

## TA-INSTITUTIONEN UND -PROGRAMME

### Technology Assessment in Japan: Past, Present, and Future

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**In contrast to European countries and even other Asian countries, Japan does not have formal TA activities. Several attempts were made already in the 1970s when the Science and Technology Agency (STA) and MITI – the Ministry of International Trade and Industry started to investigate TA activities of the Office of Technology Assessment (OTA) in the US with a view to introducing TA into the Japanese S&T system. An attempt was made to create a law for TA, but it failed. A few TA projects were realised but they never went beyond the pilot stage with the exception of Technology Forecast surveys which became a regular feature of Japanese S&T policy. However, as concerns about the relationship between S&T and society have grown since the mid 1990s, there are signs that TA might come to life again. The article describes some recent developments and ventures an optimistic glance into the future of TA in Japan.**

#### 1 Introduction

In a modern society, in which Science and Technology (S&T) are pervasive, almost all public issues will be solved with the assistance of, and in connection with, S&T. The relationship between Science, Technology, and Society has become an essential issue contemporary societies should cope with. Therefore, many of these societies are examining various approaches to tackle such issues including but not limited to technology assessment (TA), technology foresight, ELSI/ELSA (Ethical, Legal, and Social Implications/Aspects) programs, citizens' participation in S&T, public consulting, public debate, science outreach, science advice, regulatory science, and so on. Unfortunately, Japanese society does not have enough experience in this

issue, despite a few exceptions, including a long tradition of Technology Forecasting. Above all, the Japanese government does not have formal TA activities.

Japan has a fairly large Research and Development (R&D) system; its magnitude is 16.7 trillion yen (Euro 123,1 billion), 3.35 % of GDP (2002) in monetary terms, and 757 thousand researchers (2003) in terms of manpower. S&T policy is highly placed in the government system. The Prime Minister is in charge of the chair of the Council for Science and Technology Policy (CSTP) in the Cabinet Office, which is the highest body of S&T policy in Japan. The Science and Technology Basic Law, enacted in 1995, provides the fundamental framework of S&T policy. Based on this Law, the government defines the Science and Technology Basic Plan every five years, with the second plan now ongoing. Japanese society appears to have a matured S&T system.

In contrast with this, with regard to the relationship between S&T and society, there seems to be a lack of activities and policies.

Of course, Japanese society possesses and provides a history of TA, from which the present situation of TA is an inevitable consequence. However, we can find a new, though fragile, stream of relevant activities recently. In this essay, I would like to introduce the history and future of TA in Japan, noting these important peripheral activities, referring also to other issues related to TA.

#### 2 Back to the 1970s

In the 1960s, Japanese society was facing serious pollution problems throughout the country. Among them, there were the four major pollution outbreaks: Minamata disease, Niigata Minamata disease, chronic cadmium poisoning (Itai-Itai disease) and Yokkaichi asthma. In 1967, the Basic Law for Environmental Pollution Control was enacted to establish environmental quality standards, and to develop regional environmental pollution control programs. Four of the most serious diseases caused by water and air pollution went to court. Pollution problems became one of the most important political issues in the public eye. The Environmental Agency was subsequently established in the government in 1971.

In those days, the Japanese government began to pay attention to TA, obviously being affected by the United States, where TA was conceptualized and the Office of Technology Assessment (OTA) was to be established in the Congress. In 1969, the Japan Techno-Economic Society (JATES), a private non-profit association of leaders in both industry and government who were interested in technology, surveyed industrial forecasting activities in the US. The survey introduced the concept of "Technology Assessment" as a by-product. After that, several technocrats in the government began to be interested in TA.

TA was officially mentioned in the 1971 report of the Council for Science and Technology (CST), which was the highest body in governmental S&T policy till the Council for S&T Policy (CSTP) replaced it in the 2001 Government. The report argued that TA should be introduced to rationalize S&T policy, and to build nation-wide consensus for S&T, under the circumstances of both growing pollution problems and an anti-scientific atmosphere. The White Paper on S&T in 1971 also mentioned that TA should be introduced to cope with problems in advance of the introduction of technology to society.

In 1972, both the Science and Technology Agency (STA) and the Ministry of International Trade and Industry (MITI) began to investigate technology assessment activities in the US to introduce TA into the Japanese S&T system. Two government bodies began to pilot TA studies individually, which dealt with agriculture, tall building construction technology, Computer Assisted Education, iron works by atomic energy, mining technology of seabed materials, and so on.

