Science and Technology Studies (STS) and Social and Ethical Issues in Radiation Protection seen from the angle of STS

1. What is STS?
2. Robert Merton and "Norms of Science" (scientific ethos)
3. Some Philosophies of Science
4. Thomas Kuhn's Paradigm and Scientific Revolutions
5. The Strong Program
6. Normal Science v. "Post-Normal Science"
7. Fact / Value Dichotomy seen from an STS perspective
8. Lay Knowledge and Deliberation Processes

KINS Workshop on Radiation Protection
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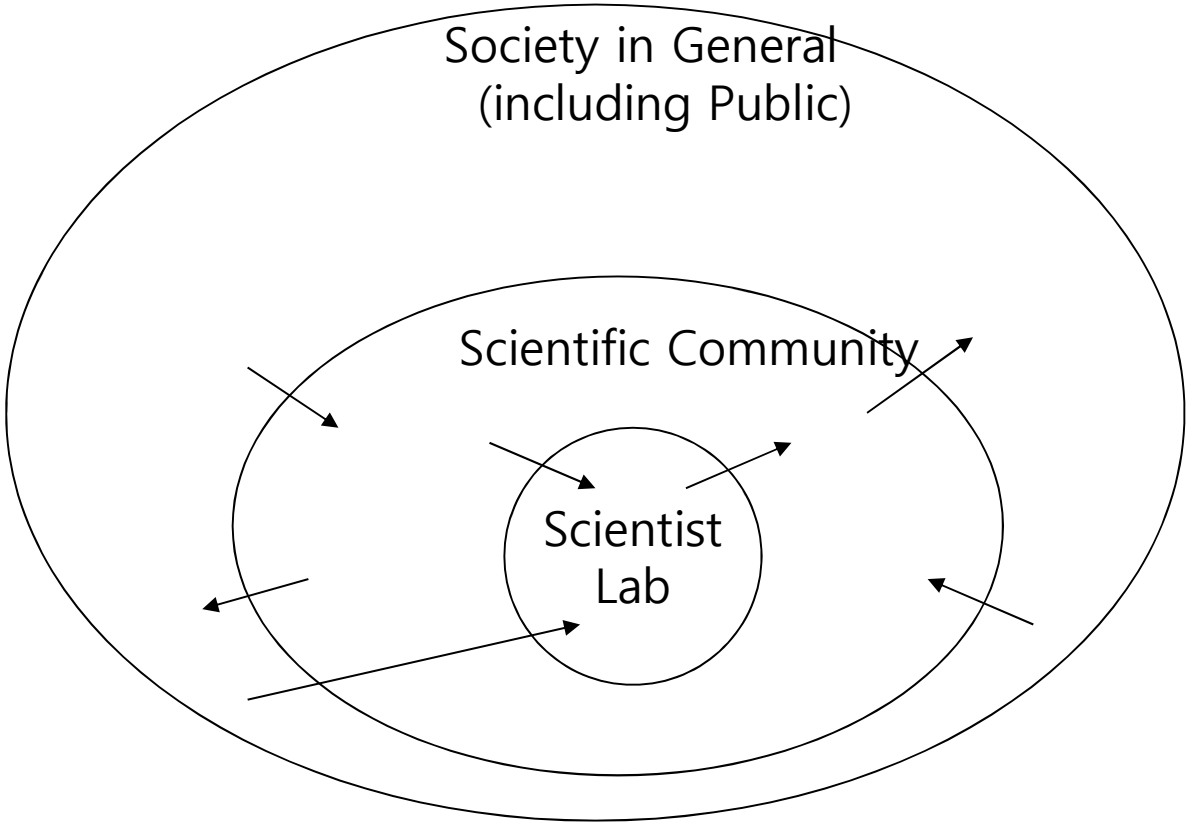
What is STS? – 1) Science, Technology and Society (Studies)
2) Science and Technology Studies
Levels of Interactions between Technoscience and Society



STS examines various interactions between scientific practices, scientific communities, and the society

Robert K. Merton and scientific ethos

- 4 norms in science ➔ “scientific ethos”

universalism: that truth claims are to be subjected to pre-established impersonal criteria consonant with observation and with previously confirmed knowledge

communism: that the substantive findings of science are a product of social collaboration and are assigned to the community. They constitute a common heritage.

disinterestedness: that the scientist searches for truth for its own sake, apart from the interests of class, nation, or economic reward. Such rewards may be received, but work should not be specifically directed towards obtaining them. (Another Mertonian sociologist of science described the publication of manuscripts in science as "gift-giving.”)

organized skepticism: that the judgement should be suspended until the facts are at hand and the beliefs have been scrutinized in terms of empirical and logical criteria

➔➔ “ethos of science”

➔ If violated ➔ pseudo-science, scientific fraud

Some Philosophies of Science

◆ Logical Positivism or Logical Empiricism

Science = Logic + Observational statements

A verification of a theory is an essence of science.

