Advisory Opinion

Remodeling science and society for the next 20 years:

Ten recommendations from Young Academy of Japan

Young Academy of Japan, Science Council of Japan

Sep 28th 2023

The original was written in Japanese and SCJ provides English version of the Executive Summary for non-Japanese readers.

This Advisory Opinion summarizes and publishes the results of the deliberations of Young Academy of Japan, Science Council of Japan.

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Executive Summary

1 Rationale for this Statement

The innovation landscape in Japan is reaching a critical juncture as its global prominence in science and related fields declines. For a nation with limited resources, sustained innovation is crucial to fostering new values and ensuring a prosperous future, both materially and culturally. Young Academy of Japan, which belongs to Science Council of Japan, is a unique body composed of researchers under the age of 45 who conduct cutting-edge research in diverse fields spanning humanities, social sciences, and natural sciences. Young Academy of Japan is poised to conduct innovation over the next two decades from an academic perspective. Thus, Young Academy of Japan has assessed the barriers to innovations holistically and considered possible remedies. Based on these interdisciplinary deliberations, we have identified ten issues and formulated recommendations for solving them.

2 Current Status and Challenges

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 (Figure 1).

Figure 1 Five areas that need to be addressed to foster innovation

3 Content of the Advisory Opinion

The following are ten pressing issues that must be addressed immediately to foster innovations by envisioning academia and society in the coming 20 years (Figure 2).

(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.

(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.

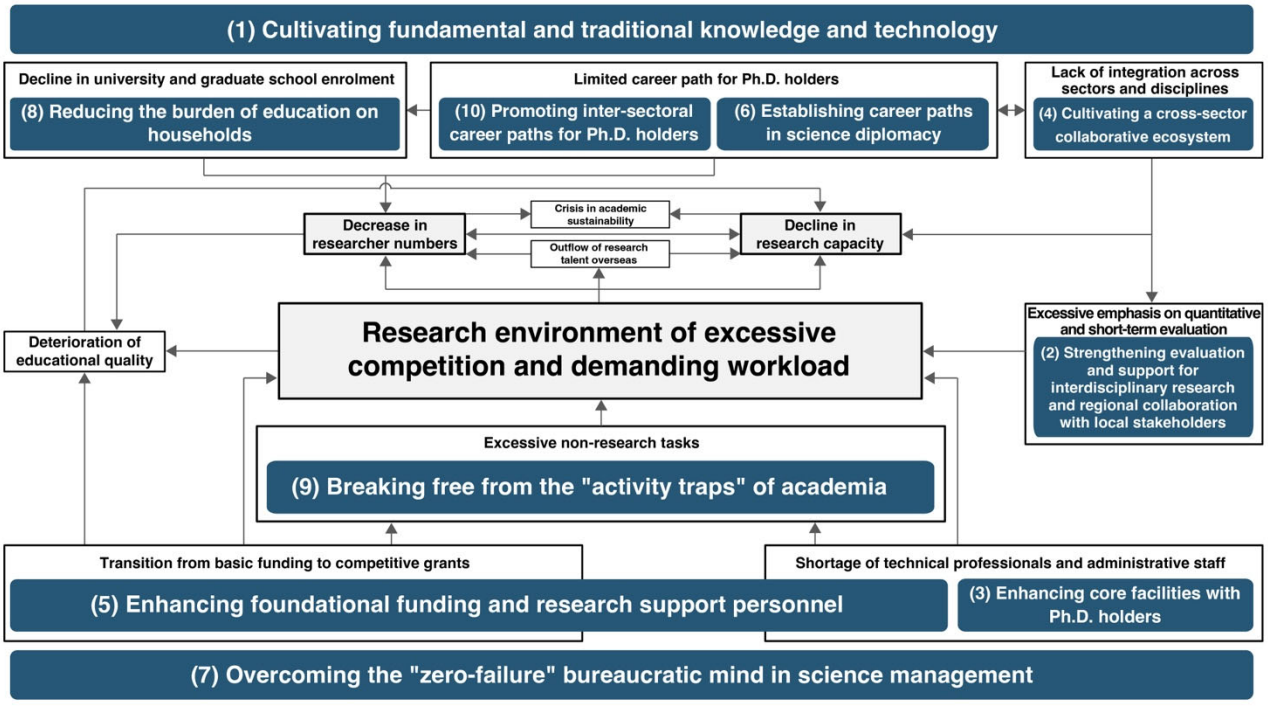

Figure 2 Ten Recommendations for Science and Society in 2040