

Embedding HSE risk assessment procedures into R&D process of emerging technologies in Japan

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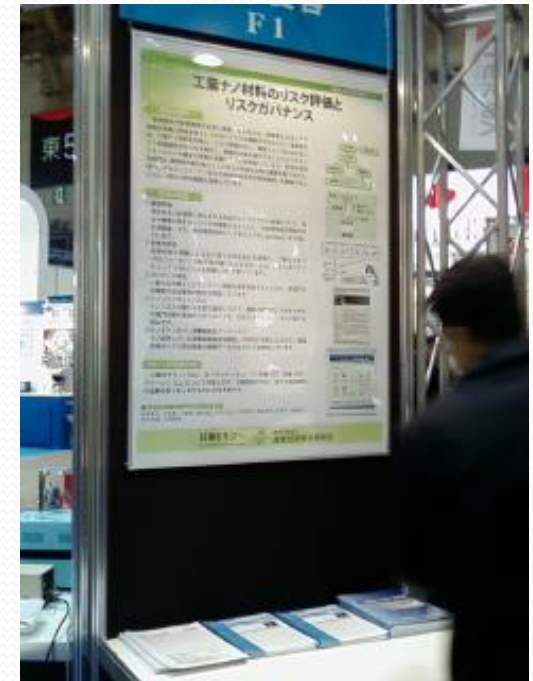
Stuttgart, Germany

Outline

1. Cultural barriers to innovation of emerging technologies in Japan
2. Growing interest in risk assessment at AIST
3. New initiative called “TIA nano”

Voices from business people at an exhibition

- R&D in a major manufacturer: He was developing products using MWCNT. However, potential customers often said no to their products, due to the fear of health concerns (in particular, mesothelial tumor).
- R&D in a copy machine manufacturer: He was deeply concerned about health risks of nanoscale toner exposure. However, the industry association cannot start to discuss such issues because of business secret of each company.
- R&D at the middle management level: Although he is eager to promote the MWCNT project, his staff complained about their safety and his boss ordered him to suspend the project because of potential health risks.
- R&D in a cosmetics manufacturer: Although they marketed their product as “nano” in 2007, they stopped selling them as “nano” in 2008. At present, they adopt a wait-and-see attitude.



“Nanotech 2009”
(February in Tokyo)

Attitudes of the Japanese companies toward health, safety and environmental (HSE) risks

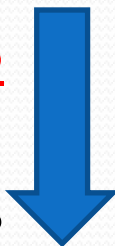
They always wait for instruction and a clean bill of “safety” from governmental agencies.

As a result, 1) There are almost no human resources able to conduct risk assessment in industrial sector. 2) It is difficult for them to decide how to address potential HSE risks by themselves.

Government Agencies

Instructions

laws and regulations,
standards, and advices



Compliance

Companies

Industry
associations

The case of engineered nanomaterials - What happens now in Japan

Governmental
agencies

are seeking for their way in uncertainty.

Industry sector

Innovations have been stopped.

Although a few companies conducted toxicity tests, they do not disclose the results because of the distrust of mass media.

The general
public

Almost all people know the word “nanotechnology” and have positive feeling to nanotechnology through TV commercials and consumer products. But **they are ignorant of the safety issues.**

The case of AIST



National Institute of Advanced Industrial Science and Technology (AIST)

- The largest research organization in the area of industrial science and technology in Japan
- Around 3,000 researchers (plus over 5,000 visiting researchers)

Multi-disciplinary competence

“Life Sciences & Technology”

“Information Technology & Electronics”