Selected Members of the Vienna Circle (from left to right: Moritz Schlick, Rudolf Carnap, Otto Neurath, Hans Hahn and Philipp Frank.

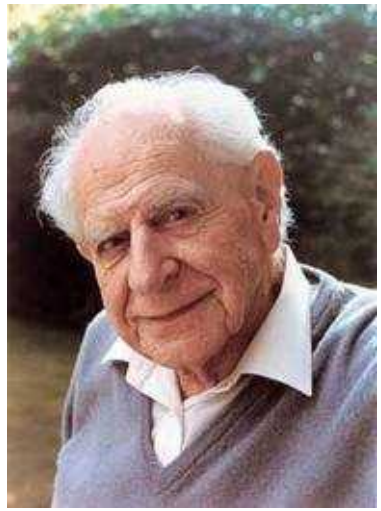
◆ Sir Karl Popper

denial of verificationism

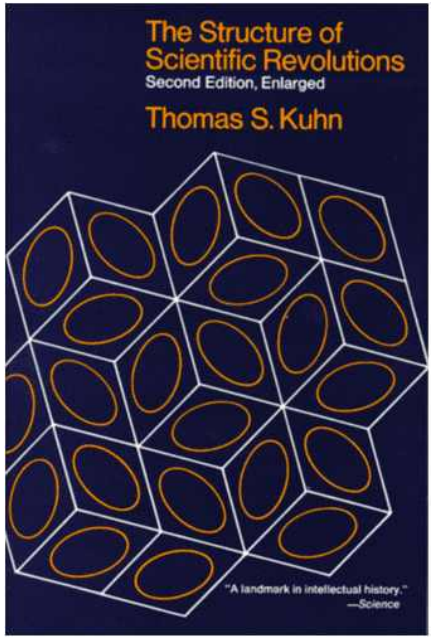
falsification as a criteria for science/pseudo-science

"conjecture & refutation"

a heroic image of science ➔ liked by scientists



T.S. Kuhn's *Structure of Scientific Revolutions* (1962)



➔the idea of the "paradigm" and its change
ex) The Newtonian paradigm

During the scientific revolution,
a new paradigm is chosen not because
it has more explanatory power, but because
of some other (aesthetic) reasons.

Period of
Scientific Revolution

paradigm **A**
competing with
paradigm **B, C,…**

Paradigm **B**

Normal science

Paradigms A and B are
"incommensurable"

paradigm **A**

Normal science (puzzle-solving)

Kuhn revolutionized the way people think about science, scientific changes, and the relationship between science and society.

Before Kuhn	**After Kuhn**
Realism (scientific theory = real)	doubt about realism -->constructivism
demarcation bet. science and society	science in society (scientific community)
cumulative, continuous development	revolutionary, discontinuous development
distinction bet. observation and theory	interconnectedness of observation + theory
Discovery (which exist in nature);	Construction (Paradigms of science constructed by scientists)
verification / falsification	paradigms are not easily falsified
individual scientists	scientific community
free communication bet. scientists	incommensurability bet. paradigms
unity of science	no such unity (disunity of science)

Kuhn was mainly interested in “Science and the Scientific Community” but bore some implications on “Science and the Society in general”.

