

Activities without Institutionalization: Limits and Lessons of TA and TA-like Activities in Japan

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Abstract– Even though the TA has not been institutionalized in Japan, there have been many TA and TA-like activities, in areas including food, healthcare, energy and technology strategy, since the idea of TA was introduced from the US. This paper analyzes the nature and limits of those TA and TA-like activities; and the lessons for institutionalization of TA in the context of Japan are discussed, including the need for flexible framing and collaboration, the importance of appropriate distance, and the role of the Diet..

I. INTRODUCTION*

Even though the TA (technology assessment) has not been institutionalized in Japan, there have been many TA and TA-like activities since the end of 1960's when the idea of TA was introduced from the US. TA is practice which supports problem-definition or decision making for the development and utilization of technologies by anticipating the various social impacts of technologies and technology related measures. When the scope of the range of social impacts considered is limited to specific aspects or the practice is not labeled as TA, those practices are called TA-like activities. Those TA and TA-like activities were interesting; but because of the lack of institutionalization, those attempts were not necessarily effective. Institutionalization of TA means the formal establishment and legitimization of TA activities in the institutional structure of government and society. In this paper, we analyze the contents of those TA and TA-like activities and explore the limits and the lessons of those activities. This analysis will be useful when the institutionalization of TA is attempted in the context of Japan.

In November 1969, a mission from the Japan Techno-Economics Society (JATES) visited the US and brought back a novel term TA. After the mission came back, the Eight-Members Committee was organized in 1970; and they placed TA on the agenda, explaining that the reconsideration of the development of science and technology was a top priority to solve urgent problems such as global environmental issues. As pollution and energy-saving were the most urgent issues to be solved at that time, they defined TA as “conducting check and regulation repetitively in the development and application of technology” [1].

After that, various attempts were undertaken by

* This study is based on the project “Innovation and Institutionalization of Technology Assessment in Japan: Dealing with Nanotechnologies” (2007-11) sponsored by the Research Institute for Science and Technology for Society (RISTEX). The authors gratefully acknowledge their support.

government organizations and non-governmental actors. Those are analyzed in the following chapters. Chapter 2 focuses on TA activities, chapter 3 focuses on TA-like activities, and chapter 4 will discuss the limits of those TA and TA-like activities and the lessons for institutionalization of TA in the context of Japan.

II. ATTEMPTS OF TA IN JAPAN

A. STA – Attempts for Methodological Development

The Planning Bureau of the Science and Technology Agency (STA) began to research on TA in 1970 and mentioned about TA in 1970 White Paper published in April 1971. Science and Technology Council (Recommendation No. 5) also emphasized the importance of TA as an instrument of science and technology for human welfare [2]. The 1973 Science and Technology White Paper stated, “TA...seeks to examine and evaluate technology from many aspects beforehand, including its benefits and undesirable impacts, the technological as well as economic potential, and the society's viewpoint.” This text clearly indicates wider social impacts TA will focus [3].

In addition to abstract discussion, the Planning Bureau established in April 1971 an expert committee and started case studies of TA to develop methodologies of TA. Concrete areas chosen were pesticide, high-rise building and computer aided intelligence. The case study on agricultural chemicals was one of three studies launched [4] [5]. An interesting aspect of this case is the breadth of the analysis, which encompasses the impacts of the technology on society, culture, and even minds and lifestyles of people. For example, it gives labor-saving effects of agricultural chemicals as a negative impact of agricultural chemicals on farmers. It argues that this would lead to the exodus of young workers leaving the area, thus breaking up families and creating problems for the regional community. On the other hand, as for the positive impact for the society, it lists the reduction of infectious diseases and the creation of surplus labor. In the category of culture, the negative impact on farmers includes a decline in the traditional farm village arts and the decline of the farm village environment.

As an analysis this TA on pesticide has broader focus on various social aspects and interesting. But this was the case study for the development of the methodology and experimental feedback to the decision making or the agenda setting on agriculture was not observed.

