmed, the application will be disqualified for failing to meet the requirements enrollment in and completion of the research integrity educational program by the time of application is not a prerequisite for Lead Joint Researcher applicants).

The Lab

- * JST settled the contract and the license agreement with the WILL Interactive, Inc. having the copyright of the video teaching material “The Lab”.
- * The Lab is a virtual experiential learning simulation that can play the characters of four people who face various suffering concerning research fraud conducted at the university laboratory:
 1. Research representative
 2. Foreign postdoctoral
 3. Graduate student,
 4. Research ethics official



THE LAB

Avoiding Research Misconduct

Go to The Ethical
Decision Making
Tutorials



View Intro Video



Accessibility

Acknowledgments



Legal

11th March, 2011



What happened in Japan in 2011

- * Great earthquake beyond the understanding of mechanism of recent seismology, series of tremors happened by shifting seismic centers.
 - = Incompletion of science at that time
- * Tsunami killed ten thousand people.
 - = Alert system failure + lost past lessons
- * Nuclear plant accident
 - = Man-made disaster by the operator, since the emergency counter-measures in a same type of nuclear reactors near the seismic center worked and no accident happened.
- * Radioactive contamination caused by the nuclear plant
 - = Confusion brought by less systematic science advices



Problems

- * Seismology:

- * There was a gap between advocacy and public expectation.

- (Ex) Scientists tell us “we are sure that big earthquake of level 7 will happen with 70% probability within coming 30 years”:

- Is this a ‘prediction’ that society pragmatically want?**

- * Tsunami:

- * There might be a possible role of science to remind a forgotten risk.

- (Ex) **One field activity of a professor in a community saved 3,000 pupils’ lives.**

- * Radioactive contamination:

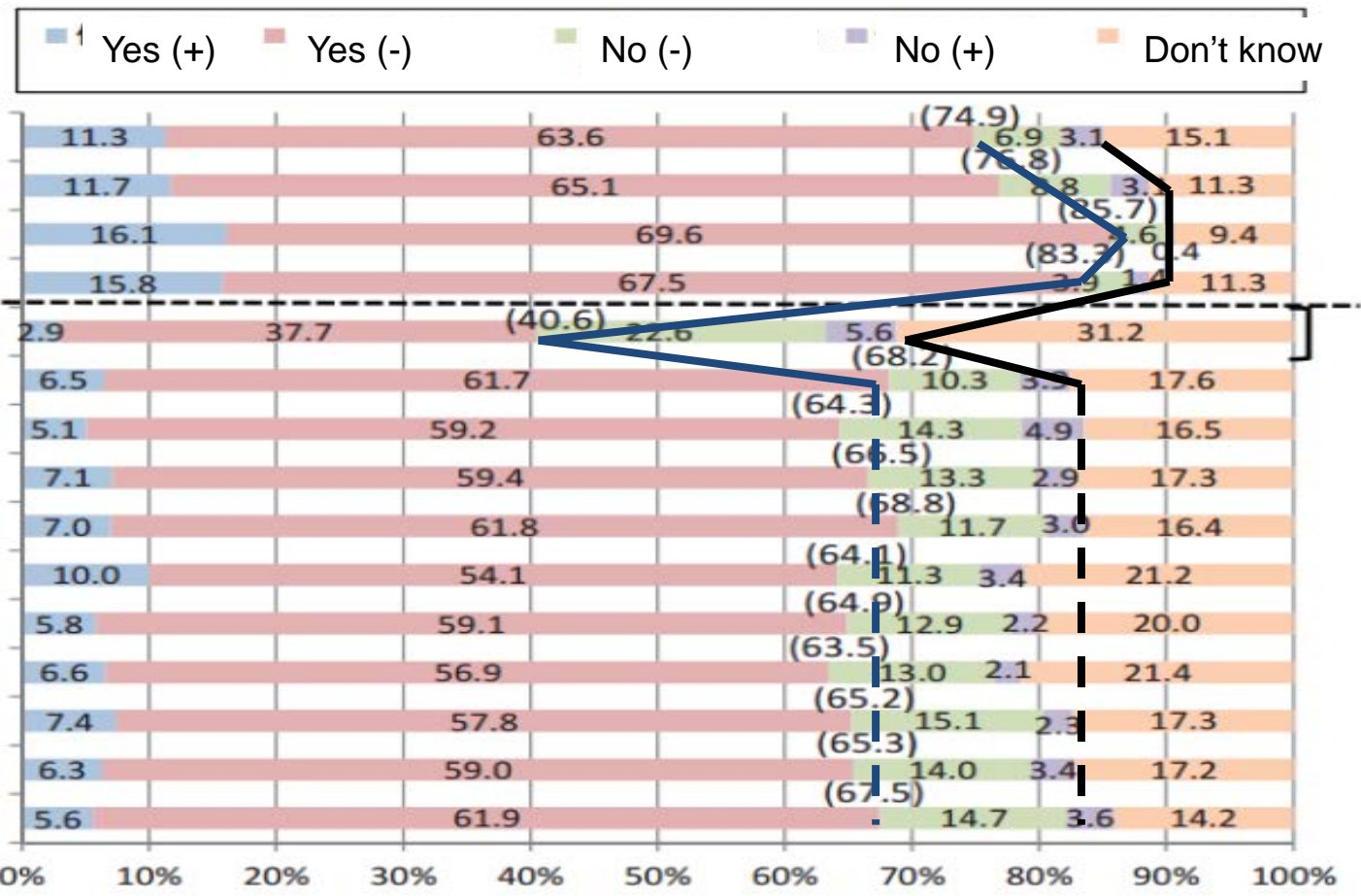
- * Individual scientists advised individual politicians non-systematically with less holistic scope.

