

Shift in the center of scientific research activities to Asia and the Asian Research Area scheme

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Shift in the center of scientific research activities to Asia

In February this year, the Annual Meeting of the American Association for the Advancement of Science (AAAS), which publishes *Science*, was held in San Diego. The meeting had 5,000 participants including scientists, entrepreneurs, policy makers and journalists from 50 countries around the world and over 150 sessions were held with the theme of "Bridging Science and Society." Extensive topics were discussed ranging from environmental science, energy, nanotechnology, smart grids and biotechnology to science and technology policy, communications, journalism and science diplomacy.

A major topic at the meeting was the rapid shift in the center of scientific research activities to Asia including China and India, which the former-NSF Director Dr. R. Colwell called a "Silent Sputnik." With the emergence of a new center of science and an explosive increase in the amount of knowledge in the world, the participants discussed how countries can establish win-win relationships instead of zero-sum relationships. They also discussed such as the roles of policies and the scientific community and how global governance and regional cooperation should be conducted in order to establish win-win relationships between countries¹⁻³.

The author was invited to an executive lunch meeting. At the meeting, discussions took place on the topics of supporting countries which have not developed sufficient research infrastructure, scientific culture, and peer review systems, as well as supporting countries which have different regimes, in a world where the globalization of science is progressing. There were also discussions about the prevention of fraud in research of the new research system where a large group of researchers work together for example on climate change and genomic research. It is worth remembering that there were high expectations of Japan's role in ensuring scientific integrity in Asia⁴.

Another session which attracted attention was a session titled Ensuring the Transparency and Integrity of Scientific Research which was organized by leaders in scientific community, namely the President of the National Academy of Sciences and the AAAS Council Chair. The session attracted a large audience. The chairperson of the session strongly warned that the recent allegations about handling of data by some scientists at the IPCC (Intergovernmental Panel on Climate Change) have increased public distrust of science in general. Many participants at the session, while arguing that the mishandling of data did not change the IPCC's forecasts, offered acid opinions about the need for research data disclosure and strict measures as an effort to restore confidence. The author also commented that it is time to have global discussions on science integrity, in a world where scientific research activities are rapidly expanding from west to east and south.

In serious public discussions over many hours, words not used

in typical academic conferences were heard such as value, responsibility, virtue, trust and democracy concerning science. This made me clearly recognize the characteristics and the importance of the AAAS platform.

Learning from the history of the shifts in the centers for scientific research activities

From the end of the 19th Century to the beginning of the 20th Century, major trade disputes occurred between the UK which was a developed nation and the US and Germany which were emerging economies at that time. The UK strongly criticized the US and Germany arguing that the knowledge and outcomes of basic research obtained in the UK flowed into the US and Germany, which then used them for mass production and exported the new products, and obtained large profits. After the criticism, the US and Germany launched large-scale support for universities and developed research infrastructures through industry and academia working together, including the establishment of the Carnegie Institution, the Rockefeller Foundation and the Kaiser Wilhelm Society. The current US and German economies, which rely heavily on science and technology, were established based on the infrastructure developed back then⁵.

History repeats itself. Semiconductor and other trade disputes which occurred between Japan and the US in the 1980s developed into research disputes. This created severe political pressure from the US, which criticized Japan for free-riding on basic research. As a result, universities and public organizations were forced to purchase American supercomputers, space satellites and analytical instruments. It was a major turning point for Japanese science and technology policy. I do not think that at that time Japan sufficiently used the historical lessons learned from the research disputes between the UK and the US/Germany a century ago.

It was only in 1995 that the Science and Technology Basic Act was established and proper investment in science and technology started in Japan. Currently, the world's economic power is rapidly shifting from the G7 to the G20. In this situation, it is worth noting that China, India and resource-producing countries are investing their wealth in long-term infrastructural development for scientific research.

Globalization and changes in research support systems

The rules for all activities including the economy, corporate management and civic life are rapidly changing due to globalization. The same can be said about research and education. Nation does not solve any problems by itself in the present era. Nationalistic research and education systems which have been developed since the 19th Century are entering a period of major transformation, due to the increase in the number of international joint re-

search activities, increasing human resource exchanges and intensifying competition over obtaining human resources. This applies not only to Japan but also to other countries.

The EU Framework Programme is a cross-border research support system. It now expands the scope of its network worldwide beyond the 27 EU member states. Japan also established the Human Frontier Science Program (HFSP) as a global research support system at the end of the 1980s. Recently, it launched a system to support research and human resource development in developing countries as a joint project between the Japan Science and Technology Agency (JST) and the Japan International Cooperation Agency (JICA), and is receiving high praise. However, the author thinks that this system alone is not enough and that it is time to create more varied schemes.

