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The Rise of Science and Technology Diplomacy in Japan

Atsushi Sunami, Tomoko Hamachi, and Shigeru Kitaba

JAPAN'S science and technology (S&T) infrastructure faces many challenges. The nation's population is declining, which will likely reduce economic growth and therefore probably decrease both the amount of investment in S&T and the number of people working in the field. Additionally, the rise of the BRIC countries (Brazil, Russia, India, and China) in S&T, especially China, has been remarkable over the last several years. It is almost inevitable that Japan's relative strength in science will erode in this globalized world.

Against this backdrop, there has been increased interest in science and technology diplomacy in Japan. For policy makers and scientists, one of the primary objectives of S&T diplomacy is to tap into the growing science base beyond a nation's borders including research facilities and human resources. International mobility of human resources for science is sometimes referred to as the "brain circulation" that drives today's global science. Japan cannot allow itself to fall outside of the research network created by this brain circulation. Thus, another important objective for Japan's S&T diplomacy is to remain one of the critical

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points in this global network. However, Japan is opening itself up to the rest of the world too slowly in relation to other “catching up” nations, such as South Korea. By utilizing science and technology diplomacy, Japan can expand its volume of international research collaborations with dynamic nations around the world and can revitalize its innovation system.

The electoral comeback of Japan’s Liberal Democratic Party last December ended three years of rule by Japan’s Democratic Party. Prime Minister Shinzo Abe, who leads the new government, has emphasized the need to rebuild Japan’s diplomacy in the face of unsolved critical issues in several important areas that affect relationships with the United States, China, and South Korea, among others. If the Abe government is able to establish a new and effective institutional framework to link science and foreign policy, Japan can use science for diplomacy in reconstructing its foreign relations with strategically important countries and regions.

Japan’s History with Science and Technology Diplomacy

On August 19, 2011, the Japanese government issued the 4th Science and Technology Basic Plan, a five-year national strategy on science, technology, and innovation with the outlook for the coming decade. This is a notable step as it was the first basic plan that designated S&T diplomacy as an issue of national importance.

Japanese Science Diplomacy before 2008

Executive members of the Cabinet Office’s Council for Science and Technology Policy (CSTP) issued a proposal in 2007 with the hope that the nation would become aware of the increasing importance of collaboration between S&T and diplomacy, and Japan would increase its presence in the world. Of course, before the CSTP issued the proposal, Japanese universities and research and development (R&D) institutions already conducted international joint research projects and exchanges of scientists with foreign institutions in various areas of S&T.

In the first decade of the twenty-first century, Japan held policy dialogues with ministers and senior officials in charge of S&T, especially with Asian countries. From the perspective of diplomacy, S&T contributed to building good relations with other countries. For example, Japan concluded twenty-four agreements on scientific and technological cooperation with thirty-four countries by 2000. (At present, there are thirty-two agreements with forty-six countries and the European Commission.) The oldest one was concluded in 1973 with the former Soviet Union and the agreements concluded in the 1970s are with Central and Eastern Europe countries and newly independent states (i.e., parts of the former Soviet Union).

It is no exaggeration to say that S&T, a borderless field for the pursuit of the truth, plays an important role in promoting trust among nations. Moreover, S&T has been an effective means for establishing a trusting relationship with

developing countries. Since the mid-1950s, Japan contributed to the improvement of social development and the welfare of people in developing countries through Official Development Assistance (ODA), and many Japanese S&T researchers were dispatched to the developing countries.

Thus, international activities in the field of S&T, whether they originated out of scientific or diplomatic interests, have steadily contributed to maintaining Japan's strong presence in both S&T and the diplomatic world. However, people in the S&T sphere gave little consideration to diplomacy when they collaborated on international projects. Likewise, Japanese diplomats did not often think about using Japan's S&T as a diplomatic tool. In other words, S&T and diplomacy were not strategically linked to each other.

