Working Group Report

Achievements and Future Directions of Science and Technology Advisor to the Minister for Foreign Affairs of Japan

7 August 2017

Working Group of the
Advisory Board for the Promotion of Science and Technology Diplomacy

Contents

1 The background and objective of the working group

(1) Ministry of Foreign Affairs (MOFA) held the "Advisory Panel on Science and Technology Diplomacy (hereinafter, the "Panel"), chaired by Dr. Takashi Shiraishi, (then President, the National Graduate Institute for Policy Studies) under the auspices of Mr. Fumio Kishida, Minister for Foreign Affairs since July 2014. The aim of this Panel was to discuss new challenges and responses to science and technology diplomacy (STD) and formulate recommendations which should be taken into account in advancing the STD further. The Panel submitted a report to the Foreign Minister Kishida in May 2015. The report is a result of the discussions on "science diplomacy,"[1] which is an effort to connect science and technology (S&T) with diplomacy, to address the necessity for more strategic efforts and reinforcement of more effective foundation thereto. Such discussion resulted in 15 recommendations including the appointment of a science and technology advisor to the Minister for Foreign Affairs on a trial basis. Based on these recommendations, MOFA appointed Teruo Kishi, Professor Emeritus of the University of Tokyo, as Science and Technology Advisor to the Minister for Foreign Affairs (hereinafter, the "Advisor") in September 2015.

(2) More than a year and a half has passed since the appointment of the Advisor, and during this time, the Advisor has domestically engaged with formulating a science advisory network planned for the S&T's utilization to diplomacy (for the organizational knowledge-gatherings) while internationally expanding a network (cooperation with science advisors of relevant states) and active public relations of Japan's diplomatic efforts on S&T. Alongside that, acknowledging the rising interests in STD within MOFA for the sake of the advisor's various efforts, some undertakings such as human resource development and data utilization (an effort of "mapping" the S&T's developments in major foreign states, etc.) are ongoing. It should be an appropriate moment to consider the future directions of the Advisor's activities while reviewing his past

[1] In general, "science diplomacy" has three aspects; "science for diplomacy," "diplomacy for science," and "science in diplomacy." (The Royal Society, *New Frontiers in Science Diplomacy: Navigating the Changing Balance of Power*, January 2010)

achievements.

(3) Considering the foregoing discussions, the Advisory Board for the Promotion of Science and Technology Diplomacy (Advisory Board) has established a working group on "the achievements of the Science and Technology Advisor to the Minister for Foreign Affairs and its future direction." The Advisory Board has decided to consider, on a mid-to long-term basis, future directions of the Advisor's activities (which include defining basic elements of the Advisor's activities) with Dr. Shiraishi as the chair, reviewing the Advisor's past achievements. Three elements were highlighted to be kept in mind in the process of the review: 1) the Advisor, 2) a scientific advisory mechanism, and 3) STD as factors of indicating the objective for the appointment and the expected roles of the Advisor, in addition to the relevance of the Advisory Panel's Report (Recommendations 1 to 15).

2 Advisor's achievements, future directions, and challenges

Although the Advisor takes part in a wide range of activities, they can be roughly categorized into the following three aspects: (1) advice and recommendations, (2) national as well as international network-building and human resource development, and (3) public relations. Hereafter, the future direction and challenges based on the Advisor's past achievements will be reviewed for each aspect.

(1) Advice and recommendations to foreign policy based on the scientific evidence

(a) Achievements

(i) Activities for major diplomatic opportunities

Since the appointment of the Advisor in September 2015, Japan has spearheaded large-scale and high-level international conferences including by serving as chair for the G7 meetings in 2016 and co-organizing the Sixth Tokyo International Conference on African Development (TICAD VI), which was held in Africa for the first time ever in August 2016. In September 2015,

the United Nations adopted the 2030 Agenda for Sustainable Development and, subsequently, as the Sustainable Development Goals (SDGs) entered into the implementation phase in the international community, the importance of utilizing science, technology and innovation (STI) for addressing issues was highlighted. Under the Advisor, the following activities were undertaken in relation to the aforementioned series of diplomatic opportunities.

① In the run-up to G7 Science and Technology Ministerial Meeting and Summit Meeting in May 2016, study group meetings on specific subjects were held under the Advisor from January to March 2016 with the attendance of the experts and the relevant ministries. These study group meetings were held in order to gather scientific wisdom and share it with the relevant government departments in charge of preparation of the Ministerial and Summit Meetings. As a result, discussions in the study group relevant to the necessity of strengthening marine observation and the importance of health data utilization were reflected on the Summit documents (i.e., the G7 Ise-Shima Leader's Declaration and the G7 Ise-Shima Vision for Global Health).

