

BOOK REVIEW

Nuclear Power Safety and Governance in East Asia

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1. Introduction

The world is experiencing a new nuclear renaissance as nuclear power is being actively discussed to meet the increasing demand for electricity due to the rapid application of AI and the construction of data centers. COP28 in 2023 adopted a pledge to expand renewable energy and a declaration to triple the world's installed nuclear power capacity by 2050. In addition, for the first time, nuclear energy was included as a decarbonization tool in a COP agreement.

The same is true in East Asian countries. China currently operates 55 nuclear reactors for power generation, with 27 new reactors under construction and 24 more planned. In the near future, China is expected to operate 106 nuclear reactors, surpassing the United States as the world's largest nuclear reactor owner. South Korea, despite strong public opposition to nuclear power, currently operates 25 reactors, with three under construction and two planned, and Japan, which had curbed nuclear power generation in the wake of the nuclear disaster at the Fukushima Daiichi Nuclear Power Plant in March 2011, is accelerating its return to nuclear power following a cabinet decision in February 2023 on its GX Basic Policy. Clearly, the return to nuclear power generation is accelerating.

In the midst of this renaissance of interest in nuclear power, there is a need to strengthen nuclear safety regulations worldwide and especially in East Asia based on the lessons learned from the Fukushima nuclear accident. In particular, Japan, China, and South Korea are geographically close to each other in East Asia. Once a nuclear accident occurs in one of these countries, it could cause severe damage to neighboring countries as well.

This book is the fruit of joint research collaboration between researchers in Japan, China, and South Korea. It is based on a strong awareness that nuclear safety is no longer a domestic issue and that it is necessary to exchange experiences and work toward common safety standards, safety management, human resource development, and information sharing on nuclear power plant safety at the East Asian level.

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First, I will express my deep respect for this international joint research conducted with such high aspirations and my sincere gratitude for publishing such an excellent volume.

2. The Significance of Comparing Japan, China, and South Korea

In this section, I would like to address the academic and social significance of comparing Japan, China, and South Korea, which have different political systems (nuclear governance) regarding nuclear safety regulation. Chapter 3, “A Comparative Analysis of Japanese, Chinese, and South Korean Attitudes toward Nuclear Safety in East Asia,” provides the following discussion.

In this chapter, 521 residents of Tokyo, Beijing, and Seoul were surveyed on their awareness of nuclear safety, the need for international cooperation on nuclear safety, and the establishment of a safety regime at the regional level in East Asia. The survey revealed that residents of Tokyo, Beijing, and Seoul lack a basic understanding of nuclear power plants, have low trust in their governments and nuclear power producers regarding nuclear safety and information disclosure, and are very concerned about nuclear accidents in their own countries and in neighboring countries. For example, regarding the extent of radiation damage to their own country in the event of a nuclear accident in a neighboring country, a high percentage of respondents in all three countries answered “somewhat damaged” or “very damaged” at 80–90%.

Some respondents believed that no nuclear safety system existed at the East Asian regional level, while others believed that such a system was not functioning properly. The results of this survey highlight pressing issues, including the need for technical exchange related to nuclear safety in the East Asia region, efforts toward common safety standards, safety management, human resource development, information sharing, and cooperative efforts between Japan, China, and South Korea regarding nuclear risk.

The survey and analysis in Chapter 3 are extremely interesting. At the same time, however, it is necessary to consider more broadly and deeply what academic and social significance and value there is or could be in conducting and comparing public opinion surveys in the context of East Asian countries that are reluctant to engage in deliberation or “stakeholder involvement,” and in the context of different political systems (nuclear governance).

For example, when considering safety, the scientific safety of the regulatory standards of nuclear regulatory agencies has much to do with the state of scientific literacy of the citizens of each country. In addition, how information is disclosed in each country has a great deal to do with fostering social understanding and acceptance of such regulations. The nature of such scientific and social rationality is very different in Japan, China, and South Korea.

Such a comparison of public awareness in the three countries is considered necessary in the context of the East Asian region, where people are reluctant to engage in deliberation and stakeholder involvement, and requires careful consideration of the status of scientific literacy, information disclosure, and deliberation in each country. It may be necessary to question the state of risk governance in Japan, China, and South Korea, including information disclosure, accountability, “place of dialogue,” and deliberation, as the relationship between science, politics, and society in nuclear energy policy.

