

Research Material No.196

**International Comparison of the Public Attitudes towards and Understanding
of Science and Technology**

**—Comparative Study of Internet Survey in Japan, the United States of
America, and the United Kingdom—**

(Summary)

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1 Objective

The objective of this study was to obtain suggestions regarding the prospective form of science and technology communication activities in Japan in the future by conducting a comparative study of public attitudes towards and understanding of science and technology in Japan, the United States of America (U.S.A.), and the United Kingdom (U.K.).

2. Methodology and Content

(1) Methodology

The study was carried out by sending email survey requests to monitors registered with internet research companies, and by having the respondents access survey screens as posted on the internet by the research companies.

(2) Survey items

- Level of interest, frequency of conversations, and level of knowledge of issues including science and technology
- Frequency of use of information media, public facilities, etc.
- Level of understanding of basic concepts of science and technology
- Image of science and technology
- Methods of acquiring information on science and technology and satisfaction of users of those methods
- Positive/negative attitudes toward science, motivation for educational advancement/employment, etc.

(3) Period of survey

Japan	eight days, from February 27 (Friday) to March 6 (Friday), 2009
U.S.A.	10 days, from February 27 (Friday) to March 8 (Monday), 2009
U.K.	10 days, from February 27 (Friday) to March 8 (Monday), 2009

(4) Number of object monitors

Japan	155,365 persons
U.S.A.	1,437,662 persons
U.K.	195,005 persons

Note: These numbers indicate the number of monitors registered with the research companies at the start of the survey.

(5) Number of valid responses

(Unit: person)

Age	Japan		U.S.A.		U.K.	
	Male	Female	Male	Female	Male	Female
20-29	148	166	168	159	147	147
30-39	194	206	169	167	177	180
40-49	194	155	180	184	163	166
50-59	233	335	142	149	147	150
60-69	251	309	86	96	108	115
Total	1,020	1,171	745	755	742	758
	2,191		1,500		1,500	

3 Previous Studies of Public Attitudes towards Science and Technology in Japan

The Survey of Public Attitudes Towards Science and Technology in Japan (Public Opinion Poll) has been carried out by the Public Relations Office, Minister's Secretariat, Cabinet Office, Government of Japan at intervals of several years since 1960. The most recent surveys in this series were the "Public Opinion Poll on Science and Technology and Society" conducted in December 2007 and January 2010 (Table 1).

However, the surveys carried out by the Cabinet Office were domestically-oriented studies and did not have questions intended for an international comparison.

The National Institute of Science and Technology Policy (NISTEP) conducted Surveys of Public Attitudes Towards and Understanding of Science and Technology in November 1991 and March 2001 by a visit/interview method, using a questionnaire coordinated with questions used in surveys of public attitudes in the United States and European countries (Table 2).

Subsequently, NISTEP carried out questionnaire surveys of monitors registered with internet research companies (hereinafter referred to as "internet survey") in February 2007 and March 2009 (the present comparative survey) using the same questions as in the survey conducted in 2001.

Table 1 Previous Surveys of Public Opinion Poll on Science and Technology in Japan

Survey	Date of survey	No. of valid responses (n)
Public Opinion Poll on Science and Technology	June 1960	2,506
Public Opinion Poll on Science and Technology	December 1962	2,349
Public Opinion Poll on Level of Science and Technology	February 1963	2,425
Opinion Poll of Young People on Science and Technology	December 1965	2,254
Public Opinion Poll on Science and Technology and Nuclear Power	October 1976	3,972
Public Opinion Poll on Science and Technology	December 1981	2,368
Public Opinion Poll on Interest in Science and Technology	February 1986	2,376
Public Opinion Poll on Science and Technology and Society	March 1987	2,334
Public Opinion Poll on Science and Technology and Society	January 1990	2,239
Public Opinion Poll on Science and Technology and Society	February 1995	2,045
Public Opinion Poll on Future Science and Technology	October 1998	2,115
Public Opinion Poll on Science and Technology and Society	February 2004	2,084
Public Opinion Poll on Science and Technology and Society	December 2007	1,667
Public Opinion Poll on Science and Technology and Society	January 2010	1,916

Note: The above are surveys conducted by the Cabinet Office, Government of Japan. In all cases, the surveys were carried out by the visit and interview method by survey personnel.