In those days, CST attempted to create a law for TA. However, in 1973, there happened the Oil Shock, which seriously affected TA studies. These studies were consequently shifted to energy studies. Pilot TA programs continued into the late 1970s, but they were just nominal. In the end, the Japanese government, both administrative bodies and the Diet, did not decide to institutionalize TA.

Looking back to those days, TA studies pursued by both STA and MITI seem to have had many limitations. They were just pilot studies, and could not affect policy making at

all. Furthermore, the fear that TA might bring a negative image for S&T within an overall anti-scientific atmosphere, spread among government officers and statesmen who were concerned with S&T policy.

However, even under such conditions, we can find a few remarkable projects initiated by the government. For instance, the Institute for Future Technology (IFTECH) conducted a research project, 'Technology Forecast in Japan' with STA funding, which is a repetitive S&T study applying the Delphi method to investigate the future status of technology development. The first Technology Forecast was carried out in 1970. In 1991, it was handed to the National Institute of Science and Technology Policy (NISTEP) of the Science and Technology Agency (STA). This year (2004), the eighth survey will be carried out. As Technology Forecast has a long tradition in Japan, people occasionally refer to the results of the survey. However, there is no way to affect S&T policy making, such as priority setting of public funding of R&D. It is just a survey.

As a result, TA and its relevant activities, except for Technology Forecast, have been forgotten in Japanese society up until now. This is different from European countries, which institutionalized TA as parliamentary offices of TA and/or TA programs from the 1980s to 1990s. Japan has little experience with TA, and we cannot find a TA tradition proper in the Japanese S&T system at all.

### 3 Recent Changes

Although Japanese society does not have a TA tradition, we can find many signs that express a possibility that TA will come to life again.

Concerns about relationships between S&T and society have grown since the mid 1990s. In academia, STS (Science, Technology and Society/Science and Technology Studies) emerged in the early 1990s and grew during that decade. The community of STS researchers is still small and scattered, but the Japanese Society for Science and Technology Studies (JSSTS) was established in 2001. Those who joined JSSTS introduced the idea of participatory Technology Assessment and other concepts, which were developed in the European TA tradition. STS researchers carried out a

consensus conference on gene therapy in 1998. This was the first attempt of a consensus conference in Japan, which was followed by other trials. Today, various methods of enhancing public participation are examined separately in Japanese society, but these methodologies have not been integrated into TA yet.

On the other hand, there occurred many events by which people became aware of the importance of STS issues. Especially in 1995, many accidents happened; a large earthquake in Hanshin-Awaji, chemical terrorism by a cult group, and so on. After those, we were facing GMO (Genetically Modified Organisms) issues, BSE issues, bio-ethics problems in tailor-made therapy, the 'Accident at the Tokai Fuel Conversion Plant in 1999', and more.

The government made some attempts to cope with such problems. The Ministry of Agriculture, Forestry and Fisheries carried out a consensus conference on GMO with the assistance of STS researchers in 2000, which was the first conference of that kind organised by a governmental body. The concept, Regulatory Science, was introduced into official arguments. A few official reports, prepared by the ministries, mentioned the necessity of Regulatory Science.

Because of these events, there were attempts to institutionalize STS from outside of the STS community. A feasibility study of 'Science and Society' was pursued from 1996 to 2001, which was led by a prominent scientist with public research funds to establish new research activities for Science and/in Society in universities. However, although this was a great opportunity to institutionalize a new type of TA, the Government Reform in 2001 put an end to these activities.

In 1999, the Council of Science and Technology (CST) established the "Discussion Group on Society and S&T in the 21st Century" to discuss the relationships between society and S&T. The group concluded with the report 'Science and Technology Thriving in and for Society' in 2000, in which the group emphasized the importance of interactions between S&T and society, communication between S&T and society, ethical aspects and social responsibility of S&T, among other points. This was another chance to introduce a new type of TA. However, the Japanese government and seemingly also society forgot the word, TA. Therefore, the gov-

ernment did not translate such ideas into concrete policy programs.