- * People were confused and worried by fragmented information.

Do you trust scientists or their explanation ?

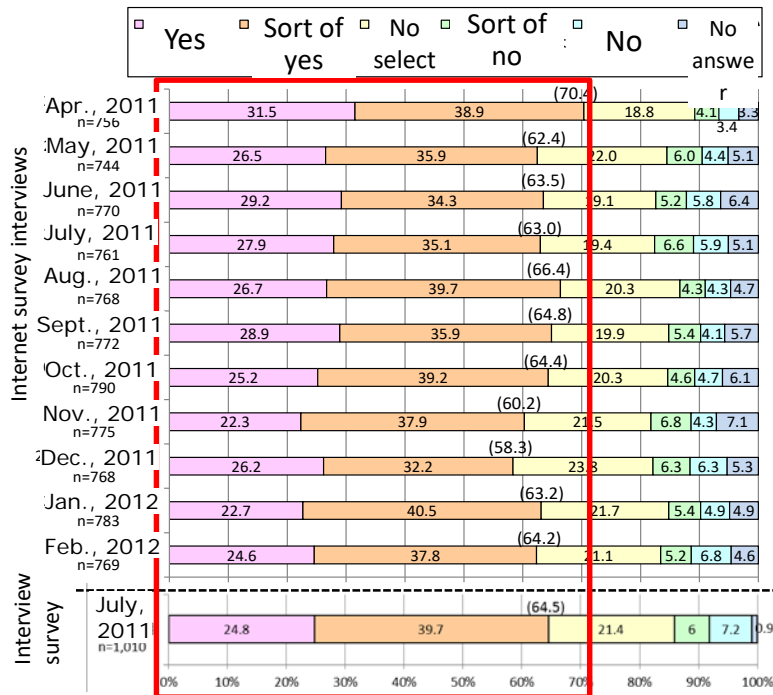
Before 3.11

After 3.11



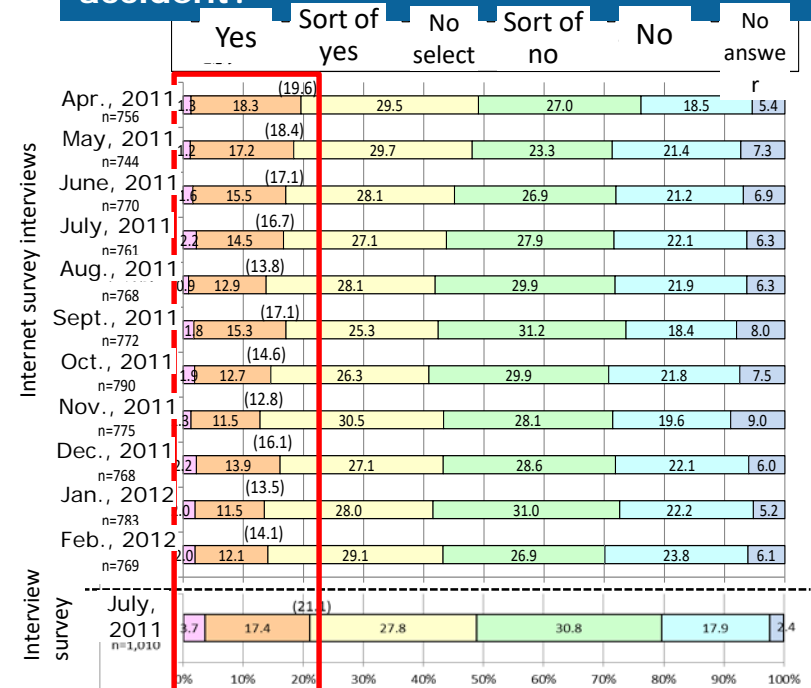
Citizens demand, but scientists do not respond

Do you want to hear scientists' opinion on nuclear power plant accident?



More than 60% of citizens want to hear scientists' opinion on nuclear power plant accident

Do you think if scientists announced their opinions on nuclear power plant accident?



Fewer than 20% of citizens think scientists expressed their opinion on nuclear power plant accident

Source: Study from about the change of public awareness of science and technology (National Institute of Science and Technology Policy: August 1, 2012 Science and Technology Council meeting materials) from processing

As a result...

- * Interest and expectation in science of Japanese public did not significantly changed. They stayed 'pro-science'.
- * However, public trust to scientists and engineers was lost by 10~20 points after the earthquake.
- * Appropriate communication between science community and society did not realized.
- * Public did not think that scientists announced their opinions on nuclear power plant accident properly, while they wanted to hear scientists' opinion on nuclear power plant accident. = "Gap"

Revision of “Code of Conduct for Scientists” by SCJ



Statement
**Code of Conduct
for Scientists**
— Revised Version —

Science Council of Japan
January 2013

- SCJ revised “Code of Conduct for Scientists” in 2013 from the original version issued in 2006. The code had been influenced by the Budapest Declaration in 1999 and the events in 3.11 2011.
- It made clear the relations between science, scientists and society:
 - Itemizing Scientists in Society, Research that answers to Social Wish, Accountability and Disclosure, and Dual Use in addition to “usual” scientific activities
 - Creating chapters, especially “Research Integrity” and “Science in Society”

II Research Integrity

(Research Activities)