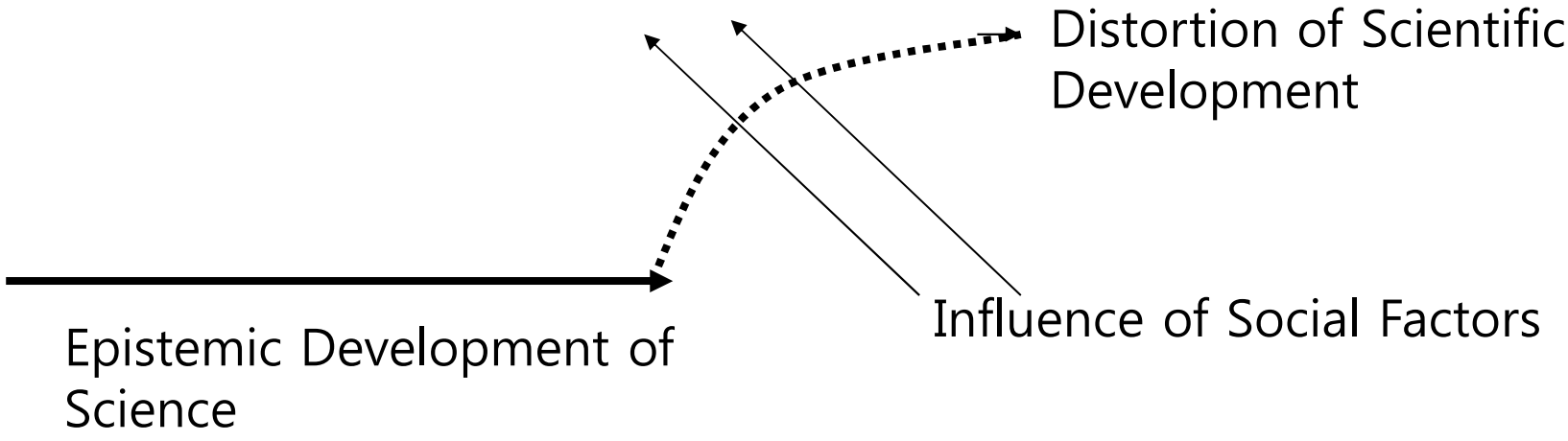
The Strong Program: Edinburgh School (Bloor, Barnes, Shapin…)

The Strong Program and the Social Construction of Scientific Knowledge

➔ social constructionism or social constructivism

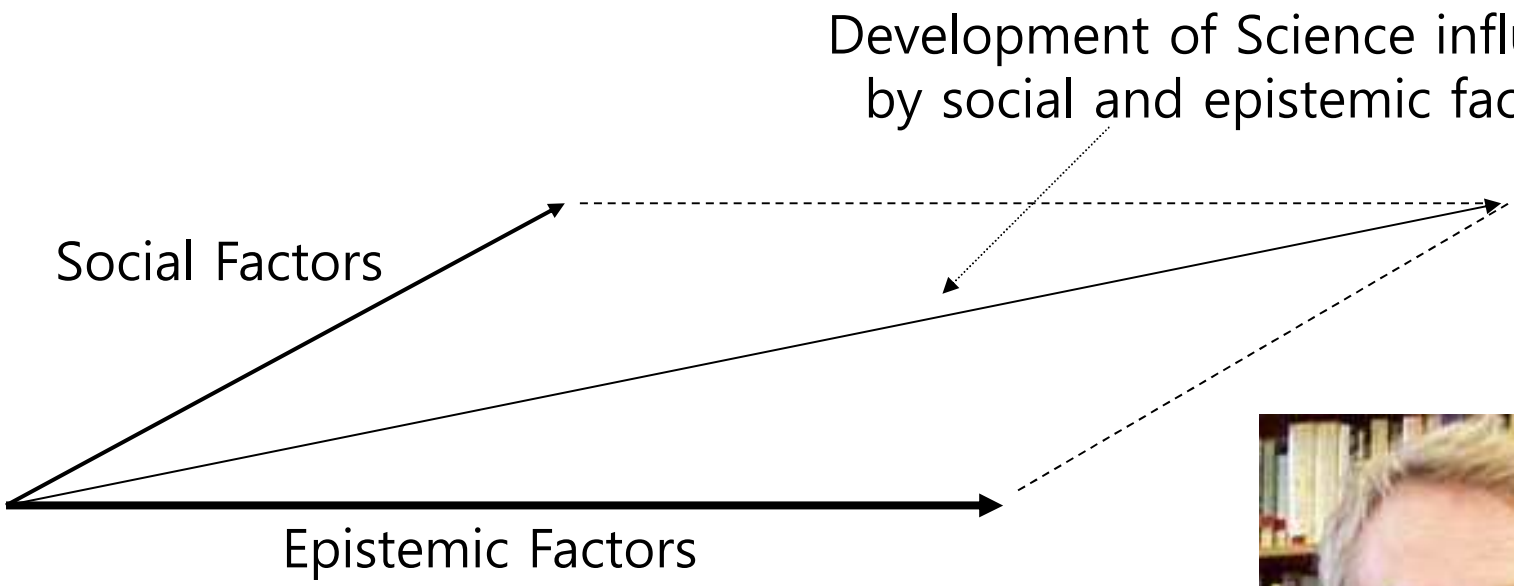
➔ from the "Scientific Community" to "Society in General"