Table 2 Internationally Compatible Surveys of Public Attitudes Towards Science and Technology Conducted in Japan

Survey	Date of survey	Survey method	No. of valid responses (n)
International Comparison of the Public Attitudes towards and Understanding of Science and Technology in Japan, the United States of America, and the European countries (Report of Survey Research on Grants-in-Aid for Science and Technology for FY1990-1991)	November 1991	Visit/interview	1,457
The 2001 Survey for Public Attitudes Towards and Understanding of Science and Technology in Japan [NISTEP REPORT No.72]	March 2001	Visit/interview	2,146
An Attempt of Internet-Survey on Public Attitudes towards Science and Technology [DISCUSSION PAPER No.45]	February 2007	Internet	2,868
International Comparison of the Public Attitudes towards and Understanding of Science and Technology —Comparative Study of Internet Survey in Japan, the United States of America, and the United Kingdom— (Discussion Paper No. 45)	March 2009	Internet	2,191(Japan) 1,500 (U.S.A.) 1,500 (U.K.)

Notes: 1) All of the four above-mentioned surveys were conducted by National Institute of Science and Technology Policy (NISTEP).

2) In the surveys conducted in 2007 and 2009, the same questions as in the 2001 survey were used.

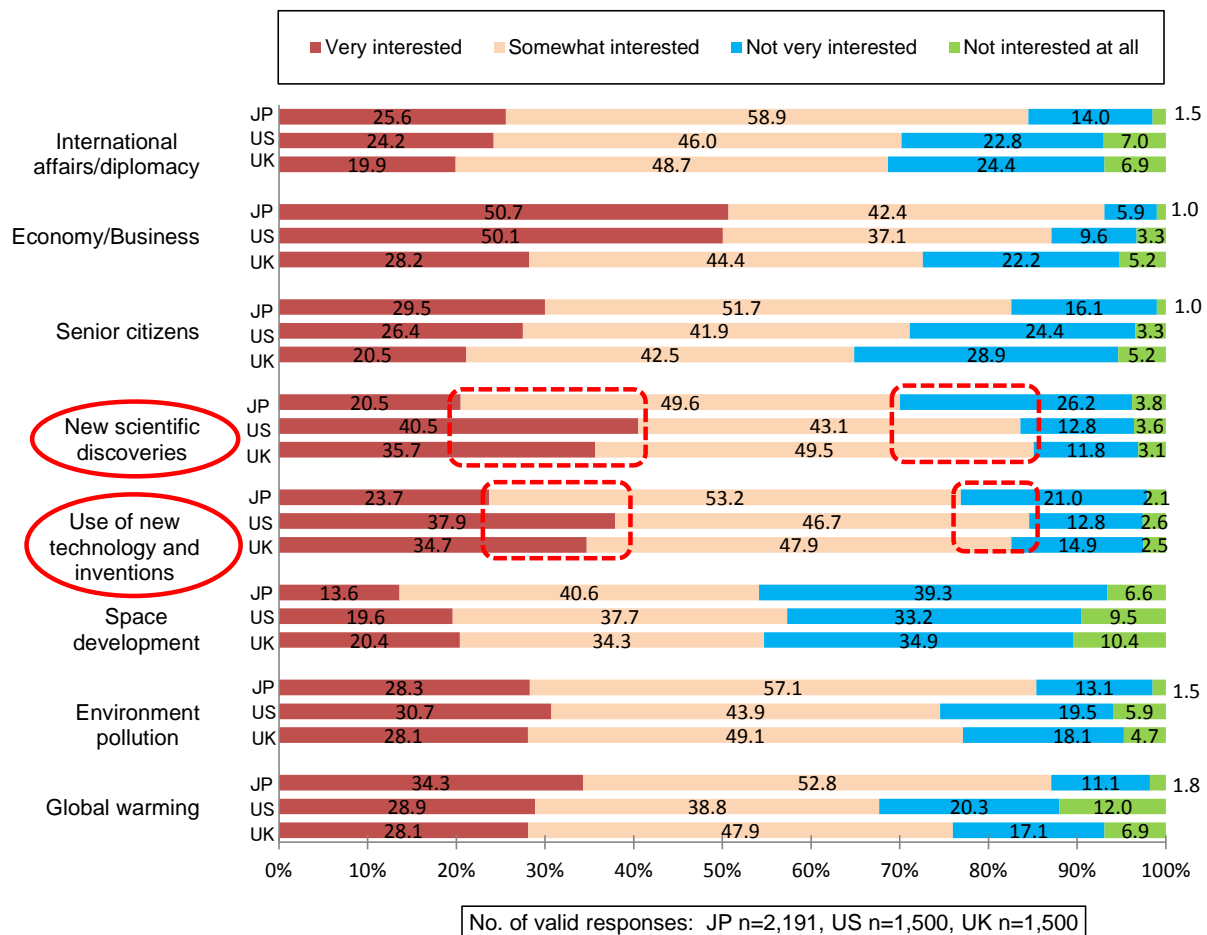
3) The survey conducted in 2009 was carried out by NISTEP in all 3 countries (Japan, U.S.A., U.K.)