The STA also experimented TA methods in the policy

areas under the STA jurisdiction in 1973. But the Planning Bureau was fearful of the resistance from bureaus in charge of specific area such as nuclear policy and space policy. So the five bureaus in the STA independently conducted TA in 1973. TA became as a tool to perform accountability for the individual bureaus' own projects from narrow focus. One in the Planning Bureau admits that there was no serious mood in the bureau because of the missing link between TA exercises and policymaking [1].

As those in the bureau realized the limitation of such sectional TA activities, an official once lobbied for the establishment of a parliamentary TA organization like the US Office of Technology Assessment (OTA). The official lobbied some Diet members during 1977-78, but these members had never in mind that the Diet undertakes TA activities. Following the members' little interest, the Research Bureau in the Diet became intimidated. The failure of lobbying resulted in the abandonment of the institutionalization of TA and the withdrawal of the TA case studies in the STA [6].

B. MITI – Experimental Uses of TA in R&D

MITI launched an in-house TA study group in May 1971 and also started with a TA case study of nuclear steelmaking. At the same time, a MITI's Advisory Committee for Industrial Structure reported that "it is necessary to place TA in the total system in the industrial policy". In March 1973, MITI informed that they would conduct TA on their concerned R&D projects as many as possible. MITI had a will to use TA in the administration of R&D projects.

One of the interesting attempts is the TA related to the Sunshine Project. The MITI contracted institutions for TA on solar energy technologies, geothermal energy development and utilization technologies, technologies for the gasification and the liquefaction of coal, and hydrogen energy technologies, and conducted studies for three years beginning in fiscal year 1974, the year the Sunshine Project was initiated. TAs of solar energy technologies were conducted by the Japan Research Institute [7]. Through TA activities, the members pointed out that, if the objective of promoting the use of solar energy was to respond to the depletion of resources and environmental protection, the energy efficiency should be in the scope of the project. This included the "insulation of buildings", reduction of electricity use, and the containment of transport losses for solar power generation plants. They also claimed that the Sunshine Project only considered seed sides such as air conditioning, etc., using solar energy, and raised the issue that there were no themes such as the R&D of houses that do not need air conditioning devices [8].

In this case, through the practice of TA, important elements for the implementation of the project, that is, link with energy efficiency measures, needs of the users rather than the seeds of technologies were identified. But as no feedback mechanism was established at that time, the TA report which was interesting as an analysis was not used effectively.

C. MAFF and Hokkaido Government – Consensus

Conferences on GM

Around 2000 in Japan, public concern over food safety arose as a variety issues associated with food emerged. The handling of BSE, in particular, incurred public distrust of governments. At that time, participatory TA, such as the consensus conference developed by Denmark, drew interest as a tool for improving communication. Using Danish practice as a model, consensus conferences were held for GM foods at national and local levels in Japan.

At the national level, the Society for Techno-innovation in Agriculture, Forestry, and Fisheries (STAFF) under the MAFF (Ministry of Agriculture, Forest and Fishery) held the first consensus conference on GM crops by a public organization in 2000. This was conducted by STAFF under the project of "Research Responding to the Citizen's Proposal." The purpose was to obtain people's concerns and suggestions through the consensus conference and promote the necessary research.

The final report, produced by the consensus conference, addressed the following nine issues: (1) GM technology; (2) the benefits of GM technology to society (amount of agricultural chemicals used, food crisis measures); (3) environmental effects of GM crops (hybridization, effects on the ecosystem); (4) impact of GM foods on health; (5) systems and mechanisms for GM crops; (6) labeling; (7) Japan's agro-industry (the role of GM in Japan's agro-industry, self-sufficiency rate); (8) international relations (world food supply, economic gap between developed and developing nations); (9) information provided by the government. The STAFF presented the result to the MAFF and the Ministry of Health, Labor and Welfare (MHLW). Following the inputs, the monitoring research program of GM crops was introduced in 2001.