Science and Society before the Strong Program



ex) Lysenkoism; Nazi science; eugenics…

Strong Program and the Social Construction of Scientific Knowledge

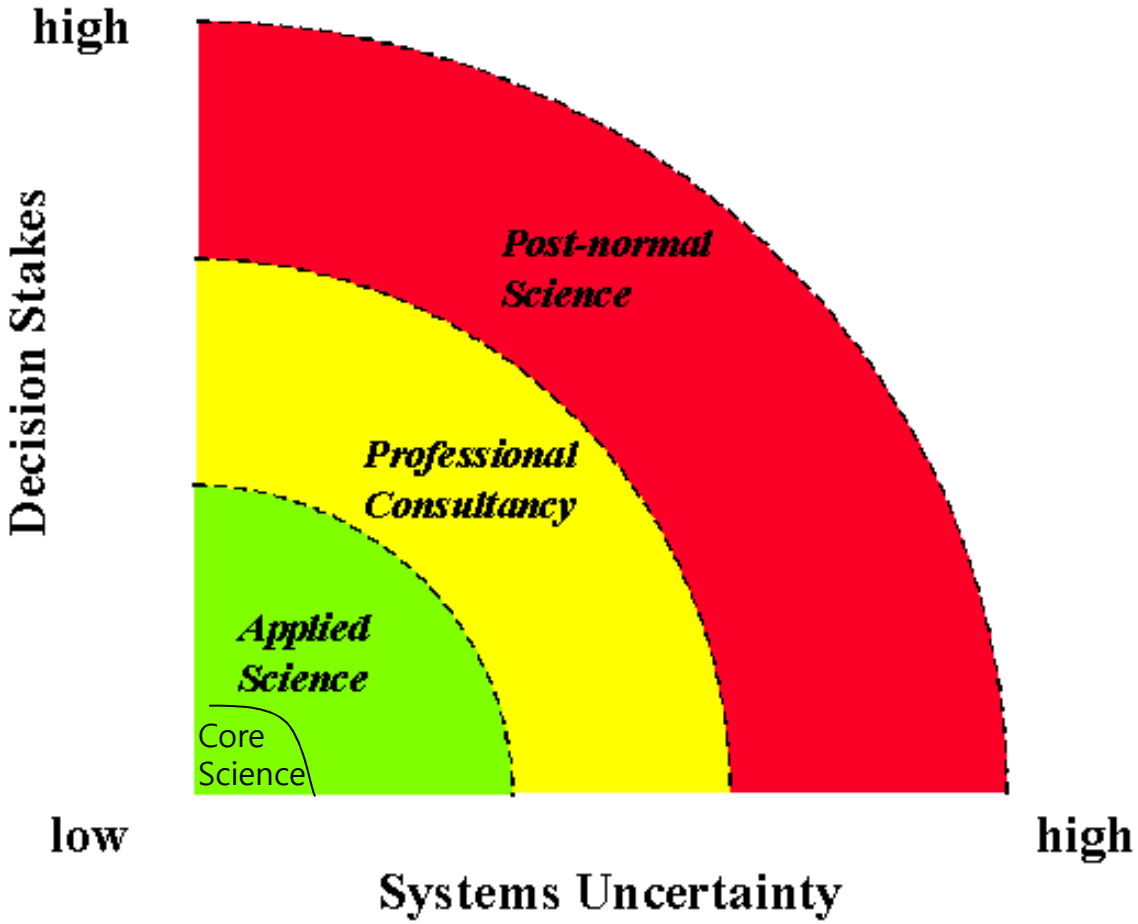


Epistemic factors + social factors ➔
determines the development of science

Science (&technology) is essentially social!