4 Main Results of Survey

(1) Level of interest in various social issues

- In Japan, the level of interest in certain social issues such as “International affairs/diplomacy,” “Economy/business,” and “Senior citizens” is higher than in the U.S.A. and U.K. On the other hand, the level of interest in “New scientific discoveries” and “Use of new technology and inventions” is lower in Japan than in the U.S.A. and U.K. (Figure 1).
- The percentage of persons responding “Very interested” in “New scientific discoveries” was 40.5% in the U.S.A. and 35.7% in the U.K. In contrast, the level of interest in Japan was only 20.5%, or approximately half that in the U.S.A. Furthermore, in Japan, the total of “Very interested” and “Somewhat interested” was 70.1%, which was more than 10 points lower than in the U.S.A. (83.6%) and the U.K. (85.2%). Similarly, the level of interest in “Use of new technology and inventions” was also lower in Japan than in the U.S.A. and U.K. (Figure 1, areas indicated by broken lines).

Figure 1 Level of interest in various social issues



Note: In addition to the eight issues shown in this figure, the survey also included the issues “Agriculture, forestry, and fisheries,” “Education,” “Energy,” “New medical discoveries,” “Defense/security,” and “Declining birthrate.”

(2) Level of interest in science and technology-related issues

- Next, interest in a group of seven issues deeply related to science and technology was examined, for example, “New scientific discoveries,” “Use of new technology and inventions,” “Energy,” “New medical discoveries,” “Space development,” “Environment pollution,” and “Global warming.” The average scores of Japanese males in all age groups from 20s to 50s were lower than the average scores of males in the U.S.A. and U.K. in the same age groups. In particular, a large difference could be seen between Japanese males in their 20s and 30s and males in the U.K. in the same age groups (Figure 2).
- The average scores of Japanese females by age group were lower than the average scores of females in the U.S.A. and U.K. in the same age group for all age groups except U.K. females in their 50s. In particular, the low level of interest among Japanese females in their 20s and the high level of interest of females in the U.S.A. in their 40s and 50s were outstanding (Figure 3).