Furthermore, the low level of trust in nuclear operators in East Asia is also thought to be closely related to the lack of deliberation and “place of dialogue” (Stakeholder Involvement). Recent studies on trust have shown that trust based on the professional competence and impartiality of operators and regulators is called “trust as competence,” which is a 20th-century type of trust. As society becomes more diverse in the 21st century, “trust as care,” which is based on the ability and qualifications of operators and regulators to listen carefully to people’s opinions and engage in

dialogue, is becoming more important and is called “21st-century trust.” It would be very interesting to see how “trust as competence” and “trust as care” are developed in Japan, China, and South Korea.

3. Isn't the Issue of Nuclear Safety a Trans-scientific Question?

Alvin Weinberg, a physicist who also participated in the Manhattan Project, the research and development of the atomic bombs dropped on Hiroshima and Nagasaki, published an article titled “Science and Trans-Science” in 1972 in *Minerva*, a comprehensive social science journal (Weinberg 1972).

Using the health hazards of low-dose radiation exposure and severe accidents at nuclear power plants as examples, he stated that such social issues “can be asked of science, but cannot be answered by science” and raised the importance of trans-scientific questions. In the same paper, Weinberg also stated that “scientists must be clear about where they are in the realm of science and where they are in the realm of trans-science.”

Weinberg argued that the era of the “Republic of Science” (Polanyi 1962), in which social issues were “technologically solved” through the development of science and technology, is over. We have moved into an era in which it is necessary and important to study social issues through science, but science alone cannot lead to solutions to social issues.

Weinberg speaks of the “limits” of science and technology (in a sense, the essence of science and technology), but this is not necessarily a negative assessment of the power of science and technology. Rather, it is seen as setting up a space where the power of science and technology can be appropriately and effectively exercised by clarifying the position of science and technology in tension with politics and society.

The trans-scientific questions raised by Weinberg can be considered to have roughly the same intent as the “Wicked Problems” raised in 1973 by mathematician Rittel and urban planner Webber of the University of California, Berkeley (Rittel and Webber 1973).

Weinberg’s trans-scientific agenda, however, focuses on the epistemic uncertainty of scientific predictions, with the scientific and technological risks of severe accidents at nuclear power plants and the dangers of low-dose radiation exposure risks in mind. In contrast, this complex issue targets social planning, such as urban and transportation planning, and focuses on the so-called “Unknown Unknowns” situation due to diversifying people’s values.

The term “Unknown Unknowns” has diverse interpretations and uses. Here, since experts approach social issues from specific specialized knowledge, we consider social issues in a society with diversified values to be outside the limits of such specialized knowledge when dealing with problems that are difficult to define technically and where the essence of the problem is unknown, i.e., problems for which there is no so-called optimal solution.

In this sense, one could say that the trans-scientific agenda focuses on science (epistemological uncertainty), while the “messy issues” focus on society (diversification of values).

In any case, it seems necessary to grasp the nature of the issue of nuclear safety either as a trans-scientific issue or a “wicked problem.”

4. What are the Mechanisms for Forming an Effective International Environmental Regime (risk governance)?

This book argues that close consultation and joint efforts on nuclear safety among Japan,

China and South Korea are essential to ensuring nuclear safety in East Asia and that establishing international governance to make this possible is considered indispensable.

How can an effective international environmental regime (risk governance) be formed? We may highlight Peter Haas's Epistemic Community hypothesis here (Haas 1989).

Haas noted that a major success factor in reducing pollution was the formation of a transnational scientific community of marine scientists from France, Italy, Spain, and other countries who formed a common scientific understanding of Mediterranean pollution and provided scientific advice based on this common scientific understanding to policymakers in their respective countries. Haas named the "place" for transnational scientists to form a common understanding as the "community of awareness," and stated whether or not this community of awareness had been formed. "Whether or not it functions effectively is an important factor in the success or failure of international environmental treaties" (Matsuoka et al. 2022, 130).

In this regard, it may be necessary to consider the difference between the Convention on Long-Range Transboundary Air Pollution (LRTAP), which was established mainly in Europe in 1979, and the Acid Deposition Monitoring Network in East Asia (EANET), which has been in operation since 2001.

Before forming international risk governance in the East Asian region, it may be necessary to construct a "place of dialogue" (deliberation) and establish risk governance through collaboration among scientists, politicians, and each country's society.

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