No TA program was therefore introduced. However, through such experiences government officers and prominent scientists tended to recognize the relationship between S&T and society as an important issue in S&T policy. In 2001, the Government Reform was carried out, which affected S&T policy. For instance, STA and Monbusho (the Ministry of Education, Culture and Sports) were merged into the Ministry of Education, Culture, Sports, Science and Technology (MEXT). The legal status of many national research institutions changed from government-owned and government-operated institutes to government-owned but self-operated institutions.

Two new research programs were started: the Research Institute of Science and Technology for Society (RISTEX), one of the programs in the Japan Science & Technology Agency (JST), a funding agency of MEXT; and the Center for Technology and Society (CTS), a research unit in the National Institute of Advanced Industrial Science & Technology (AIST) affiliated to the Ministry of Economy, Trade and Industry (METI).

MEXT was exploring a new and symbolic domain in S&T policy to cope with government reform in 2001. In the old administration, STA was in charge of the promotion of natural science and engineering, especially large-scale research activities, while Monbusho was in charge of the promotion of not only natural sciences and engineering but also the humanities and social sciences. Therefore, the establishment of a new Ministry as a merger of STA and Monbusho brought opportunities for collaboration between the humanities, social and natural sciences. Therefore, MEXT was to promote collaborative research activities among these disciplines. RISTEX was designed as an answer to such considerations.

RISTEX aims to solve societal problems, which occur in a society which is deeply permeated by S&T – such as the Japanese society –, by means of collaboration of various fields. Today, RISTEX is engaging in researches on S&T to realize a safe society, the fundamentals for a new governance of S&T, brain science for education, and so on. RISTEX is perceivably a kind of TA activity, because developing S&T

for society is equivalent to evaluating S&T from a viewpoint of social needs. As part of RISTEX activities, my colleagues and I surveyed the status of the European TA scene, taking special notice of the German case, and introduced it into Japanese society.

AIST was affected by the governmental reform, so that it had to restructure its organization to make clear its social relevance. CTS was established as a new research center to investigate the social relevance of technology development. CTS was the first social science research center of AIST to contribute to both the development of technological innovation, and the harmonization of innovations with social welfare. CTS intended to investigate social aspects of S&T, such as ELSI, TA, strategic policy making in S&T. The staff of CTS were engaging in surveys on the European Parliamentary TA system, Public debates on GM technology in New Zealand and the United Kingdom, Social Impacts of Nanotechnology, GM issues in Japan, and so on.

#### 4 Conclusion – Present and Near Future

As described above, TA has not been institutionalized in Japanese society formally, while individual attempts have gradually accumulated, and social anxiety for a good relationship between S&T and society is growing. The year 2004 may become a turning point.

The Cabinet Office carried out an opinion poll titled ‘S&T and Society’ in February 2004. While polls regarding S&T have been repeated at intervals of about five years, it is the first opinion poll with this title, ‘S&T and Society’. Among the results, many people paid attention to a question, in which 80 percent of respondents answered that S&T should realize well-being in terms of not only material but also spiritual aspects in the future. Social demands for S&T are changing.

MEXT launched a small program to promote ELSI activities to investigate the social impacts of biotechnology and/or nanotechnology, as a part of the existing funding system in this fiscal year. The program is a ‘call for tender’ type. However, because of limitations of budget, only one or two proposals will be accepted. Even so, this is an epoch-making event for Japanese society.

It is remarkable that the white paper on S&T in this year is to describe TA, something that we have not seen for 30 years. The special topic of the white paper will be ‘Science, Technology, and Society’, which is considered as a reflection of a new and worldwide trend in S&T policy such as the shift from “S&T for their own sake” to “S&T in/for Society”. The white paper will introduce not only TA but also ELSI and S&T outreach as new concepts in Japan.

Korea has introduced ELSI programs as well as TA and Technology Foresight programs; Taiwan has introduced ELSI programs, as well. Compared with these neighbors, a specific cultural condition does not seem a reason for Japanese society not to institutionalize TA and relevant related activities. The coming issue of the white paper will probably open discussions about a re-introduction of TA. Even if formal TA programs are not realized, individual attempts related to TA will be examined. This white paper is to be issued in June.

Unfortunately, CTS was suddenly shut down at the end of April 2004. I was in charge as the director of CTS, and had difficulties with such kinds of activities carried out within science and engineering research organizations. It will not be easy for Japanese society to adopt TA again. However, the climate is changing.

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