Figure 2 Average scores and result of statistical test for interest in 7 scientific issues (males)

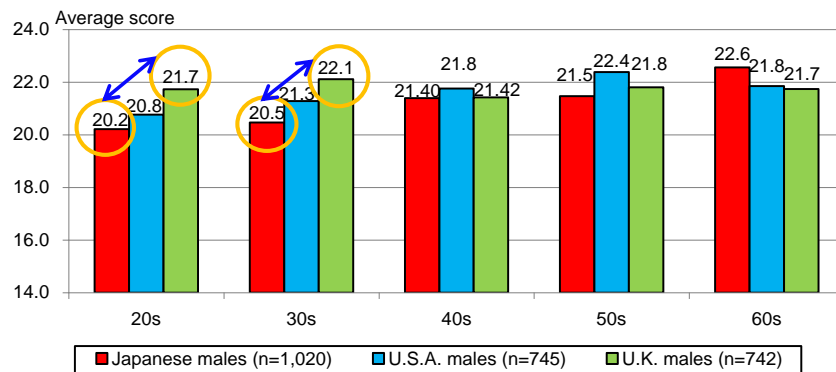
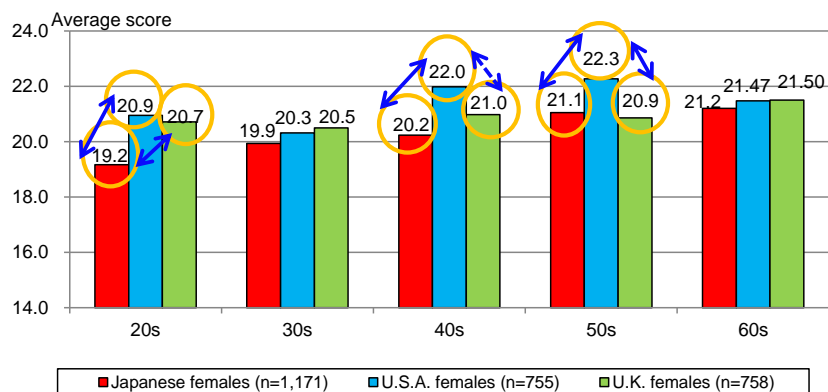


Figure 3 Average scores and result of statistical test for interest in 7 scientific issues (females)