7 Scientists shall act with integrity according to the spirit of this Code of Conduct in drafting, planning, applying for, implementing, and reporting their own research. By reporting their research results through such means as papers, scientists shall take responsibility as well as obtaining recognition for their achievements in accordance with the role that they played. Scientists shall ensure that research and survey data are recorded, stored and rigorously handled, and not only refrain themselves from any misconduct such as fabrication, falsification or plagiarism, but also refrain from aiding or abetting such misconduct.

(Establishing Sound Research Environments and Thorough Educational Enlightenment)

8 Scientists shall recognize that establishing and maintaining fair research environments where responsible research can be conducted is one of their important duties, and shall work continuously to improve the quality of research environments in the scientific community and their own institutions, and toward educational enlightenment preventing misconduct. Moreover, they shall also seek the understanding and cooperation of the public in achieving these goals.

(Consideration for Research Subjects)

9 Scientists shall respect the dignity and rights of individuals who cooperate in their research, and shall safeguard and give proper consideration to their welfare. They shall also treat animals and other research subjects with all due care and respect.

III Science in Society

(Dialogue with Society)

- 11 Scientists shall participate actively in dialogue and exchange with citizens, for better mutual understanding between society and the scientific community. As well, in order to resolve various issues and realize welfare in society, they shall also work to provide scientific advice effective for policy making to persons involved in the planning and determination of policies. On such occasions, scientists shall aim to give advice based on consensus among scientists, and, when differences of opinion exist, shall offer explanations that are easy to understand.