The Emergence of Science and Technology Diplomacy in Japan

In 2008, the concept of science and technology diplomacy became public with the CSTP report "Toward the Reinforcement of Science and Technology Diplomacy,"¹ which was based on the discussions at a CSTP working group from July 2007 to April 2008. It defines science and technology diplomacy as any steps taken "to link S&T with foreign policy so as to achieve their mutual development" and "to utilize diplomacy for the further development of S&T and promote efforts to utilize S&T for diplomatic purpose." It also describes the basic policies for promoting science and technology diplomacy:

1. establishing systems in which Japan and its counterparts can enjoy mutual benefits,
2. generating synergy between S&T and diplomacy for resolving the global issues facing mankind,
3. developing "human resources" that sustain S&T diplomacy, and
4. increasing Japan's international presence.

It also insists that Japan's science diplomacy place importance on strengthening 1) S&T cooperation with developing countries for resolving global issues, 2) S&T cooperation using Japan's advanced S&T, and 3) the basis for promoting S&T diplomacy.

Why did the concept of science and technology diplomacy come to public attention at that time? One trigger behind its emergence was the necessity of demonstrating leadership in a series of important international gatherings that were held in 2008. Japan hosted the G8 summit, G8 related ministerial-level meetings (including the G8 S&T Ministers' Meeting), and the Tokyo International Conference on African Development IV. In the midst of the accelerating growth of emerging economies, it was time for Japan to make the most of S&T as a "soft power."

However, the aim of science and technology diplomacy was not only to meet diplomatic needs. The other trigger was the need to open up Japan's science community to the world and end the inward-looking propensity of Japanese researchers. The CSTP working group report was unique in that it encouraged S&T cooperation with developing countries as well as developed countries. Cooperating with developing countries is helpful to solving global issues, but at the same time the working group considered that it is also valuable to the revitalization of Japan's science community. The working group thought that foreign researchers in dynamic nations could stimulate Japanese researchers and be a positive influence on Japan's R&D system as it was in the era of catching up during the last century.

Developing the Concept of Science and Technology Diplomacy

The idea of science and technology diplomacy gradually spread among the S&T and diplomatic communities in Japan. At the same time, however, as the "catching up" nations rapidly increased their presence, it became difficult for Japan to maintain a leading position in the field of S&T. For example, China and South Korea's share of research papers in twenty-two S&T fields cited in Thomson Reuters' Web of Science has been increasing since around 2000, while that of Japan has been declining over the same period. The growth of Chinese and South Korean articles in the share of the top 10 percent of research papers in these twenty-two fields is also remarkable. Furthermore, in recent years, Japan has been facing the stagnation of R&D expenditures both in government and in the private sector. Taking these situations seriously, the executive members of the CSTP made a proposal to further strengthen Japan's science and technology diplomacy in June 2009.

Following this proposal, the CSTP created a task force to identify concrete measures to strengthen Japan's role in the world while considering how the world will change by 2020. The forecast shows that the erosion of Japan's relative strength in science is likely inevitable. For example, it is estimated that the population from age twenty to thirty-nine in Japan will reduce to almost three quarters by 2020 (compared to 2005).² This will likely also lead to a decline in the number of researchers and scientists who lead Japanese S&T.

Taking this vision of the future into account, the task force compiled a tough-minded report in February 2010. Unlike the 2008 report, the 2010 report points out that some developing countries are no longer just the recipients of technology but are on an equal footing and, therefore, Japan should integrate its R&D system with R&D resources in the rest of the world including developing nations. Another point worth making is the shift in the perception of "diplomacy." The task force suggested that "diplomacy" shouldn't just be establishing good relationships with other nations, but should also be achieving the realization of national interests and strengthening the industry's international competitiveness. Thus science

and technology diplomacy came to be seen as a more strategic aspect in the revitalization of Japan.

The 4th Science and Technology Basic Plan of August 2011 embraces the key points made in the task force report. The plan recommends that Japan strategically develop its international S&T activities together with dynamic nations. Based on that idea and being aware of the energy of growing Asian nations, the plan proposes that the Japanese government promote the East Asia Science & Innovation Area initiative: an idea of open regional cooperation under which the nations collaborate in promoting cross-border flows of people, goods, and capital to enhance R&D efforts and collaborative research to address common issues in Asia. The task force proposed the initiative in the expectation that science, technology, and innovation would help build a more integrated East Asian community, a diplomatic initiative that was proposed by then prime minister Yukio Hatoyama and is new in that S&T is clearly positioned as a soft power of diplomacy.