One of the interesting aspects of this attempt is that the consensus conference was conducted under the project of "Research Responding to the Citizen's Proposal". And based on the outputs of it, concrete research program on monitoring was undertaken. In that sense, it can be said that this attempt of the consensus conference was partially institutionalized. But compared to the wideness of perspectives presented in the final report including benefits, environmental impacts, health impacts, industrial structure and international relations, the scope of social impacts which can be dealt with under the institutional framework was very limited.

Another interesting case of participatory TA on GM is the Consensus Conference by the Hokkaido Government Office. With the proposed review of the ordinance regarding GM in Hokkaido (an ordinance preventing cross-cultivation involving the growing of GM crops in open environment), the purpose of the consensus conference was to gain an understanding of the general public opinion and reflect the discussion on the topic in the review process.

The following issues were voiced in the final report: (1) From a safety assurance viewpoint: (a) the safety of the crops as food; (b) labeling; (c) the effects on environment; (d) bioethical issues, uncertainty and sustainability of the practice, technological development; (e) future disclosure of

information on GM crops; (f) safety testing to be carried out by an independent organization; (2). From a consumer and producer viewpoint: (a) the advantages and disadvantages for consumers; (b) the advantages and disadvantages for producers (such labor reduction and competitiveness toward imports); (c) GM crops from an economic perspective; (3) The meaning of cultivation of GM crops for agriculture in Hokkaido. With Regard to the use of the final report, “although it is not strongly linked, this consensus conference is the first conference whose output was formally connected with the decision making of local governing bodies in Japan” [9].

One of the important issues emerged from these cases is the issue of “appropriate distance”, that is, the issue of to what degree the conclusions of the consensus conference should be linked to policy making. In the case of the STAFF consensus conference, the MAFF, who was taking a risk by funding a study with no clear outcome known in advance, wanted to avoid incidences of policies being restricted by the results of the conference [10]. It has been pointed out that “As it was a part of an openly recruited program on GM by the MAFF, and it was planned that the conclusion from the citizen panel would also be used as a research topic within this program, it was confined to this project, but this made it simple to organize” [11]. To carry out consensus conference as part of the project for research was probably the reason it was possible to carry it out. In this context, the Hokkaido consensus conference, which had an explicit link to policy, is different. The Hokkaido consensus conference had the possibility of having an influence in the policy making process. On the other hand, there can be a possibility that range of social impacts would be narrowed down because of the direct link to policy making.

III. EXPERIENCES OF TA-LIKE ACTIVITIES

A. *Science and Technology Policy Analysis by NGO*

In October 1966, executives in companies such as Toshiba and NEC established the Japan Techno-Economics Society (JATES). The aim is to improve communications between experts in science, technology and economy from industry, university and government, and to examine issues on science, technology and economy. JATES soon launched forecasting and planning research groups: FROG (Future Research Operational Group) in 1968. Through these exercises it was recognized in JATES about the need to establish a permanent research organization.

As mentioned in chapter 1, in October 1969, JATES sent a mission to the US. After coming back to Japan, the research group proposed to set up think-tanks for forecasting and planning research. JATES first planned to establish a think-tank therein, but Noboru Shinohara, administrative vice minister in the STA, took an initiative to establish a research organization independent from JATES. Shigeru Yonezawa, Governor of Nippon Telegraph and Telephone Public Corporation (NTTPC; now NTT) promised to offer financial and human resources.

Finally IFTECH (The Institute for Future Technology)

was established as an incorporated foundation in February 1971, based on the activities of FROG of JATES. The basic fund was contributed by Toshiba, Hitachi and NEC. The initial target for the contribution was 300 million yen, but the 1973 oil shock made it difficult to achieve the target. As a consequence, IFTECH had to undertake sponsored research from the outset and it has never been a non-profit and independent organization in a strict sense [12].