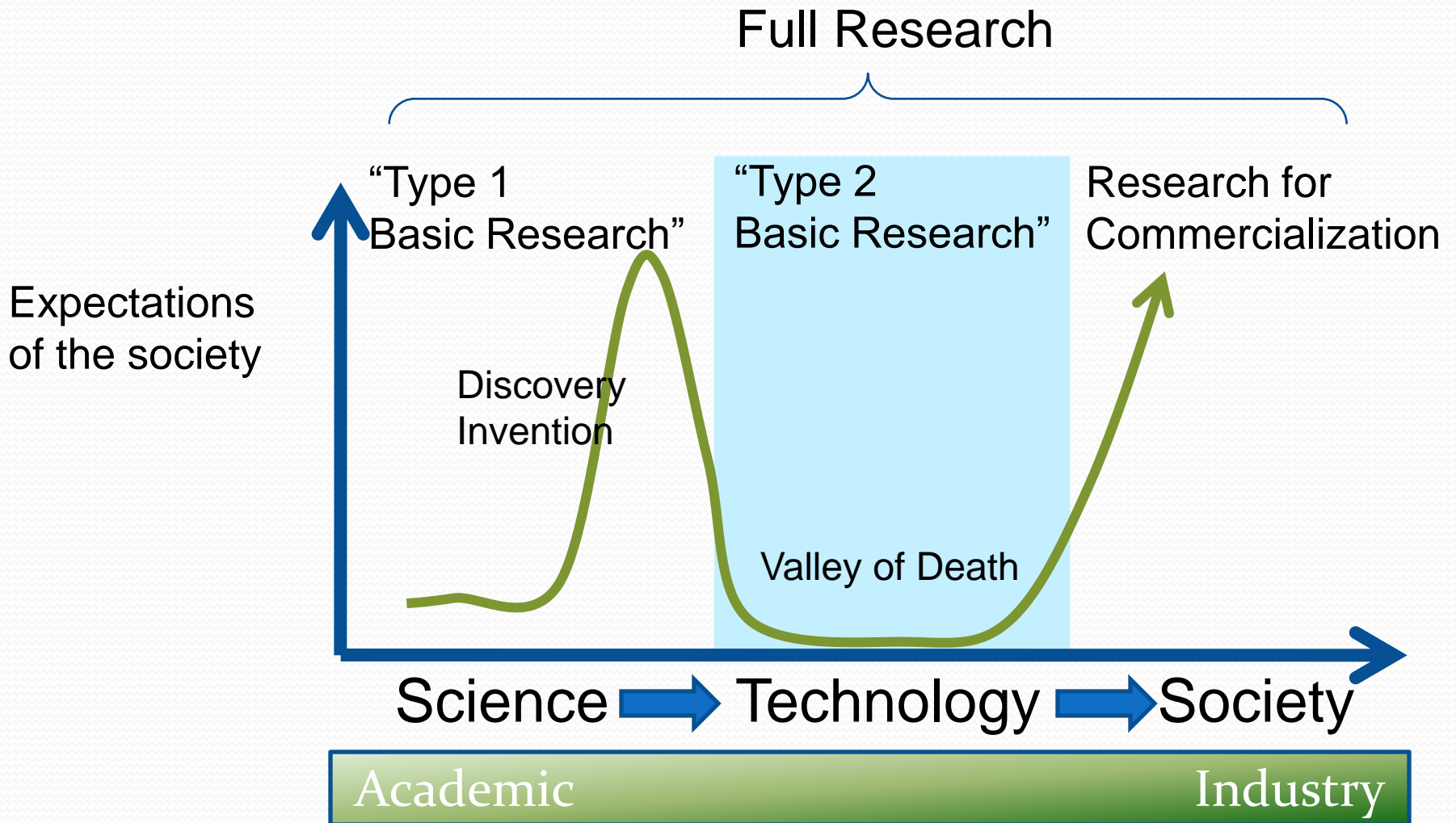
“Nanotechnology, Materials & Manufacturing”

“Environment & Energy”

“Geological Survey & Applied Geoscience”