Now Japan's science and technology diplomacy enters a new phase, advancing from just transferring technologies or R&D results overseas to strategically using S&T for diplomacy and leveraging diplomacy to help strengthen Japan's S&T infrastructure.

Representative Measures Taken under the Science and Technology Diplomacy Initiative

Since formalizing the science and technology diplomacy concepts from 2008 to 2010, Japan has taken several important measures to strengthen S&T cooperation with dynamic nations around the world. These measures are related in an attempt to promote 1) joint research with developing countries in order to resolve global issues as well as provide capacity building in those countries, 2) research cooperation in the field of cutting-edge technology with technologically advanced countries, and 3) cooperation based on an equal partnership with East Asian countries in the context of the East Asia Science & Innovation Area.

Research Cooperation with the Developing Countries

In accordance with the 2008 CSTP report, which emphasizes S&T cooperation with developing countries, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the Ministry of Foreign Affairs (MOFA) launched Science and Technology Cooperation on Global Issues in 2008. This new program has two subprograms: the Dispatch of Science and Technology Researchers program and the Science and Technology Research Partnership for Sustainable Development (SATREPS) program.

The Dispatch of S&T Researchers program has been jointly operated by the Japan International Cooperation Agency (JICA) under the umbrella of MOFA and the Japan Society for the Promotion of Science (JSPS) under the supervision of MEXT.

In this program, according to the needs of the partner countries, the most suitable researchers in Japan are dispatched to developing countries as JICA experts to engage in joint research that MEXT and JSPS select. This program aims to make significant international contributions through joint research that is expected to develop new technologies and to enhance the research capacity of Japan and its counterpart countries.

SATREPS is another promising program for promoting joint research with developing countries. In SATREPS, the Japan Science and Technology Agency (JST) and JICA collaborate to promote international joint research that targets global issues—such as limited bio-resources, natural disaster prevention, and infectious disease control—that are based on the needs of developing countries. It also aims to promote international joint research that includes a plan for future social implementation by collaborating with ODA in order to acquire new knowledge that will lead to solutions to global issues and advance the level of scientific and technological capacity in developing countries.

SATREPS projects are selected each year from project proposals submitted by Japanese research institutions. JST uses research contracts to support research costs incurred in Japan. JICA provides support through its technical cooperation project framework to cover costs in the developing country. The overall R&D management of the international joint research is handled jointly by JST and JICA. JST has the expertise in funding research projects at research institutions in Japan, and JICA brings experience in technical cooperation in developing countries. Since it began in April 2008, a total of sixty-eight SATREPS projects have commenced in thirty-five countries.

This type of collaboration between funding agencies and foreign development agencies has also been seen in the United States where the U.S. Agency for International Development and the National Science Foundation have recently launched Partnerships for Enhanced Engagement in Research (PEER).

Thus, Japan has been increasing its willingness to open up its scientific programs to foreign partners and to sponsor genuinely collaborative partnerships with developing countries.

Research Cooperation in the Field of Cutting-Edge Technology with Technologically Advanced Countries

For Japan to achieve a world-class S&T capability in such an intense economic and technologically competitive environment, the Japanese government has been aware that it is more important than ever for the government to manage international joint research in a strategic manner. This means MEXT must designate countries and research fields of cooperation in a top-down manner on a basis of having intergovernmental agreements in place.

In line with this government policy, JST has been implementing a research exchange program known as the Strategic International Cooperative Program

(SICP) since 2003. This program provides intensive support to mostly advanced countries with relatively small international research projects. Aiming at further developing science and technology, JST has supported three hundred and thirty-five research projects in twenty-two countries and one region (as of June 2012).