IFTECH was not an organization devoted to TA activities, rather an organization working on technology foresight. But the activities of IFTECH also incorporated social dimensions of technologies. One of the initial fundamental research themes was the basic design of Japanese-style science and technology development system. IFTECH also involved in the Delphi studies which have been undertaken almost every 5 years by STA, especially in the fourth and fifth rounds. The STA commissioned IFTECH to carry out the study. IFTECH had leeway to internally hold frank discussion.

B. *Risk Management on Food s*

The risk-analysis in food safety policy consists of three elements: risk assessment, risk management, and risk communication. The Food Safety Commission (FSC) has been designated as the organization responsible for risk assessment, while MHLW and MAFF have been designated as the organizations responsible for risk management. At every stage of the process, risk communication is the obligation of the organizations responsible for both risk management and risk assessment.

Accordingly, as regards the scientific safety assessment of food, assessments of the health effects are routinely carried out by experts on the FSC’s expert panels. Risk management measures are carried out on the basis of an overall judgment encompassing various elements such as economic considerations (cost-effectiveness), social considerations, and political considerations. Under the framework of risk analysis, factors other than scientific safety impacts that should be taken into consideration in terms of risk management are termed “Other Legitimate Factors (OLF)”. Specifically, economic, social, ethical, and cultural factors can be considered to fall within the remits of OLF. However, there is no explicit debate on evaluating these factors.

In this area, the practice of risk communication is also emphasized. The framework stipulates the importance of interaction between the stakeholders and a multiplicity of views. However, it features a greater emphasis on information disclosure and persuasion than on mutual interaction. In a 2006 report entitled “Towards Better Risk Communication on Food Safety,” the FSC referred to participatory TA (involving consensus conferences, focus groups) as one of the means for resolving this problem; however, this has yet to be realized.

C. *Assessment in the Medical Costs Reimbursement System*

MMW (Ministry of Health and Welfare) used the phrase “medical technology assessment (MTA)” in its 1990 White Paper, saying “future challenges for research into science and technology in the health sector include the establishment of

medical technology assessment that scientifically assesses the best approach to clinical applications of rapidly developing medical technology.” The white paper goes on to explain the term “MTA” as follows: “a comprehensive assessment of medical technology and devices that includes not only their effectiveness and safety but also aspects such as economic efficiency, ethics, etc” [13]. But, partly because of the opposition from Japan Medical Association, HTA was never institutionalized.

On the other hand, there are three levels of TA like activities relating to health care services. First level is an examination of the impact on the human body, including a drug toxicity assessment which is built into the system as the precondition for the introduction of the technology. Second level is an economic and other assessment of the medical technology, which is concluded in the framework of the medical costs reimbursement system. Third level is bioethical considerations, which are deliberated at the Council for Science and Technology Policy and the Diet.

Among them, assessment in medical costs reimbursement system is undertaken by the Central Social Insurance Medical Council (CSIMC), which is an advisory body to the MHLW. The Health Technology Assessment Subcommittee comprised of experts under the CSIMC specializes in it. The written health technology assessment proposals are required to include the following assessment items: (1) effectiveness, (2) safety, (3) ease of dissemination, (4) the maturity of the technology, (5) morality and social validity, (6) forecast impact on medical expenses, (7) the category of medical costs reimbursement which is thought to be reasonable, and (8) comparison with alternative technologies already covered by insurance. However, it has been pointed out that there are unclear points about the criteria for insurance coverage of drugs.

D. Assessment of Nuclear Energy

The Agency for Natural Resources and Energy of the Ministry of Economy, Trade and Industry (METI) is in charge of energy policy. Because of the multi dimensions of the social implications of energy such as energy security, environment and economy, it has to undertake TA like activities incorporating social dimensions, using arena of Advisory Council for Natural Resources and Energy. Among the various energy sources, nuclear energy has wider social implications including safety and security, and it has to be treated with special care.