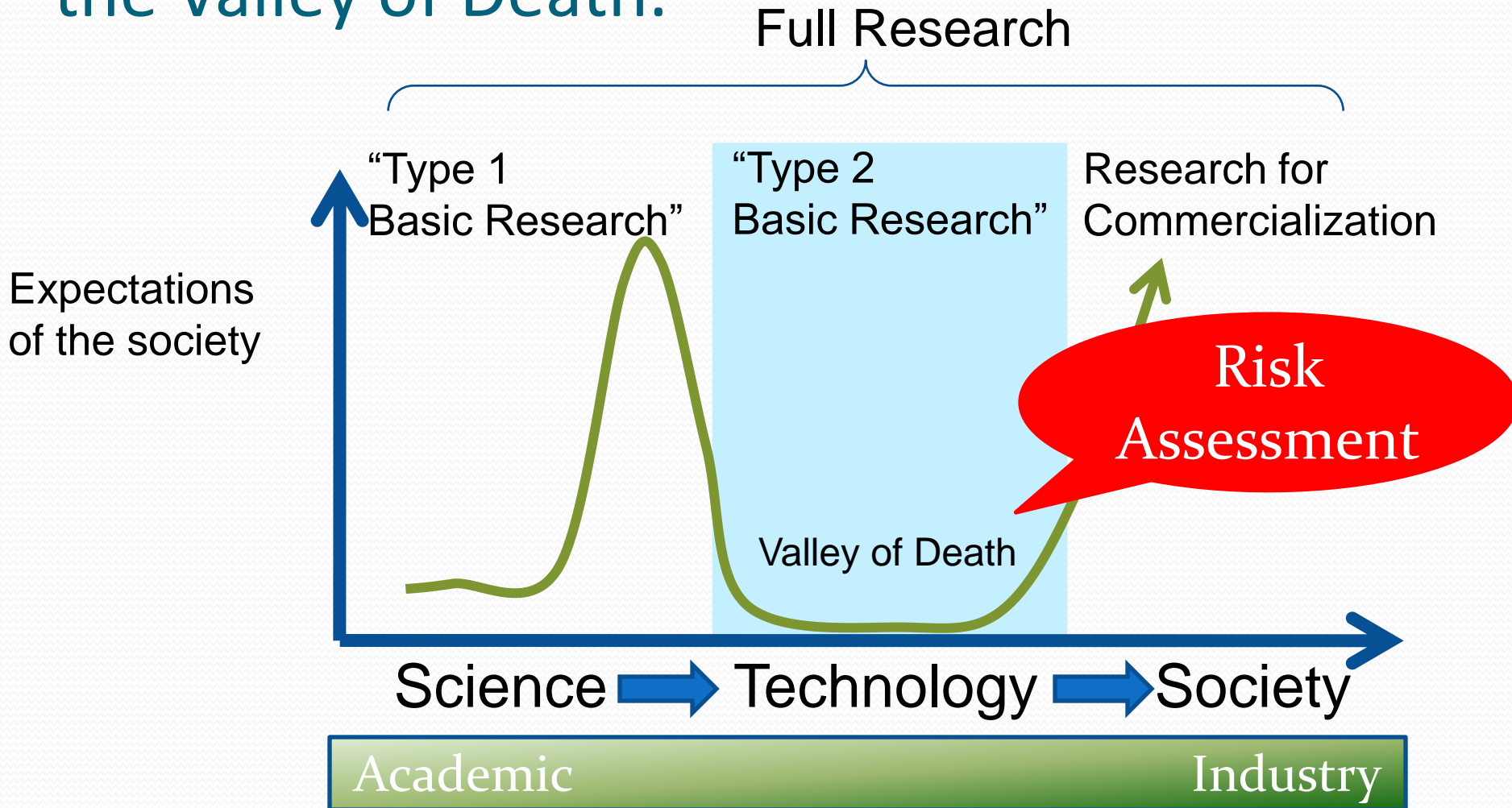
“Metrology & Measurement Technology”

“Full Research” model at AIST



Source: AIST web site

“Risk Assessment” is essential to overcome the Valley of Death.

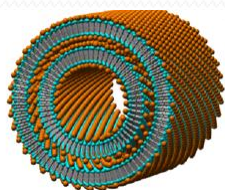


Urgent demands for a common platform within AIST

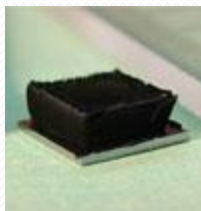
Researchers in various units have just begun to address “risk issues” separately.



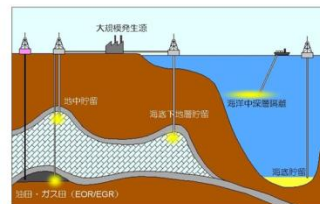
solar cell module
(metal compounds)



Organic
nanotubes



Carbon
nanotubes



Carbon capture
and storage



Built-in
software



Biofuels

Basic ideas

“Every emerging technology has its own emerging risk”

“No risk assessment, no innovation”

“Risk assessment” is one of the industrial technologies.

Concept of nanotechnology R&D base in Japan “Tsukuba Innovation Arena (TIA) nano”

“TIA nano”

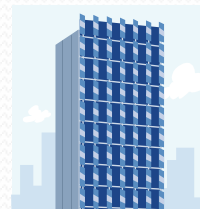
Nano Electronics

Nano Measurement

Carbon Nanotube (CNT)

...

Safety Assessment



Open innovation style



“under one umbrella”

Safety Assessment Center (Tentative)

Facilities under consideration

1. Analysis of fine structure
2. Measuring physical and chemical properties
3. Preparation of liquid dispersal samples
4. Analysis of liquid dispersal samples
5. Tests of in vitro toxicity
6. Observation of living tissues by electron microscope
7. Tests of dustiness
8. Exposure assessment using simulated manufacturing line
9. Exposure assessment using control measures

Companies

Human resources
Research funds
Materials/ Products



Implementation
of risk assessment
of nanomaterials



Researchers
National laboratories
Universities

Expected outcome

Changes in the business culture

Human resource development in
business sector

Promotion of innovation

input

Methodology
development for
risk assessment
of nanomaterials

Participation



Conclusions

- What is needed in Japan is to change corporate culture to accommodate emerging technologies and to change the relationship of government agencies and industrial sector and their roles.
- As R&D people began to realize the need to incorporate risk assessment thinking into R&D process from the early stage, a common platform for the R&D people should be prepared.
- National laboratories, such as AIST, could provide facilities, technical know-how, and information that promote voluntary risk assessment by companies.



Thank you

iNTeg-Risk project seems to be highly suggestive for us.