CSTP and CIIE Joint Workshop on the Next Industrial Revolution

Filling Gaps for Sustainable Evolution
- A Scientist’s View -

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Global Trends in the 21st Century

- Technology breakthrough, innovation, and globalization leading to rapid changes in industrial structures and social systems
  - Nano, bio and information technologies
  - High-speed digital communication, massive transportation
  - Personalized health/medical care, smart energy, ubiquitous finance
  - Economy of scale to economy of satisfaction

- Global sustainability?
  - Growth of population, depletion of resources, energy shortage, environmental deterioration
STI Policy Movement in Japan

- Major issues such as recovery and rebuilding, future energy plan, deindustrialization, aging with declining population, sovereign debt, economic crisis …….. after 2011 Great East Japan Earthquake

- **4th Science and Technology Basic Plan** (rev. 2011)
  - Restoration and reconstruction
  - Green innovation, Life innovation
  - Issue-driven R&D strategy
  - ……
  - S&T budget for FY2013 ~ 4.6T Yen (49,000 M$) (+25%)

- Prime Minister Abe’s initiative as a part of the Growth Strategy
- Features
  2. Comprehensive package for issue-driven STI
  3. Policy combination (budget, tax, deregulation, etc.)
  4. Responsible ministries

**Five challenges for S&T and innovation:**

1. Clean, economical Energy System
2. Healthy, longevity society
3. Building the next generation infrastructure
4. Revitalization of regions using strengthened regional resources
5. Early Recovery from the East-Japan Earthquake

**Strong leadership by Council for Science and Technology Policy**
Questions in Designing STI Policy Meeting Social Wishes

In order to effectively link scientific achievement to innovation, economic growth and social welfare,

✓ How to systematically identify social issues?
✓ How to design R&D programs meeting social wishes?
✓ How to cultivate motivation of scientists in issue-driven (state-determined) research?
✓ How to encourage scientists to set forth research themes from a wide perspective on social issues?
✓ How to induce fusion and collaboration of different scientific disciplines and technology fields?
System of R&D for Innovation

Business and Service

Government

Society

Funding agencies

Funding A

Funding B

Funding C

Research Institutions

Universities

Industry

Engineers

Scientists

Government

Product development

Synthesis

Analysis

Applied research

Issue-driven basic research

Science-driven basic research

Universities

Research Institutions

Funding agencies

Fund. A

Funding B

Funding C

Government

Business and Service

Society

Industry

Engineers

Scientists

Funding agencies

Fund. A

Funding B

Funding C

Government

Business and Service

Society

Industry

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Scientists
System of R&D for Innovation

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Gaps, fractures and fragmentations

Analysis

Synthesis

Product development

Applied research

Issue-driven basic research

Science-driven basic research
Gaps to be Filled

Between:
- Basic and applied research
- Scientific disciplines
- Industry, business, research institutes and universities
- Government ministries and funding agencies
- Scientists, engineers, policy makers, and society

Something is missing?
A Loop for Sustainable Evolution

Actors in Society are:
- statesmen,
- policy makers,
- business persons,
- administrators,
- engineers,
- educators,
- writers,
- artists,
- journalists,
- etc...

who move society.


(Revised from H. Yoshikawa, 2010)
Necessities of Circulation

Discovery of social wishes is the key for acceleration

1. Recognition of the entire loop and each player’s own role
2. Good communication
3. **Observing Scientists**
   - Observation of the present state of society and the environment
   - No neglect of observed abnormalities
   - Discovery of social wishes (incl. invisible wish)
   - Warning to society
4. **Designing Scientists**
   - Collaboration with and learning from observing scientists
   - Recognition of the essential role of designing scientists for the circulation
   - Developing science of design to improve the services
   - Non-biased advices to society
5. **Actors in Society**
   - Private enterprise: flexibility, social responsibility, challenge, altruism
   - Government: for the people, for the private enterprise, no useless conflict within politics
6. **The People at Large**
   - Social technology

(Revised from H. Yoshikawa, 2010)
A Concept of R&D Planning to Meet Invisible Social Wishes

**VISION**

**DESIGN**

How to realize ideal society, given FACTS and TRENDS

- How S&T work for VISION
- What else required

**TRENDS**

Direction of changes in the next ten years

(Ex. Globalization, informatization, increasing social-security burden, tight energy supply)

**FACTS**

Societal conditions that will certainly hold in the next ten years or so

- Apparent and latent facts
  (Ex. Population distribution, social infrastructure)

Field-driven R&D Themes

“Encounter”

Ideal society to come

Possible pathways to reach VISION

Changes are inevitable, but they have different, but possible directions
Thank you for your attention!

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