The Atomic Energy Commission (AEC) also undertakes TA like activities. For example, the Technical Subcommittee of the New Nuclear Policy-planning Committee of AEC committee considered four options for the handling of spent fuels with regard to the future development of nuclear fuel cycles in 2004: (1) Reprocessing after a certain period of time in storage; (2) Used fuels are reprocessed, but those that exceed the capacity for reprocessing are directly disposed of; (3) Direct disposal; (4) The used fuel is stored in the short term, and then one of the options of reprocessing or direct disposal is chosen. There were ten assessment criteria:

ensuring safety, energy security, environmental suitability, economics, nuclear non-proliferation, technological feasibility, social acceptance, ensuring options, challenges that accompany policy changes, and overseas trends. The subcommittee concluded that the current path of reprocessing cannot be described as economic if the costs that accompany policy changes are not considered, but it has accumulated social assets, and is beneficial in its aspects of energy security, environmental suitability, and securing options. This resulted in the renewed confirmation of the reprocessing path. It was innovative in that it analyzed multiple policy options using multiple standard assessments. But the weighting of multiple criteria was not clear and transparent.

In addition, general research organizations not limited to the energy policy also undertake TA activities related to nuclear energy. Activities of NIRA (National Institute for Research Advancement), a government wide think tank, in late 1970's is interesting because of the wideness of issues dealt with. The research took the stance of promoting the development of nuclear power, but there was regret about the past in which nuclear development plans were drawn up based on optimistic assumptions. “Based on deep regret about the past and a strict understanding of the reality of the current situation, it is necessary to clarify the various factors affecting nuclear power and the various obstructive factors, and implement the necessary policies effectively based on appropriate predictions of the future” [14]. In April 1974 the Atomic Energy Society of Japan (AESJ) established the Nuclear Power Systems Investigation Special Research Committee. In parallel with this, in April 1975, the Nuclear Power Systems Research Committee was established within the NIRA. In fact the two committees were held simultaneously. The Nuclear Power Systems Research Committee was composed of experts from universities, public and private research institutions, corporations, industry, and government organizations. It created a report entitled “Analyses and Assessments of Nuclear Power Systems” with an a chapter about the light-water reactor and reprocessing issues, which were important challenges for the consolidation of nuclear power in Japan. It discusses not only technological aspects but also a wide range of other aspects including nuclear power development, natural restrictions of reprocessing and waste disposal, environment and safety, and social acceptance.

The Nuclear Power Long-Term Strategies Committee, with key figures from MITI, was established in April 1977 as a continuation of the Nuclear Power Systems Research Committee. It conducted in-depth studies of the various problems of nuclear power development and use, and proposed policies for the future from a long-term perspective [15]. This exercise is interesting in that wider social aspects were included in the assessment and the result were used strategically by MITI to reorient policy concerning light water reactor and reprocessing.

E. International Technology Strategy by the Diet Members

When a STA official lobbied the Diet members for the

establishment of parliamentary TA organization in 1970's, they did not have interests in TA activities. But the situation had changed in the late 1980's. In 1987, a friction between Japan and the United States took place concerning the revision of the "Agreement between the Japan and the US on Co-operation in Research and Development in Science and Technology". As Japanese key actors became seriously aware of the importance of national strategies in science and technology, the necessity of TA came to the fore. The Diet members and several key stakeholders including Jiro Kondo (SCJ) and Moriya Uchida (Teijin Ltd.), set up the Study Group on International Technology Strategy in November 1988.

Parliamentary interests in strategic implication in science and technology continued. In June 1994, Taro Nakayama and Tatsuro Matsumae set up the Science and Technology and Policy Association involving around 150 bipartisan Diet members. The association attempted to submit a bill for the establishment of a parliamentary TA organization in 1995 and 1997. After several meetings, the association finally dissolved in 2002 without the legislation of a parliamentary TA [1].

Bipartisan group played very important role for the establishment of Science and Technology Basic Law in 1995. But the importance of parliamentary TA seemed to be weaker compared to the importance of Science and Technology Basic Law in the bargain between politicians and bureaucrats.

