

International Conference on Science and Technology for Sustainability 2024

**“Ecosystem for Sustainable Innovation
-Toward Sustainable Science and Society in 2040 ”**

Objective

To promote innovation over the next 20 years from scientific and academic perspectives, it is essential to bridge the gap between academic disciplines, strengthen collaboration with local stakeholders, and enhance international collaboration. All of them are based on a foundation built on accumulating knowledge and technology in basic and traditional fields. Despite these goals, the foundation that supports innovation is eroding due to intense competition for research funding and positions, an overreliance on quantitative metrics that are ill-suited to exploring research such as interdisciplinary and regional collaborative studies, diminished stable funding such as basic expenses, insufficient technical professionals and administrative staff, and a deteriorating research environment due to overwhelming workloads. This not only depletes the time and mental bandwidth needed to address the academic issues, but has also curtailed research on important academic issues, regional challenges, and international collaborations. In addition, these are driving an exodus of talent and reducing the number of graduate students.

To be truly innovative, there is an urgent need to support a diverse cohort of graduate students the future torchbearers of innovation and to create career paths that enable researchers to work across fields and sectors. The academic sector needs to critically assess its current state and implement profound improvements to its research environment. Swift action on these fronts will catalyze interdisciplinary studies, international collaboration, and regional collaboration, paving the way for innovative leaps in the next two decades.

Overview

In this symposium, we will discuss the ecosystem for sustainable innovation toward sustainable science and society in 2040. As a basis for discussion, we proposed five areas: 1) advancement of interdisciplinary research, 2) advancement of regional collaboration, 3) advancement of international collaboration, 4) development of human resources and career paths, and 5) restructuring of research environment. Each of these is organically linked to the others, and it is essential to look at the overall picture (see figure).



Figure Five areas that need to be addressed to foster innovation

“Remodeling science and society for the next 20 years: Ten recommendations from Young Academy of Japan” (Young Academy of Japan, Science Council of Japan, 2023)¹ will form the basis of the discussions at this symposium. Ten recommendations are the followings.

- (1) Cultivating fundamental and traditional knowledge and technology
Cultivation and accumulation of knowledge and technology in fundamental fields is the fertile ground for innovations.
- (2) Strengthening evaluation and support for interdisciplinary research and regional collaboration with local stakeholders
A system for evaluating academic ventures aimed at interdisciplinary research and solving regional challenges needs staffing and budgeting.
- (3) Enhancing core facilities with Ph.D. holders
Strengthening core facilities with skilled technical personnel with doctoral degrees is needed to promote innovations and expand career paths of Ph.D. holders.
- (4) Cultivating a cross-sector collaborative ecosystem
A system to let academia, industry, government, and local stakeholders collaborate to address interdisciplinary challenges is needed.
- (5) Enhancing foundational funding and research support personnel
We see a paradoxical situation where competitive funds are underutilized due to a lack of foundational expenses and human resources.
- (6) Establishing career paths in science diplomacy
Cultivating individuals capable of spearheading science and technology diplomacy and developing their career trajectories are important.
- (7) Overcoming the "zero-failure" bureaucratic mind in science management
To truly drive innovation, it is imperative to move beyond the bureaucratic mindset. It is necessary to understand and accept inherent risks of pioneering work.

¹ Young Academy of Japan, Science Council of Japan (2023) “The Outlook for Science and Society in 2040 - Ten Critical Issues -,” Advisory Opinion (Science Council of Japan), 1-68,
<https://www.scj.go.jp/ja/info/kohyo/pdf/kohyo-25-k230926-4en.pdf>

(8) Reducing the burden of education on households

To stem the decline in the number of graduate students, it is essential to substantially reduce the financial burden of education on families.

(9) Breaking free from the "activity traps" of academia

It is essential to change the culture that appreciates the relentless effort and refine its operations to ensure alignment with its core objectives.

(10) Promoting inter-sectoral career paths for Ph.D. holders

It is imperative to promote the integration of specialized expertise across sectors, increase job mobility, and promote job-based employment.

These recommendations were proposed by young researchers across disciplines in Japan, but as the article published in *Nature* has had a great impact both in Japan and abroad (Ikarashi, 2023)², there are global common grounds with the situation surrounding science in society. This symposium will discuss issues and potential solutions for the ecosystem for sustainable innovation with (young) researchers, government, industry and the publics from around the world, with a focus on international similarities and differences.

² A. Ikarashi (2023) Japanese research is no longer world class — here's why, *Nature*, 623, 14-16.
<https://doi.org/10.1038/d41586-023-03290-1> (Last accessed : 25 November, 2024)