David Bloor

Post-normal Science (by J. Ravetz)



Jerome Ravetz

Symptoms of post-normal science

Facts are uncertain
Values are in dispute
Stakes are high
Decisions are urgent

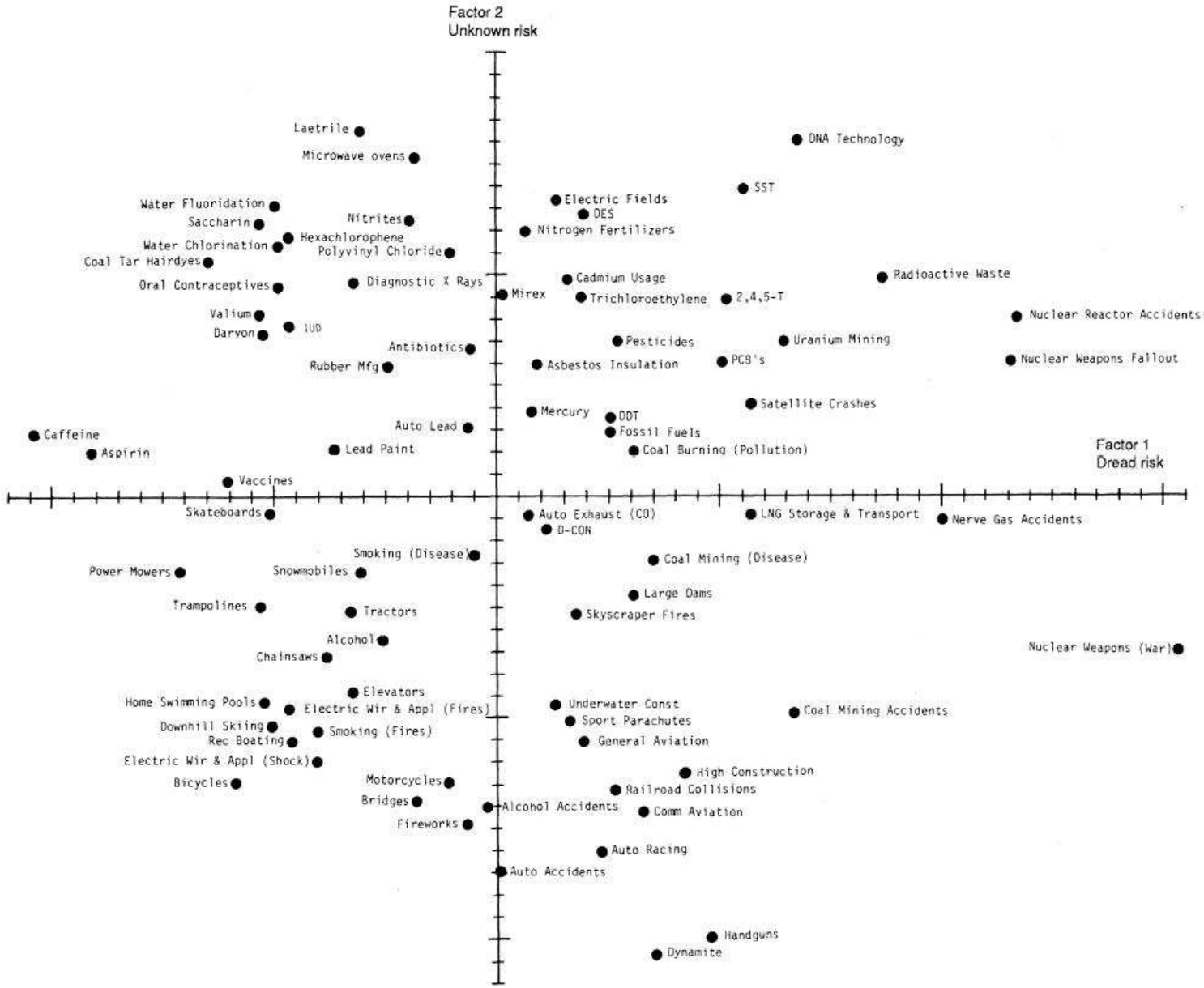
➔ Problems cannot be solved
By Normal scientific practices