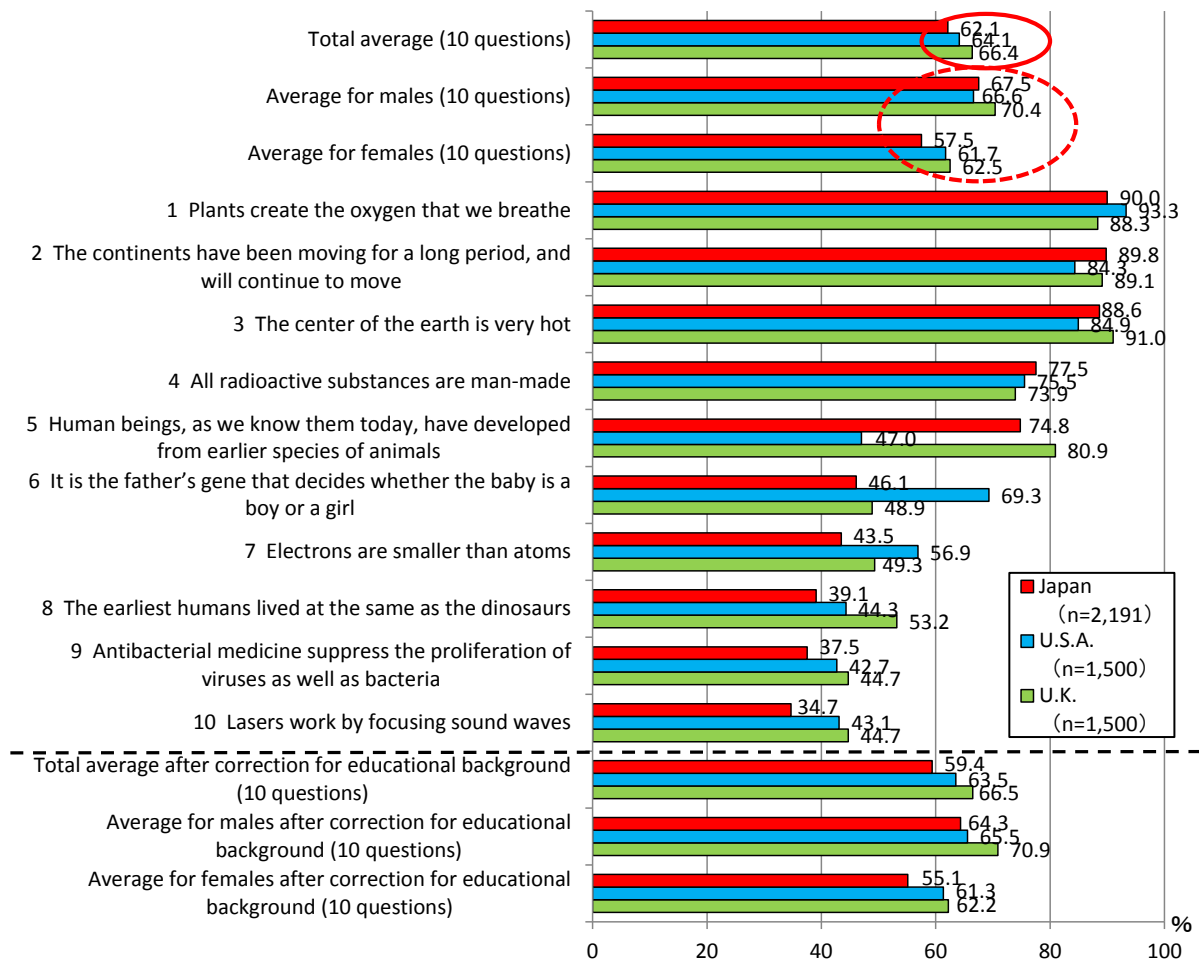
Notes:

- 1) In Figures 2 and 3, points were assigned to the level of interest in 7 science-related subjects (“Very interested” = 4 points, “Somewhat interested” = 3 points, “Not very interested” = 2 points, and “Not interested at all” = 1 point), and the average value was calculated.
- 2) In the figures, the numerical values for each country are the average values with a maximum possible score of 28 (7 items x 4 points).
- 3) A trial significance test found significant differences between the data joined by the double arrows. The solid lines and broken line indicate significance levels of 1% and 5%, respectively.

(3) Comparison of understanding of basic concepts of science and technology

- The total average correct response rate to 10 questions measuring the level of understanding of basic concepts of science and technology (level of basic knowledge of science and technology) was 66.4% for the U.K., 64.1% for the U.S.A., and 62.1% for Japan. Thus, Japan scored 2 points lower than the U.S.A. and 4 points lower than the U.K. (Figure 4, area circled by solid line).
- In a comparison of the average correct response rate by gender, Japanese males (67.5%) scored one point higher than males in the U.S.A. (66.6%) but three points lower than males in the U.K. (70.4%). On the other hand, the average correct response rate for Japanese females was 57.5%, which was four points lower than females in the U.S.A. (61.7%) and five points lower than females in the U.K. (62.5%) (Figure 6, area circled by broken line).