② In relation to TICAD VI, prior to the conference scheduled for August 2016, study group meetings on international cooperation were held from March to May 2016. Based on the discussions at the study group and the second Advisory Board meeting, Prof. Kishi submitted the recommendation for TICAD VI, "A More Prosperous Africa with the Power of Science, Technology and Innovation" to Foreign Minister Mr. Kishida, on 15th August 2016. The recommendation called for enriching people's lives through "Improvement of Africa's science and technology level by human resource development" (shift from brain drain to brain circulation) and "Application of R&D results to overall society." Consequently, the elements of science and technology were reflected in the TICAD VI outcome documents (Nairobi Declaration), the Prime Minister Abe's keynote speech, and Japan's measures for TICAD VI.

From 25 to 27 August, the Advisor visited the S&T-related

institutions in Nairobi, Kenya, exchanged opinions with the relevant people and provided a keynote speech at the JICA-organized symposium, "Roles and Challenges of Science and Technology Cooperation in Africa: From Research to Development." The Advisor also met with Mr. Yukiya Amano, Director General of the International Atomic Energy Agency (IAEA), to exchange views.

③ Under the SDGs adopted by the United Nations in September 2015, an emphasis was given to the utilization of STI for realizing a wide range of goals. Such efforts include the establishment of a "Technology Facilitation Mechanism (TFM)" under Goal 17 (Means of Implementation), which covers international cooperation for the achievement of the SDGs. One of the elements comprising the TFM is the STI forum, which is expected to be held as a place for dialogue between stakeholders. In June 2016, Prof. Tateo Arimoto, a member of the Advisory Board, attended its first meeting.

Since then, the Advisory Board held discussions on SDGs and submitted the "Recommendation for the Future: STI as a *Bridging Force* to Provide Solutions for Global Issues ~ Four Actions of Science and Technology Diplomacy to Implement the SDGs" to the Foreign Minister, Mr. Kishida. To formulate the recommendations, study group meetings were convened from March to April 2016 under the leadership of the Advisory Board member Dr. Michiharu Nakamura. With the attendance of experts from related fields and a wide range of relevant institutions such as international cooperation, ocean, outer space, basic science and universities, as well as from the industry, expertise from respective fields was gathered. The participants examined how to contribute to the achievements of the SDGs through STI for the future international cooperation. In May 2017, at the second STI Forum held shortly after the submission of the recommendation, experts (including the members of the Advisory Board) involved in the formulation of the "Recommendation for the Future" attended the forum as speakers, following contact from the Advisory Board members and related experts to key persons such as the co-chair. A side event for sharing Japan's experiences on international cooperation for solving global issues by utilizing STI

(such as SATREPS[2]) was co-organized with the World Bank. Through this event, practices towards solving global issues through cooperation with the business sector and utilizing data were presented, attracting great interest from other states. Furthermore, based on the discussions towards formulating the recommendations, the Japan Science and Technology Agency (JST) produced a handbook on Japan's good practices in both public and private sectors. The handbook, introduced by the co-chair at the STI forum, attracted attention from the participants. These facts show that cooperation with the science and technology community under the leadership of the science and technology advisor turned out to be a success.

A series of such efforts was mentioned in the report on Japan's status of implementation under the Voluntary National Review at the United Nations High Level Political Forum on Sustainable Development (HLPF) held in July 2017. In the presentation at HLPF, Foreign Minister Kishida, referring to the practices to solve the challenges with the Japanese companies' technology, publicized messages on the importance of Public Private Partnership emphasized in the "Recommendation for the Future."

(ii) The consultation and advice for each division in the MOFA in addressing specific issues

The Advisor has received consultations and advised, on an *ad hoc* basis, each relevant division in the MOFA on individual cases. Specifically, the Advisor has given advice for the relevant divisions on: formulating the

[2] "Science and Technology Research Partnership for Sustainable Development." This program is designed to promote international joint research in which both Japanese research institutions and those of recipient countries work together based on the social needs in recipient countries. Its aims are to obtain new knowledge and to utilize research outcomes to the benefit of the society with a view of resolving global issues such as the environment and energy, biological resources, disaster prevention, and infectious diseases. In conjunction with this, it also aspires to improve the development of human resources and research capabilities in recipient countries by conducting joint research. SATREPS is conducted by Ministry of Foreign Affairs/Japan International Cooperation Agency (JICA), Ministry of Education, Culture, Sports, Science and Technology/Japan Science and Technology Agency (JST), Japan Agency for Medical Research and Development (AMED).

"Innovative Asia" program by utilizing ODA and other measures for opportunities for studying at Japanese graduate schools or research institutions, and internships at Japanese companies are provided for highly competent human resources in Asia and job fairs are organized for those who have interests in finding a job at a Japanese company even after returning to their home states, thereby contributing to the Japanese innovation and eventually to their own countries' industrial development; and considering the possible impacts of emerging technologies such as Artificial Intelligence (AI) and robotics technologies on conventional weapons as well as promoting collaboration with the science community pertaining to the Biological Weapons Convention in the context of disarmament policy. For those ministry officials who are less familiar with science and technology and through the support of the advisor, contacts with relevant experts in Japan has become easier, and a sense of confidence has been inspired in advancing projects by gaining expertise directly from the Advisor. Voices pointing out such effects have shown that the advisor is widely welcomed in MOFA.