IV. DISCUSSION

In this final chapter, we would like to analyze the nature and problems of TA and TA like activities in Japan, then, draw lessons for the future design of institutionalization of TA in Japan.

First, there are varieties of TA like activities in Japan. But except the case of NIRA on nuclear energy, the perspectives of those activities were limited. For example, risk analysis of food can not deal with cultural issue, medical assessment relating to medical reimbursement focuses on economic aspects, and energy assessment can not deal with lifestyle issues which are closely connected to the energy uses.

Even when multiple criteria is used, implementation is unclear. In the case of food, even though economic, social, ethical, and cultural factors can be considered as OLF, how those factors are incorporated is not clear. In the case of health, effectiveness, safety, dissemination, maturity, morality and social validity are identified as factors in addition to impact on medical expenses, there is no explicit debate on evaluating these additional factors. In the case of reassessment of nuclear fuel cycle by the AEC, ten assessment standards such as ensuring safety, energy security, environmental suitability, economics, nuclear non-proliferation, technological feasibility, social acceptance, ensuring options, challenges that accompany policy changes, and overseas trends are identified, ambiguous factor such as accumulated social assets was emphasized at the final report.

In addition, there were interesting attempts at non-governmental level such as JATES and IFTEC supported

by business community. But because of lack of enough basic funding, they had to rely on sponsored research which decreased their independence concerning framing of work.

Second, one of the problems of TA activities in Japan is the limited effectiveness. Except the Hokkaido GM consensus conference, the result of TA was not feed back to the policy process. In the case of TA of solar energy by MITI, even though the issues of related energy saving measures such as insulation of houses and need for paying attention to the demand side of technology were identified by the TA, those concerns were not feed backed. One of the reasons for ineffective feedback is that channels of feedback are narrowly conceived. More boarder ways of communicating the TA results for purposes such as issues identification and agenda setting should be pursuit.

Third, the role of Diet has been limited. Compared to the end of 1970's, Diet member became active on national strategy since the late 1980's, but the idea of parliamentary TA was never materialized. But bipartisan group played important role for establishment of Science and Technology Basic Law in 1995s and the legislation of Ocean Basic Law and Space Basic Law recently which incorporated science and technology strategy in each area.

Then based on those experiences, what lessons can we learn for the institutionalization of TA in Japan?

First, there is a need for flexible framing. It is difficult to operate comprehensive framing of technology thinking about the costs. But thinking about relatively fixed framing of existing TA like activities, function of flexible framing need to be embedded somewhere in government or society. But on the other hand, all the TA activities need not to be necessarily undertaken by new organization. There have to be complementarity and collaboration among organizations in charge of TA and TA like activities including focused activities such as HTA.

Among various possible components, non-governmental initiatives might be interesting to broaden the scope of perspectives. But thinking about the history of IFTEC, it is necessary to have stable public funding to support these activities.

Second, there is a need for feedback of the result of TA activities including feedback for agenda setting and inter organizational networking/ communication as instruments for that. But on the other hand, we need to think about "appropriate distance." If the distance is close, there is high possibility for feedback. On the other hand, there is a danger of constraints on flexible framing. The consensus conference by STAFF was the case where official link to decision was limited to R&D decisions responding to citizen's need to keep flexibility of discussion. The NIRA program on nuclear energy was the case where ad hoc mechanism (outside the traditional energy policy community) was used to keep flexibility.

Third, there might be need for some role for parliamentary TA. The function of flexible framing dose not have to be undertaken by the Diet. It can be done by "independent" organization if it has enough social trust and

capability. On the other hand, thinking about the recent trend in politics which emphasize the increasing role of politics against administration, changing reality of politics in Japan (divided government situation and possibility of government change) and more objective needs for international technology strategy under the present globalization, there is a need and possibility of institutionalization of some form of parliamentary TA.

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