Normal v. Post-normal Science

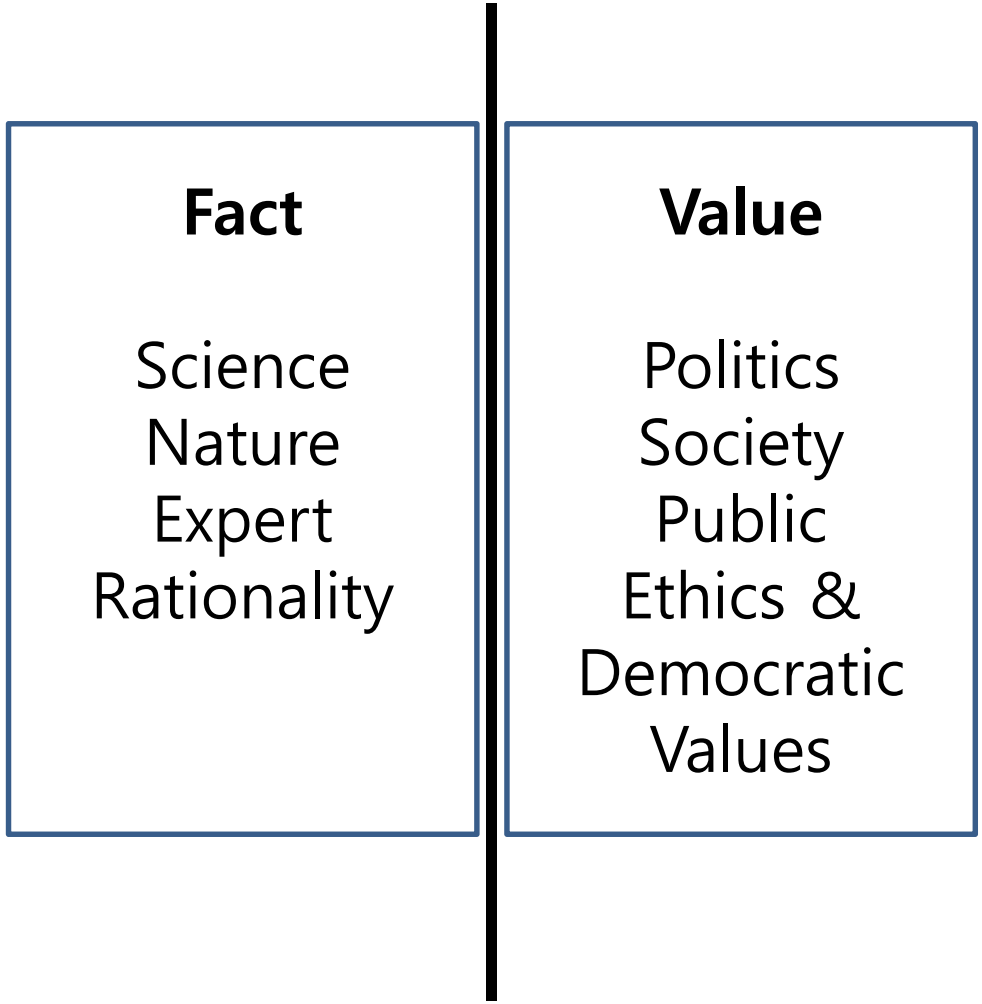
	Scientific Practice	Objects of science	Evaluation of scientific research
Normal Science	Lab Experiments; impacts of given paradigms	facts	Peer community
Post-Normal Science	Must includes all the conversations with every stakeholder	extended facts (experience and history of local stakeholders; trust matters)	extended peer community including local people and stakeholders

'**trans-science**' (by A. Weinberg, 1972): questions that can be asked of science, but cannot be answered by science

Technological risk as a social phenomenon.