(b) The future direction and challenges

(i) It would be appropriate to continue providing recommendations and advice on the properly-selected diplomatic themes and opportunities, on which expertise of science and technology gathered through the Advisor is expected to be best reflected while taking into account the diplomatic significance and impact. The anticipated key diplomatic opportunities in the forthcoming years include, for example, the summit-level review of the status of the SDGs' achievements as well as the TICAD 7 (to take place in Japan) scheduled for 2019. Especially on SDGs, it is important to make the full-fledged preparations by expanding and strengthening the Public Private Partnership further, so that Japan could continue contributing sufficiently to the subsequent international conferences, noting that prioritized goals for the review process under the UN mechanism are identified annually towards the year 2019.

In choosing the subjects for advisory activities, based on the global issues and directions enshrined in the past advice and recommendations, there would be room to consider issues related to utilizing the STI, in

relation to particular states and areas (e.g., considering the ways to utilize the cooperative schemes such as the e-ASIA[3], the "V4 + Japan,"[4] and FEALAC[5] in relationships with Southeast Asia, Eastern Europe, and Latin America, respectively) and individual issues common to various states (e.g., response to the need to raise agricultural productivities in the Asian countries and climate change issues influenced under the current international political situation). On a mid- to long-term basis, it is expected that Japan itself takes lead in identifying a new agenda from a STD prospective.

As for the specific measures on advancing STD, the SATREPS has played an important role and has been highly acclaimed worldwide. The way towards more effective utilization should be considered. Furthermore, measures to cooperate with and utilize the projects designed to develop STI on a global scale, including the e-ASIA and "Sakura Science,"[6] should be

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[3] The e-Asia Joint Research Program (JRP) is an international science and technology cooperation framework, in which 19 institutions from 13 states out of the 18 East Asia Summit's (EAS) members participate, including the United States, Russia, Australia, and NZ. The e-Asia JRP has supported 20 multilateral joint research projects so far. The funding agencies of the relevant states launched the e-Asia JRP in response to the vision of "East Asia Science and Technology Innovation Area," proposed by Japan at the 2011 EAS. From Japan, JST and AMED have participated in this program.

[4] Visegrád 4 + Japan. V4 is a group formulated by the then Czechoslovakia, Poland, and Hungary to encourage friendship and cooperation (V4 currently consists of 4 states because of the Czechoslovakia's separation in January 1993). Japan and V4 agreed to promote the "V4 + Japan" dialogue and cooperation at the time of the visit of then Prime Minister Koizumi to the Czech Republic and Poland in August 2003 and the subsequent visit to Japan by the Prime Minister of Hungary in October 2004. Japan and V4 have undertaken cooperation to promote in the fields of addressing local challenges (e.g., the democratization of the Eastern European countries, the transition to a market economy), and national security, economy, S&T, and innovation.

[5] The Forum for East Asia-Latin America Cooperation, launched in 2001, is a forum aiming at reinforcing exchange and cooperation between East Asia and Latin America. The key objectives of FEALAC are: 1) to increase mutual understanding, trust, political dialogue, and friendly cooperation among member states; 2) to tap the potential of multidisciplinary cooperation, *inter alia*, in economy, trade, investment, finance, science and technology, environment protection, culture, sport, and people-to-people exchange; and 3) to expand common ground and to promote cooperation on important international political and economic issues with a view to working together in different international fora in order to safeguard common interests. Japan has co-chaired the working group on "Science, Technology and Innovation and Education" since 2013.

[6] The Japan-Asia Youth Exchange Program in Science (SAKURA Exchange Program in Science) is the program for facilitating short-term visits of competent Asian youths to Japan to raise their interest toward Japan's state-of-the-art science and technology,

considered so that they can develop in harmony with the view of enhancing diplomatic significance and impacts.

From the perspectives of contributing to other countries' economic and social development by way of STD, along with advancing relevant efforts, it is desirable to give higher priority to the aspects of promoting other countries' innovations through human resource development (e.g., the invitation of young professionals from developing countries for enhancing a long-term partnership). Currently, the data and information analysis and utilization have been gaining more importance, led by the rapid technological advancements, and such views have become more important on the diplomatic front.

In pursuit of strategic diplomacy corresponding to the increasingly unforeseeable international situation, taking leadership in addressing global issues and enhancing Japan's soft power, STD is becoming more important than ever as a force for stability in the international society.

(ii) Regarding advice to the MOFA's departments/divisions on their undertakings, it is appropriate to continue responding actively respond to the needs which emerge on various diplomatic phases.