Asian Research Area scheme: establishment of a cross-border research system

Asia is currently a "hot spot" of the global economy and the center of scientific research is also beginning to shift to Asia. On the other hand, Asia is also experiencing the negative impacts of growth including the intensifying problems concerning climate change, the environment, energy and water, disasters, infectious diseases and disparities in wealth. The utilization of scientific and traditional knowledge is indispensable in solving these problems. It is essential to create a transnational research system in a diverse and dynamic Asia which shares many of the same problems, where front-line scientists, technical experts and social entrepreneurs gather to solve problems in order to enable mutual prosperity, through joint research and joint projects. Such a system can also become a model for similar activities on the global level in the future.

Based on the concerns described above, the author and others organized the Committee for Strategy for International Collaboration in Science and Technology and recently proposed the "Asian Research Area" scheme after more than one year of discussions⁶⁾. This scheme is fortunately attracting attention in relation to the East Asian Community scheme.

The quality of the infrastructure for science and technology in Asia varies significantly depending on the country. There are a limited number of countries equipped with human resources, facilities, funds and information. Poor research infrastructure is causing a brain drain from Asia to the West and this is creating catch-up type structures in industries, science and technology where Asia needs to introduce technologies and capital from overseas. The Western countries also harshly point out that the immature research infrastructure and scientific culture creates a breeding ground for research fraud. For Japan, the author considers that joining the Asian economic and research bloc and becoming a partner of other Asian countries is essential for maintaining sustainable growth and robust research capabilities when the country's population is decreasing and society is maturing.

The Asian Research Area scheme contains an Asian research fund, a technical assessment center, etc. and the systems will also be open to countries outside Asia. With respect to the research fund, the idea is to establish a fund using contributions from relevant countries, publicly invite proposals and provide aid for interdisciplinary joint research activities based on the problem-solving approach. It will aim to develop human resources through fellowships and establish a network. The fund will serve to provide quality assurance for scientific research and develop scientific culture in Asian countries. A technical assessment center will

be established in order to study and analyze the ethical, legal and social impacts concerning the introduction of new technologies in the region.

Conclusion: towards the realization of an Asian Research Area scheme

The author was engaged for over three years in the late 1980s in materializing the HFSP which is currently highly praised globally. Although the situation has changed significantly since then, I would like to conclude the article by pointing out two important points in realizing the Asian Research Area scheme in the future, from my experience of working on the HFSP.

The first point is its philosophy. The HFSP scheme was initially looked at as a political tool to resolve trade disputes and scientific communities overseas cast a skeptic eye on the idea. However, one day the then NSF Director Dr. E. Bloch said that, although the NSF is "national," the HFSP scheme can be considered as the precursor of a future "International Science Foundation." This suggestion became the strong driving force for the later development of the HFSP scheme.

The second point is the investigation process. More than one year after the international feasibility committee comprised of intellectuals belonging to the G7 was launched, the expression used by the committee members was changed from "your program" to "our program," triggered by a remark made by a British Nobel-laureate Sir. J. Kendrew. Consciousness of realizing the scheme jointly could be shared and the hardest part of the negotiations was over.

There will be many challenges in realizing the Asian Research Area scheme. I think that the key to success is to maintain the noble philosophy and high aspirations and to establish a network of trust.

- 1) *Science* **2009**, 326, Dec.11.
- 2) "Global Governance of Science", Report of the Expert Group on Global Governance of Science to the Science, Economy and Society Directorate, Directorate-General for Research, European Commission, *EUR 2316 EN* **2009**.
- 3) Kishore Mahbubani, "The New Asian Hemisphere—The Irresistible Shift of Global Power to the East", *PublicAffairs* **2008**.
- 4) "Scientific fraud: action needed in China", ed. by www.thelancet.com, **2010**, 375, January 9.
- 5) Tateo Arimoto, "Sekai no Kagaku Gijyutsu Taisei no Hensen to Nihon—19 Seiki, 20 Seiki, soshite 21 Seiki" (Changes in the World's Science and Technology Structures and Japan: the 19th, the 20th and the 21st Centuries), "Kagaku Gijyutsu Cho Seisaku Shi" (History of the Policy of the Science and Technology Agency), Science News Ltd., **2009**, July.
- 6) The Committee for Strategy for International Collaboration in Science and Technology, "Azia Kenkyu Ken no Sousetsu" (Toward an Asian Research Area), Takeda Foundation, **2009**, December 15.

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