(Scientific Advice)

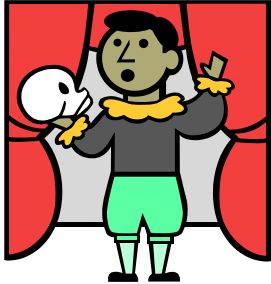
- 12 Scientists shall conduct research activities with the objective of contributing to public welfare, and offer fair advice based on objective and scientific evidence. At that time, they shall be aware of the gravity of the impact and of their responsibility that their statements may make on public opinion building and policy making, and shall not abuse their authority. As well, scientists shall make maximum efforts to ensure quality in their scientific advice, and at the same time clearly explain the uncertainty associated with scientific knowledge as well as the diversity of opinions.

(Scientific Advice to Policy Planners and Decision Makers)

- 13 When scientists offer scientific advice to persons who plan or decide on policy, they shall recognize that while scientific knowledge is something to be duly respected in the process of creating policy, it is not the only basis on which policy decisions are made. In the event that a policy decision is made that diverges from the advice of the scientific community, scientists shall request, as necessary, accountability to society from the policy planner and/or decision maker.

Two Cultures and Science Advice(SA)

**Policy makers : (Majority) Social
Science and Humanities**



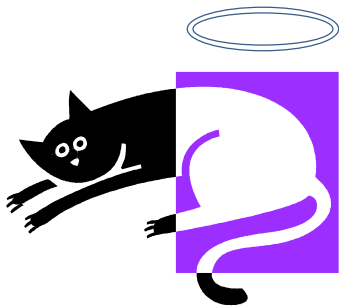
**Hamlet's question
"To be or not to be"**

Decide and take (one) action
← Science advice is one of basis

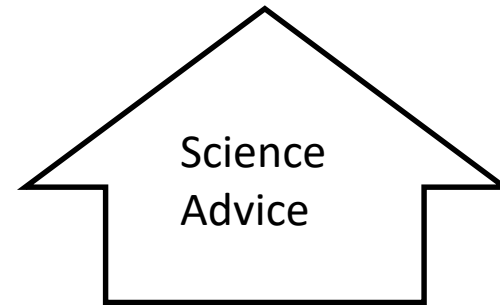
< World of Reality >

Dos : be aware that science is not almighty
Don'ts : use science as an excuse

**Science Advisers : Natural
Sciences**



**Schrödinger's cat
"Half alive, half dead"**



Dos : make effort to provide practical solution
Don'ts : distort or neglect the fact