(2) Reinforcing national and international network-building and human resource development

(a) Achievements

(i) Domestic aspects: Establishment of the STD Advisory Network

After his appointment, the Advisor endeavored first and foremost to formulate his networks. Based on Recommendation 10 of the Panel's Report, the STD Advisory Network was formed as a mechanism for assisting the Advisor, with the Advisory Board at the core. The Advisory Board members were selected to include academic experts from a wide range of S&T fields together with the members of the Panel. The members were commissioned

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and to nurture proficient human resources abroad that the Japanese universities, research institutions, and private companies look for, thereby contributing to the development of science and technology in Japan and in Asia. JST is the implementing agency.

by Foreign Minister, Mr. Kishida in December 2015. Since then, the Advisory Board (with the Advisor as chair) has discussed the general directions and the contents of recommendations to promote the Advisor's activities. After its first meeting in February 2016, the Advisory Board has convened five meetings in total.

Especially, for advancing the activities of providing advice and recommendations mentioned in (1), study groups have been held to share expertise and exchange opinions among diverse stakeholders related to the specific subjects. Setting up such a "venue" under the Advisor has encouraged information-sharing and visualization of various relevant efforts made by other ministries, institutes, and relevant academic and industrial organizations, thereby nurturing common grounds. This shows that the frameworks such as the Advisory Board have functioned as the basis for promoting cooperation among various stakeholders. A clear example of the outcomes of such cooperation is a series of efforts towards making the "Recommendation for the Future," based on discussions at the international cooperation study group relevant to SDGs and culminating in to concrete results that ensure the Japanese presence (i.e., contributions to substance through the presentations by experts who were engaged in making the recommendations, proposing specific actions through the best-practice handbook) at the second UN STI forum.

The Panel's Report recommended the appointment of the Advisor on a trial basis "by which the information on updated domestic status in science and technology and trends in foreign countries will be well reflected to the policy-making of high-level bilateral and multilateral diplomacy" (Recommendation 9). It also called for efforts to "build networks in and out of the nation for strengthening coordination with relevant ministries, organizations, academic experts and the industrial community, and formulate a structure for assisting the "science and technology advisor" (Recommendation 10). It can be said that, through the activities of the Advisor and the mechanisms of holding the study group under the Advisory Board chaired by the Advisor, domestic cooperation has advanced and the activities of providing advice and recommendations mentioned in (1) have achieved positive results. The STD by nature goes far beyond the range of

certain individual ministries and institutions' reach. Formation of network and cooperation among stakeholders are required for the implementation. It can be pointed out that establishing the Advisory Board under the Advisor and setting the network mechanism are effective in light of the STD's characteristics.

(ii) Overseas: Establishing networks with S&T advisors of diplomatic authorities in foreign countries

In relation to foreign countries, on the occasions of an overseas visit and of the relevant figures' visit to Japan, the Advisor met with high-level policy-makers of the relevant states including S&T advisors and ministers of science. At the meetings, the introduction of activities of both sides and the exchange of views on a wide range of subjects have contributed to nurturing common perceptions.

Especially, the U.S., the U.K., and New Zealand (NZ) have already appointed S&T advisors to their diplomatic authorities. The appointment of the Advisor in Japan was welcomed and expectations for collaboration are high. Among the S&T advisors of these countries, Dr. Vaughan Turekian, Science and Technology Advisor to the U.S. Secretary of State, played a central role in setting up the Foreign Ministries Science and Technology Advisors Network (FMSTAN). The meetings were organized with the attendance of countries which recently appointed the S&T advisor to the diplomatic authorities (i.e., Senegal, Poland and Oman), and have interests in appointing one. FMSTAN is hereafter on the track of promoting its management with the involvements of the International Network for Government Science Advice (INGSA).

Global dialogues on STD have been held with cooperation of the Fletcher School at Tufts University and the International Institute for Applied Systems Analysis (IIASA).[7] Prof. Kishi participated in FMSTAN's meetings and the aforementioned global dialogues during his visit to Washington D.C. in February (at the time of launching FMSTAN) and the visit to Europe

[7] IIASA is an international institute for conducting research focusing on the system analysis to contribute to solving global challenges.

(Vienna) in October 2016.

Alongside these undertakings, Prof. Kishi actively visited various states (the U.S. - Washington D.C. and Boston, Europe - the U.K., Germany, Austria, France and Latvia, South East Asia - Thailand, Indonesia and the Philippines, Africa - Kenya, and NZ),[8] and has reinforced global networks through exchanging opinions with counterparts and each countries' advisor on an individual basis.

Furthermore, Prof. Kishi had the opportunity of exchanging opinions with the following key figures: Dr. John Holdren, the Assistant to the President for Science and Technology, who visited Japan in October 2015 for the Joint High-Level Committee Meeting organized under the U.S.-Japan Science and Technology Cooperation Agreement; the Honorable Kirsty Duncan, Minister of Science of Canada, who visited Japan in May 2016 to attend the G7 Science and Technology Ministers' Meeting in Tsukuba, Ibaraki; and Dr. Pichet Durongkaveroj, Minister of Science and Technology of Thailand, with whom Prof. Kishi met at the time of his visit to Bangkok.