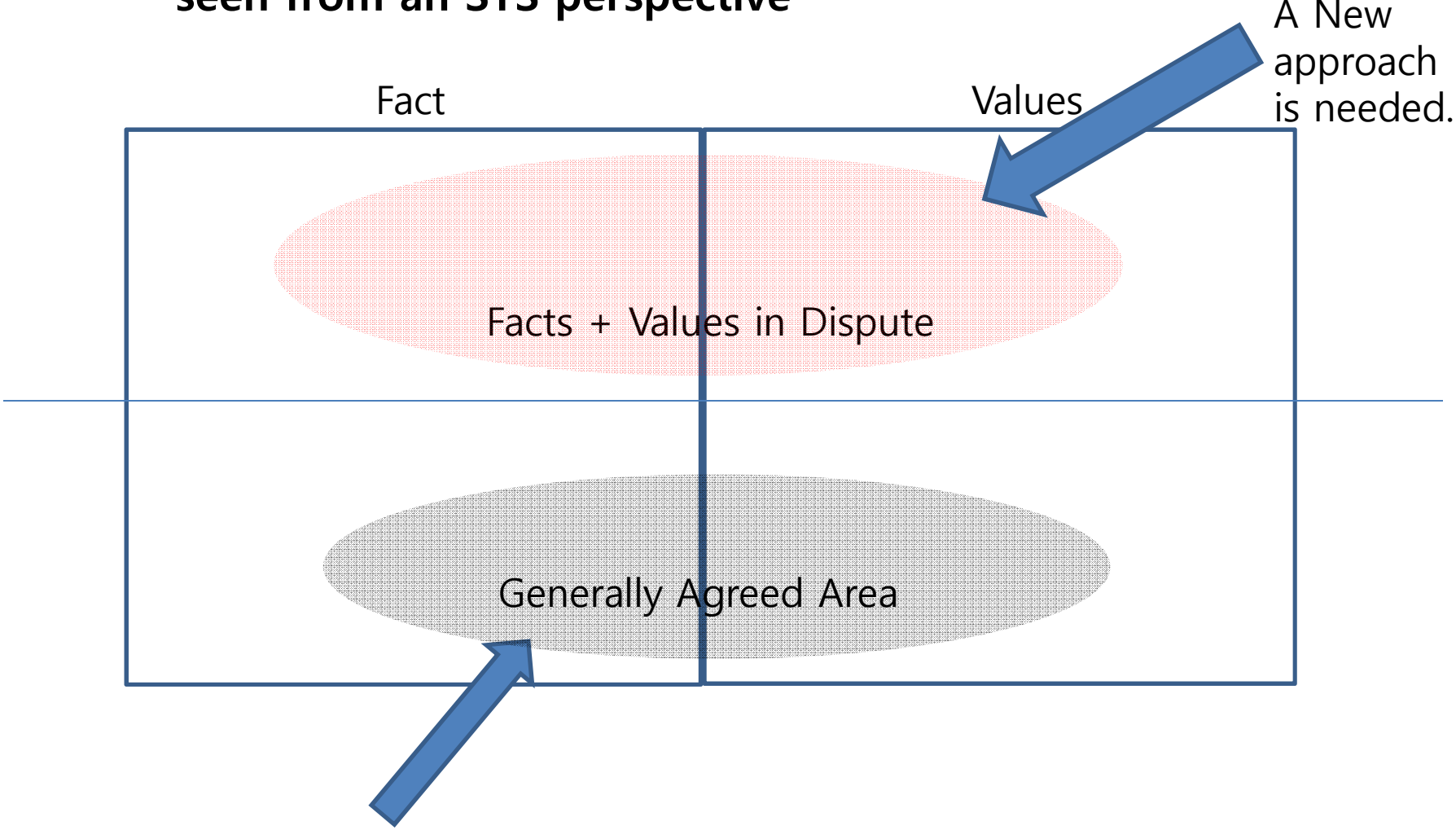


Traditional Great Divide in Epistemology and Ontology



"Let's determine scientific facts first, and then discuss politics and democracy."

A New Integration in Epistemology and Ontology seen from an STS perspective



Lay Knowledge and Deliberation Processes

An Example: Consensus Conference

- a most widely used model of public deliberation all over the world
- citizen panel (15) + expert panel
- 3-5 day workshop; write a consensus report after deliberation

- What, and who, is this technology for?
- What kind of future society we want ourselves (and our children) to live in?
- Who will get the benefits and who will get the loses due to this technology?
- Will it lead to public welfare?

Besides this, there are several other deliberative mechanisms such as community-based research, scenario workshop, science shop etc.

Public participation in technoscientific decisions➔ the idea of "civic science"

- ✓ lead the public to participate more in public science policy
- ✓ bridge a representational gap that exists between experts and the public
- ✓ restore the legitimacy of scientific and technological projects

➔ Secure a "societal immunity" of our risk society against uncertain future.

Issues of Radiation Protection?

- similar to other technological issues or risks?
- anything unique in radiation protection?
- the public can contribute to its issues?
- who are the experts in this area
  and how they think of their relationship with the public?
- what is their view of science? Scientistic or reflexive?

Thank you ^___*

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