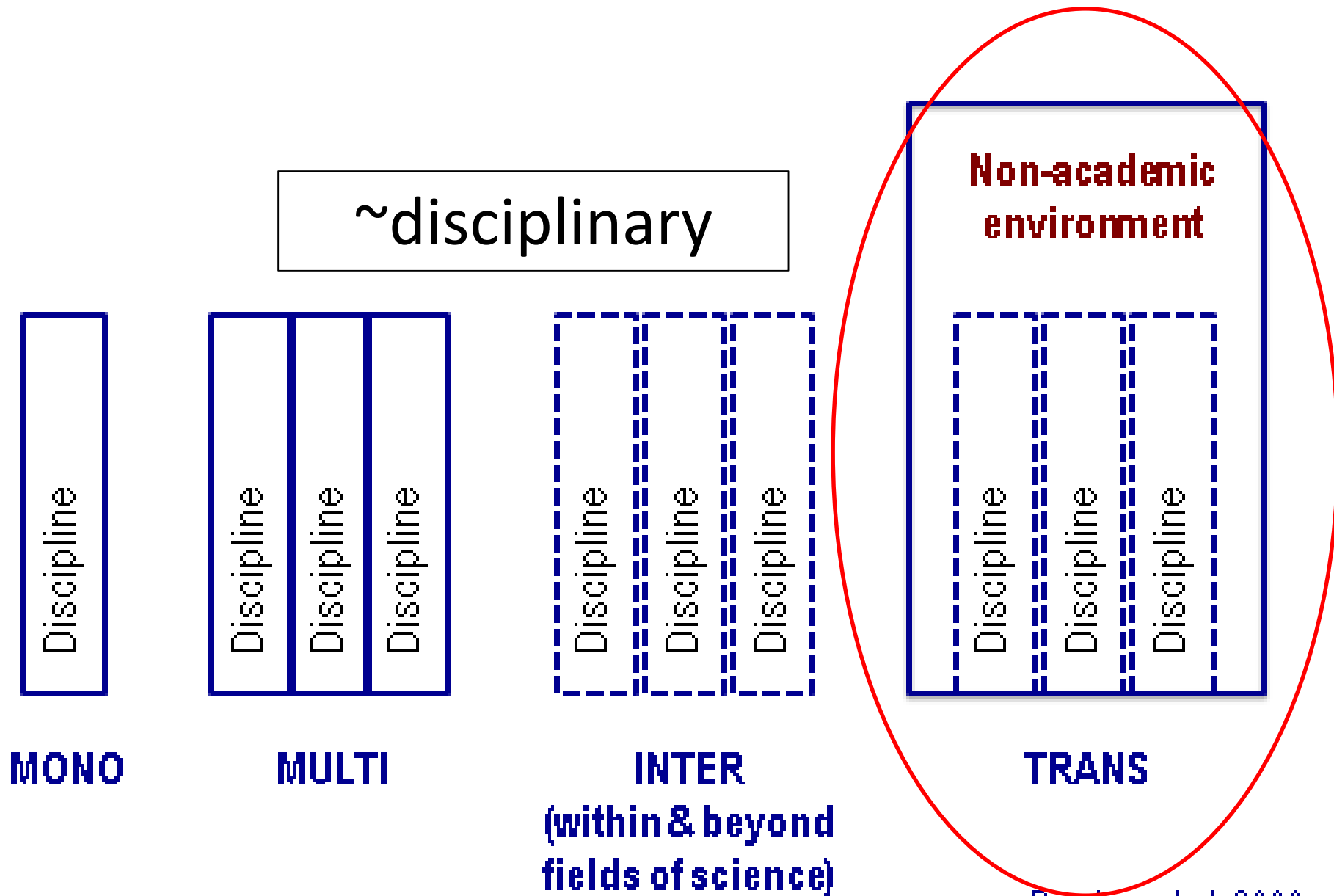
< Depth of Sciences >

Uncertainty
by nature of
sciences

Imperfection of
today's
sciences

Differed
opinions by
Individual
scientists

To leap from disciplinary silos to societal arena



Burders et al, 2009

Why science integrity for what

- * For science and scientists:

- To maintain healthy environment for science and to keep science progressing reasonably and convincing