(b) The future directions and challenges

The relationships with the advisors of the relevant states are beneficial in specifying and grasping the common future challenges and issues of particular interest to the foreign counterparts (local needs). From the long-term perspectives, this would lead to formulating the global agenda as a result of the dialogues among advisors.

Prof. Kishi and Dr. Turekian jointly contributed an article to *Science and Diplomacy* (the AAAS's journal specialized in STD) in February 2017.

Such initiatives for building and strengthening international networks are effective in formulating mutual trusts and in sharing the awareness of the issues on common policy challenges. It is expected that these initiatives would allow the advisor lead the global dialogues by continuing these

[8] This includes opportunities to visit for purposes other than the activities of the advisor.

activities together with dissemination through attending symposiums as described below.

On the other hand, the Advisor may not attend every STD-related meeting, assuming that he or she is required, as part of his/her qualification, to assume the role and activities of a top scientist. In view of broadening the network, it is meaningful to effectively share and aggregate information by ensuring attendance of the relevant experts (e.g., the Advisory Board's members), with the Advisory Board's endorsement, to meetings at which the Advisor could not attend (c.f., 4(3)(b)).

On the domestic network, it is desirable to find and foster experts to be the undertaker/supporter of the STD by dispatching researchers from various fields and experts from the industrial fields to the international forum and by ensuring their attendance to the study group. Especially, development of young professionals to support the STD, including presenting the possibility to contribute to the national and international community with their expertise as scientists, is an important task for the future.

Moreover, on the public relations aspect, collaboration with the Council for Science, Technology and Innovation (CSTI) is advancing. As it is shown in the implementation of the "SIP Caravan" (c.f., (3)(a)(iii) below), there remains room, amid further STD's efforts towards implementing SDGs, for considering the ways for further cooperation (from the viewpoints of unity with the international implementation of STI policy).[9] Those examples include considering how to give a concrete shape to the future social visions expressed by Society 5.0. It can also be pointed out that the ways to cooperate with the Science Council of Japan should be considered, as the S&T advisors of the U.S. and the U.K. are utilizing networks with their respective academies.[10]

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[9] In the 5th Science and Technology Basic Plan, it is stated that, in advancing the four initiatives, it will be essential to work in coordination with science and technology diplomacy and to act strategically in an international context.

[10] In terms of the cooperation with the academia, there is a possibility to consider utilizing the researchers' network of the Japan Society for the Promotion of Science (JSPS).

In addition, in order to further utilize the STI towards innovation cooperation with the developing countries and towards the implementation of the SDGs, it would be beneficial to cooperate with entities which undertake activities involving the academic as well as the industrial society including the Engineering Academy of Japan.

(3)Active public relations

(a) Achievements

In terms of public relations, Prof. Kishi has willingly engaged in public relations activities through the various opportunities as shown below.

(i)Publicity activities at the international conferences and forum related to science and technology

At the time of the overseas visits and aside from the aforementioned individual networking activity, Prof. Kishi has many opportunities to deliver speeches at public events such as international conferences and various forum. For example, he participated in the symposium, "Science and Technology Diplomacy and the Japan-U.S. Alliance," organized by the Carnegie Foundation held in Washington D.C. (February 2016) and the ASEAN-STI Forum in Thailand (September 2016). He therein introduced Japan's STD efforts and the Advisor's activities to the stakeholders in foreign countries.

Prof. Kishi delivered a speech at the subcommittee convened under the theme of "The Bridge between Science and Technology and Society," as part of the 13th annual plenary meeting of the STS forum in October 2016. He also gave a speech at the international symposia on the individual subjects including earth observation (the 9th GEOSS Asia Pacific Symposium held in January 2017).

(ii) Contributions to and interviews with the domestic and foreign media

Prof. Kishi has actively responded to press interviews. His comments

and articles were published in major Japanese newspapers such as the *Nihon Keizai Shimbun* and *Mainichi Shimbun*, the journals specializing in diplomacy or S&T policy (*Gaikou [Diplomacy]* and the publications by NISTEP, etc.), and English magazines covering Japan's current affairs for readers abroad (*Japan Journal*).

He also contributed, with the U.S. advisor Dr. Turekian, a co-authored article "Science and Technology Advising in Today's Foreign Policy" to *Science Diplomacy.*

Moreover, he contributed to the *Diplomatic Bluebook 2016* a short essay describing his efforts in S&T diplomacy and the role of the Advisor from his own perspective.