In addition to SICP, JST also started a new program for funding relatively large international joint research projects. Since 2009 this Strategic International Collaborative Research Program (SICORP) has had its budget increase substantially and has supported fourteen ongoing projects in three countries and one region. The CSTP task force report in 2010—which focused on integrating domestic R&D resources with those in technologically dynamic nations in order to maintain the relative strength in Japan’s S&T capacity—supported SICORP, which intends to promote international research cooperation with technologically advanced countries.

Cooperation Based on Equal Partnerships with Asian Countries

As has already been mentioned, one of the policy goals in Japan’s science and technology diplomacy is to strengthen the domestic R&D system by integrating foreign R&D resources. The Japanese government’s initiative to build an East Asia Science & Innovation Area, which is aimed at raising the capability of R&D and addressing common problems in the region, is one of those attempts, and the e-ASIA Joint Research Program (e-ASIA JRP) represents the main part of the initiative.

The e-ASIA JRP is Japan’s proposal for developing and supporting joint research projects in East Asia on a multilateral basis. Prospective members of the program are public funding agencies including governmental bodies of countries participating in the annual East Asia Summit (EAS). The multinational research collaboration is designed to be managed by a “matching fund system,” in which support from each ministry or agency will go to national universities or research institutes in each country.

This multinational research collaboration program is multipurpose. The promotion of multilateral joint research in fields such as life sciences, green technology, and disaster prevention is intended to contribute to the resolution of shared regional challenges. The improvement of scientific and technological capabilities is expected to have a positive effect on the further development of the region, which is at the center of global economic growth. From a diplomatic point of view, Japan can expect to play an active role in strengthening mutual trust and benefits among countries in the region.

At the sixth EAS meeting held in November 2011 in Bali, Indonesia, the chair’s summary stated: “We welcome Japan’s initiative for implementing the e-ASIA JRP/multilateral joint research program under the concept of East Asia Science & Innovation Area.” The e-ASIA JRP was formally inaugurated at the first board meeting held in Singapore in June 2012. The founding members included the S&T

related ministries from eight countries: Indonesia, Japan, Laos, Malaysia, Myanmar, the Philippines, Thailand, and Vietnam.

However, the initiative has just begun and there remain many challenges that need to be addressed. The most obvious one is that it needs to include more countries with ties to the region, especially China, South Korea, Singapore, and the United States. Without the involvement of the most dynamic countries with robust R&D resources, the e-ASIA initiative will not be able to live up to its potential. Also, it may need to harmonize existing programs, such as the ASEAN Committee on Science and Technology (COST) and the Asia Pacific Economic Cooperation (APEC) forum's Industrial Science and Technology Working Group. Whether this S&T initiative will succeed or not depends on Japan's capability to coordinate national interests among countries, that is, diplomacy.

Challenges and Opportunities

In this way, the Japanese government has developed a program that directly links to its diplomatic strategy and could lead to the integration of Japan's R&D system with other countries in the growing science base. However, Japan's science and technology diplomacy still has some issues. There is still a lack of connectedness between S&T policy and foreign policy. Even though many programs like SATREPS and e-ASIA JRP help to bridge that disconnect, they have not been fully exploited as solutions to diplomatic issues, such as economic diplomacy or resource security. Likewise, people on the S&T side fall short in using diplomacy to strengthen Japan's research and development system. Japan's science and technology diplomacy has not produced a synergistic effect in both sides yet.

Another challenge is that most Japanese political leaders do not perceive S&T as a useful instrument for foreign policy. Even if they do, they rarely mention it in international fora. In these circumstances, CSTP is considering setting up a meeting on science and technology diplomacy where members from industry, academia, and government can discuss international S&T activities. The meeting would help members deepen their understanding of each other's overseas and diplomatic strategies and help them develop a strategy for top-level diplomacy.

It is the time for Japan to reaffirm its global significance. To save Japan's science from its relative decline in this rapidly changing world, the new Abe administration should think hard about how to more firmly incorporate science and technology into Japan's foreign policy. **SD**

Endnotes

1. Council for Science and Technology Policy, "Toward the Reinforcement of Science and Technology Diplomacy," May 2008: 2-10.

2. This estimation was calculated based on data in the United Nations World Population Prospects, the 2008 Revision.