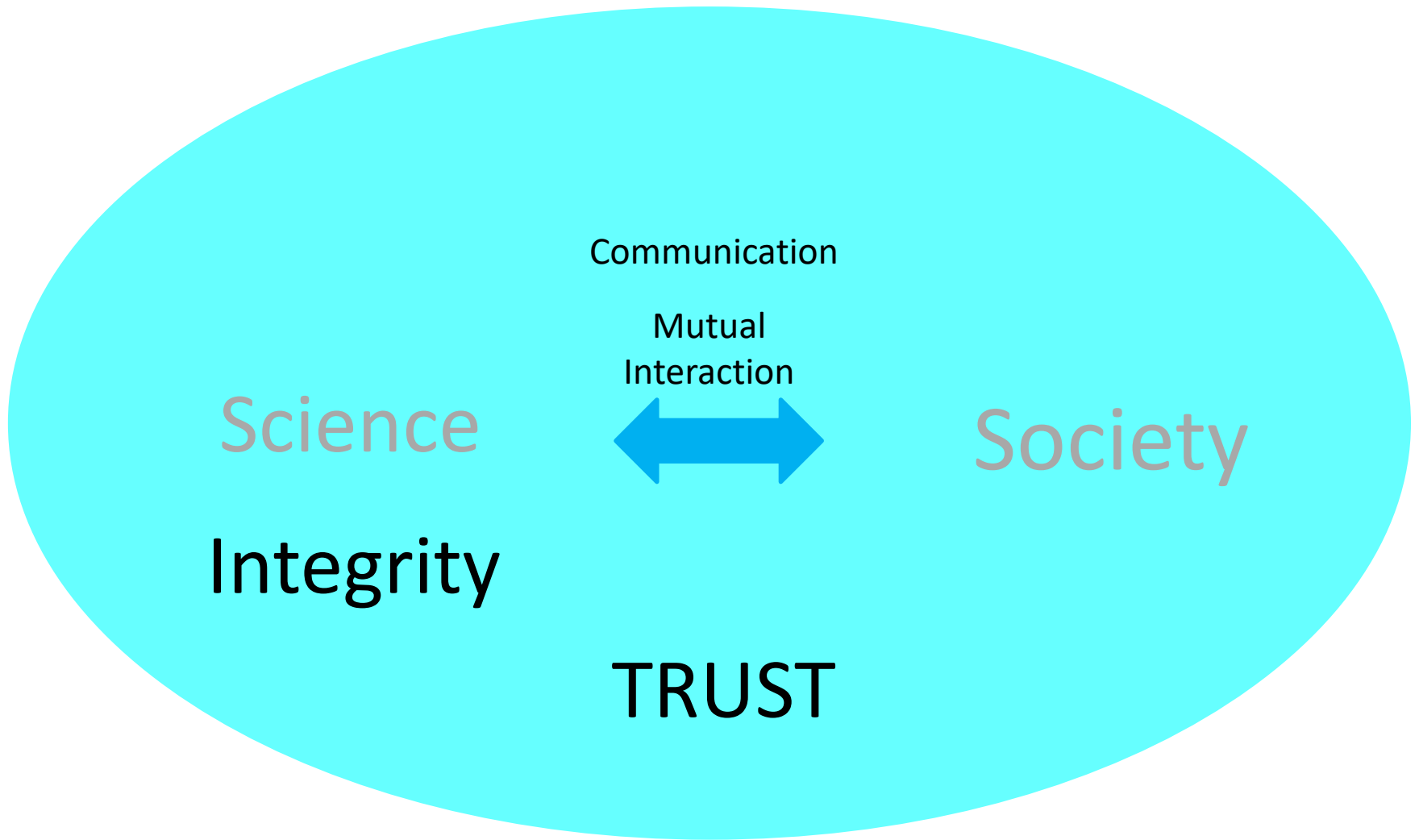
- To make scientists free from unnecessary pressures from overheated competition and to keep them as healthy citizen

- To be aware of Ethics, Legal and Societal Issues(ELSI)

- * For society and public:

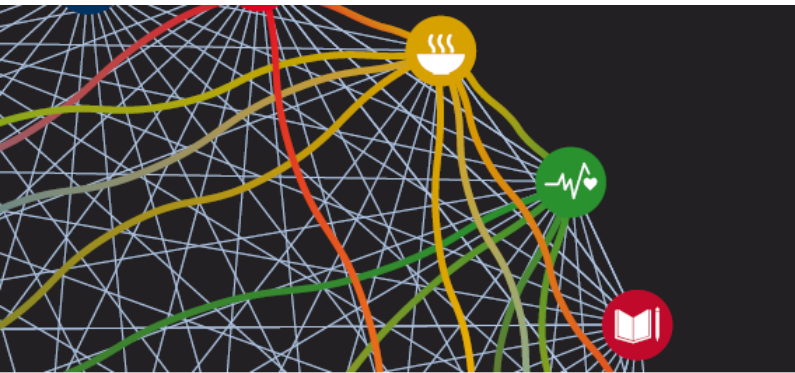
- To be aware that science is trust worthy and worth investing, since they are most influenced group, final users and sponsors of science

Finally to Build a sound, healthy and happy relation and trust between science, scientists and society



Science is a integral part of society

Now society expects science to provide knowledge for solution



ABLE GOALS

変えるための17の目標



A GUIDE TO
SDG INTERACTIONS:
FROM SCIENCE
TO IMPLEMENTATION



INTERNATIONAL
COUNCIL
FOR SCIENCE



Thank you very much for your
attention.