(iii) Public relations activities of the Japanese STI ("SIP Caravan")

As part of the Advisor's activities and in cooperation with the Cabinet Office, he conducts public relations activities on the Japanese STI, represented by the "Cross-ministerial Strategic Innovation Promotion Program (SIP)." This activity known as "SIP Caravan," entails dissemination to and networking with, through the Japanese diplomatic missions abroad, those who are related to S&T in the counterpart states (i.e., policy-makers, the relevant people at research institutions and universities), and those who involved with diplomatic or international organizations. SIP Caravan is aimed at laying the groundwork for expanding Japan's research outcomes and future international cooperation in the fields of science and technology. Seminars have been organized at the Japanese Embassies and the Permanent Mission of Japan in Europe (namely, Germany, Austria, France, and the U.K.), introducing the current R&D developments regarding the SIP themes, including "Automated Driving System," "Infrastructure Maintenance, Renovation and Management," "Enhancement of Societal Resiliency against Natural Disasters," as well as "Structural Materials for Innovation," of which Prof. Kishi serves as a program director. In Southeast Asia, he visited government agencies, universities and companies of Indonesia, the Philippines, and Thailand, to exchange opinions on the possibilities of both countries' future cooperation and potential fields while introducing the SIP, which is the symbols of the public-private, academic-industrial, and

cross-ministerial cooperation.

(b) The future directions and challenges

In the future, in addition to the above-mentioned various ways of public relations that the Advisor himself takes, further outreach effects would be anticipated, such as proactively sending more experts from a variety of S&T fields to foreign countries through the Advisor's network and utilizing the Japan House hubs, which are being opened one after the other and are fully operational. At the same time, it is expected to strengthen networks or publicity with outstanding talented researchers and innovators abroad by utilizing the embassies' functions, which are the MOFA's salient points, and by cooperating with the Japanese S&T institutions and universities overseas offices. Moreover, with regard to these public relations opportunities, international public relations of the Society 5.0 should be considered, keeping in mind the "Global Future Creation through Society 5.0," referred to in "Recommendation for the Future."

On domestic public relations activities, the practice of viewing their own activities in terms of STD is hardly prevalent, even among the S&T stakeholders, although there are many S&T talents who are active internationally at various S&T meetings and forums (including the relevant academic societies of the related fields). Under these circumstances, it would be beneficial to continue to publicize activities of the Advisor and the idea of STD in order to raise awareness of STD and to expand relevant activities. In particular, it is also essential to raise awareness of young researchers and technicians, and thus contribute toward human resource development.

3 Efforts of supporting the Advisor's activities

(1) Utilization of information and implementation of the activities based on collaboration with the relevant stakeholders

(a)Achievements

As a basic resource for advancing STD efforts, it is essential to collect and

analyze information including the recent trends of S&T and the areas of interest concerning Japan's S&T in different countries. Currently, the "mapping" work is underway, which is an effort to consolidate and analyze information of important countries and regions from the STD perspective, based on annual reports from the overseas missions, and research results and information on the international cooperation published by the domestic institutions.

Collaboration with and the utilization of the S&T attachés at overseas missions (currently, such officers are appointed in 53 missions) have been reinforced by setting up opportunities to exchange opinions with the Advisor before their overseas assignment and at the time of the Advisor's overseas visits. Regarding the diplomatic corps based in Japan, the Advisor aims to strengthen the relationship with foreign S&T attachés, and thus eventually enriching his activities by visiting the foreign missions in Tokyo and interacting with S&T attachés there.

(b) The future directions and challenges

It would be desirable to make further efforts to systematically connect the resources of overseas missions (human resource, information, and network) with the activities of the S&T Advisor and his networks by further utilizing overseas missions, which are in the front line of diplomacy.

Likewise, concerning the relationship with the S&T attaché of foreign missions in Tokyo, increased contact with them in the Advisor's activities would help building a strong basis of cooperation with the relevant states.

(2) Human resource developments and communications within MOFA

(a) Achievements

From the view of human resource development within the MOFA, a series of "STD seminars" are being held in the MOFA to enhance the S&T knowledge of MOFA staffs. The speakers of the seminar included Dr. Mamoru Mohri, the director of the National Museum of Emerging Science and Innovation (Miraikan), Dr. Hitoshi Murayama, the director of Tokyo University Institute for the Physics and Mathematics of the Universe

(IPMU), Prof. Kishi himself, and the Advisory Board member Dr. Masaru Kitsuregawa.

Prof. Kishi also conducted a lecture on STD for young MOFA officials who are ready for overseas training after working for one or two years in Tokyo. The young officials who attended the lecture commented that STD is "the prospective field" and "a capable tool of utilizing soft power." It is meaningful to raise awareness regarding the relationship between S&T and diplomacy among the young officials at an early stage, as they will play an important role in diplomacy in the future.

In relation to the high-ranking MOFA officials, efforts are being made to ensure the opportunities for individual meetings with the Foreign Minister, the State Ministers, and the Parliamentary Vice-Ministers as well as other senior officials.

(b) The future directions and challenges

Through the seminars and other relevant events, there is an apparent increase in interest in science and technology among MOFA officials. It is important to continue such undertakings and to foster awareness on a long-term basis so that MOFA as a whole could engage in diplomatic activities with a high-level of awareness for utilizing S&T, thus further reflecting the S&T knowledge on specific diplomatic activities.

To identify diplomatic themes for which S&T can be utilized in a timely manner, it is important to ensure direct communication between the Advisor and the executive level of the ministry as well as each relevant department. Such an opportunity should be continuously made whenever possible. At the same time, it would be effective for the relevant MOFA's department in charge of STD to assist the Advisor as a secretariat. For the Advisor's undertakings, there is a necessity to take both approaches at the same time.

4 On the future of the advisor

As mentioned in 2 above, the STD efforts of utilizing the STD Advisory Network led by the Advisor with the Advisory Board (and the study group under the Advisory Board) at the core have been producing positive results

and progressing effectively.

Considering the Panel's Recommendation 9 (inputs to the Minister) and 10 (expanding networks), while the Advisor has been appointed "on a trial basis," the STD Advisory Network has functioned and has enriched the diplomatic activities at both the ministerial and summit levels, showing that the STD has been evidently making a progress.

Concerning the relations with the international society, there is a substantial progress on cooperation among the S&T advisors of the relevant states and diplomatic contributions through international institutions, leading to some concrete results. On the other hand, in relation to the relevant domestic fronts, there are apparently high expectations to the roles of the Advisor which include the hope that his diplomatic activities would lead to the progress of Japan's S&T through international cooperation. The Advisor's presence as a "source" of S&T knowledge within MOFA is gaining importance in advancing individual diplomatic work and reinforcing the organization's functions in the long run.

The foregoing discussions lead the views that: the Advisor should be a permanent post to be continuously appointed, rather than the initial "trial" status; the science advisory network for the diplomacy under the Advisor should be reinforced and further expanded; and STD should continuously be promoted. To this end, it would be important to ensure the environment enabling these improvements. From this viewpoint, the following three points should be noted in particular.

(1) Basic qualifications required to the Advisor

As mentioned in the Panel's report, the roles that the Advisor is expected to play include a timely input to the Foreign Minister so as to reflect the latest information on the international S&T cooperation and the relevant trends in foreign countries on the policy-making at high-level international conferences as well as top-level diplomacy. They also include the formulation of a network which can strengthen the industry-university-government cooperation, and utilize their expertise for assisting the Advisor himself when providing knowledge and advice for the

summit-level and foreign ministerial-level meetings as well as various policy speeches. It is therefore essential for the Advisor, as a "hub" of such networks, to collect knowledge from various stakeholders and to transfer it to policy-makers. Thus, the Advisor should possess the capability of mobilizing experts, leadership, openness and fairness, and a wealth of personal connections and popularity.

To fulfill such roles, the whole mechanism, supported by the network, rests on an extensive trust from the S&T communities. This would make the mechanism well-functioning and enrich the Advisor's activities, making his advice and recommendations even more persuasive. On the policy-implementation phase based on the S&T knowledge, the cooperation of domestic stakeholders is essential. From such perspectives, it is important that the Advisor is a highly regarded scientist.

Furthermore, to fulfill the role as the neutral and objective "advisor" for policy-making, it is desirable that he or she possesses an understanding of policy decision-making in actual administrative affairs.

In addition, assuming that a significant weight is placed on formulating overseas networks and publicity activities in the Advisor's activities, the global perspectives and international experience as a scientist are also desirable.

(2) The Advisor's working conditions

In pursuing the Advisor's activities domestically and internationally, he or she actually deals with issues requiring consideration for over one to two years. In order to enable the Advisor to carry out his or her activities in a stable and continuous manner, it is necessary to have an engagement in the length of, for instance, three to five years.

As for the working conditions, Prof. Kishi currently works on a weekly basis. However, considering the schedules of overseas visits and the necessities for ensuring flexible communications and the time for meetings with assistant officials, he is in effect engaged for twice a week or even more. In the future Advisor's activities, while maintaining the recent level of

engagement and the balance with other works as a scientist, a quality enhancement is important.

(3) The need for securing sufficient mechanisms

(a) Achievements

The STD Advisory Network, with the Advisory Board at the core, is a part of the domestic network (2(2) above). This network also operates as a mechanism for assisting the Advisor in promoting STD through his activities.

It is also important to structure the secretariat mechanism to assist the Advisor in smoothly conducting domestic and international activities. To date, the MOFA's International Science Cooperation Division, which functions as the Advisor's secretariat, has employed more than one personnel as Science and Technology Experts including those from a relevant institution. The Division also plans to receive internship students including those who study natural science.

(b) The future directions and challenges

For further promoting STD under the Advisor, it is beneficial to enhance the quality of the Advisor's activities even further and to strengthen the basis of the assisting mechanisms such as the Advisory Board in a supportive manner. In formulating the recommendations for the SDGs' implementation, the study group was held through an appointment of the Advisory Board's member as a leader. This approach was a good example and it is desirable to systematically reinforce such efforts on specific subjects.

As mentioned in (2), from the viewpoints of maintaining the current level of the Advisor's responsibility, the possibility of a prior appointment of appropriate expert(s)[11] as a representative acting on behalf of or assisting the Advisor should be considered. Developing human resources for STD, in the long run, should be also continued by appointing young professionals in a

[11] In view of further incorporating "diplomatic" insights into STD, it would be suggested that the Advisor, if he or she was a natural scientist, collaborate with a social scientist in providing advice to the Foreign Minister.

scientific and technical field as an assistant to the Advisor for gaining practical experience such as attending relevant meetings with the Advisor.

Regarding the structural basis of the Advisor and its assisting mechanisms, efforts have been made to assure sufficient budget allocation for organizing meetings throughout the year, implementing overseas visits of experts including the Advisor, and for increasing the number of officials at the secretariat. Further effective activities should be conducted.

On the S&T attachés at the missions abroad (3(1)), it is important to work on collecting information which contributes to specific STD efforts. For example, by finding potential cooperative projects in their assigned state, and by forming networks, so that they can be utilized for the Advisor's activities.

Developing and reinforcing the capabilities of the MOFA officials to pursue STD along with the aforementioned efforts in 3(1) and 3(2) should be promoted. The continuous reinforcement of mechanisms by incorporating in a flexible manner, the vigor of a wide range of personnel involved in the S&T from in and outside of the ministry should also be pursued.

5 Conclusions

(1) The establishment of the scientific advisory mechanisms for diplomacy led by the Advisor has created new aspects in Japan's diplomacy, while the Panel's report paved the way for the Advisor's appointment "on a trial basis." The advice and recommendations made at the time of the diplomatic opportunities such as G7, TICAD VI, and SDGs have been presented with an aim of achieving concrete diplomatic results. Such undertakings showed, in a very visible manner, Japan's efforts in utilizing its forte in S&T for solving global challenges now facing the international community. The advice and recommendations consequently have boosted Japan's contributions.

(2) S&T is, by free and open research activities, to make it possible to pursue the universal truth and to solve the issues taking place in the real world. The expectations towards STI are high in realizing sustainable

development and economic growth on a global scale.

(3) In pursuing diplomacy towards maintaining and reinforcing free, open and cooperative international order, sending a clear message that Japan intends to contribute to the international community through S&T would lead to the enhancement of its soft power and national branding. It has thus become more important than before to promote STD in a way that it will serve the national interests.

(4) For this sake, the Advisor (and his or her support team) should play a central role in providing a set of insights and promote undertakings globally via mutual partnerships with industrial, academic and governmental entities; play a central role in achieving diplomatic outcomes thereby; and should continuously promote the STD's efforts in line with the following pillars.

■Advice and recommendations to foreign policy based on the scientific evidence
■Reinforcing national and international network-building and human resource development
■Active public relations

Working Group

Members

(Chair)

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Ritsumeikan University Professor

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In making this report, the two working group meetings were held based on the results of the discussions among the working group's members. The working group summarized a report as a result of a series of discussions, including those with Advisory Board's members.

The first working group meeting (5 July 2017)

The second working group meeting (14 July 2017)

The fifth meeting of the Advisory Board for the Promotion of Science and Technology Diplomacy (26 July 2017)

The working group's meetings were organized with attendance of the Advisory Board's members, the relevant ministries, and other institutions.

Attendees at the fifth Advisory Board's meeting included Mr. Kiyoshi Odawara, Parliamentary Vice-Minister for Foreign Affairs and Mr. Kawasaki Masahiro, Deputy Director-General (Ambassador), Disarmament, Non-Proliferation and Science Department, Ministry of Foreign Affairs.

Advisory Board for the Promotion of Science and Technology Diplomacy

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Board members

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Ryozo Nagai	President, Jichi Medical University
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Yoshifumi Yasuoka	Professor Emeritus, The University of Tokyo
Mitsuhiko Yamashita	Director, Executive Vice President, Chief Planning Officer, Mitsubishi Motors Corporation (MMC)
Yuzuru Yoshii	Professor Emeritus, The University of Tokyo Professor, Steward Observatory, The University of Arizona
Hiroyuki Yoshikawa	Special Counselor to the President, JST

The government ministries and other organizations

Cabinet Secretariat, Office of Healthcare Policy

Cabinet Office

Science Council of Japan

Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Ministry of Economy, Trade and Industry (METI)

Japan Agency for Medical Research and Development (AMED)

Japan International Cooperation Agency (JICA)

Japan Foundation (JF)

Japan Science and Technology Agency (JST)

Japan Society for the Promotion of Science (JSPS)

National Institute of Advanced Industrial Science and Technology (AIST)

New Energy and Industrial Technology Development Organization (NEDO)