Figure 4 Comparison of average correct response rates for level of understanding of basic concepts of science and technology in 2009 internet survey (10 common questions)

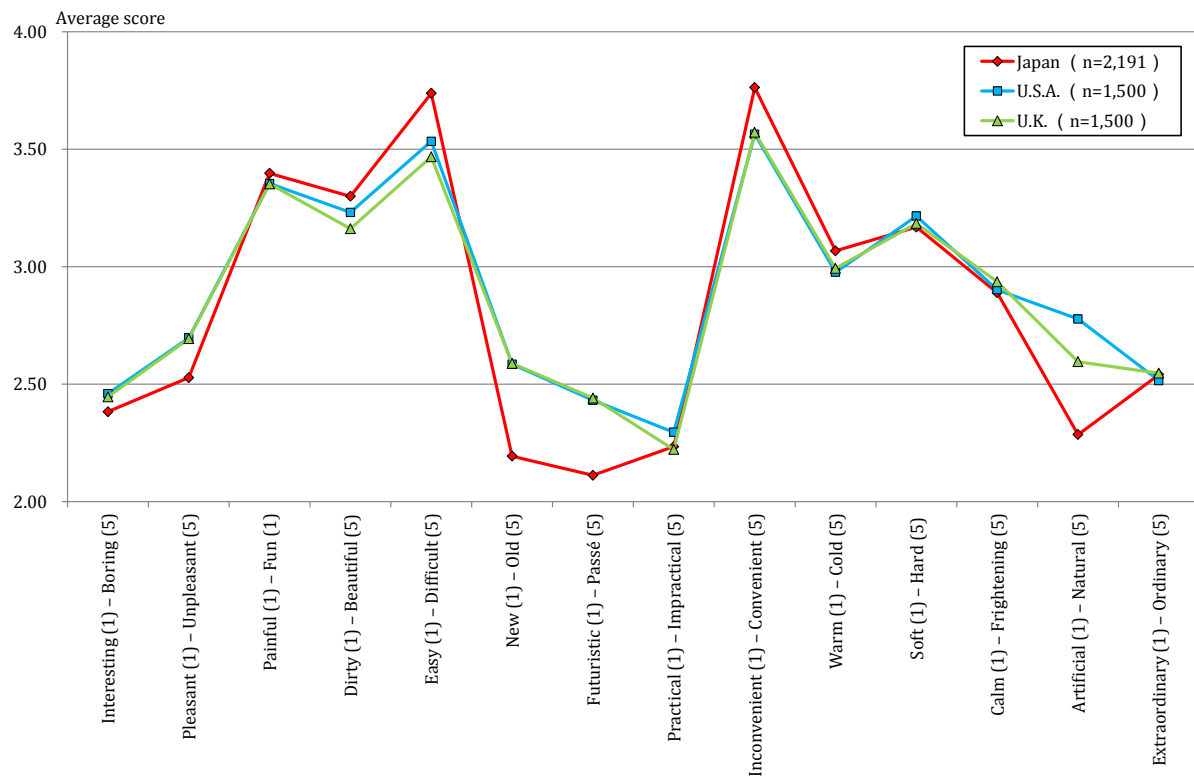


- 1) The correct answers to each question (correct statement: True (T), incorrect: False (F)) are 1-T, 2-T, 3-T, 4-F, 5-T, 6-T, 7-T, 8-F, 9-F, 10-F. The correct response rate was calculated by dividing the number of persons selecting the correct response by the total number of responses (including persons who selected "Don't know.")
- 2) In all three countries, the percentage of persons with university or postgraduate education in the total respondents in this survey was higher than the results of a statistical survey of the entire population of the country (in particular, this gap was large in the Japanese respondents). Therefore, values "after correction for educational background" are also shown for each country. These values were obtained by adjusting the percentage of educational background to agree with the results of the statistical survey of each country (for the total correct response rate and the correct response rates by gender).

(4) Image of various fields of science and technology

- The images of six fields, including “Robotics,” “Electrical engineering,” “Information technology,” “Mechanical engineering,” “Nanotechnology,” “Life sciences” were measured by the SD (Semantic Differential) technique using 14 pairs of adjectives (Figure 5). Next, a factor analysis was performed for each of the six fields, and the factors, e.g. “Advanced,” “Pleasant,” “Convenient,” etc., which formed the axis of the image of the fields were extracted.
- The results of factor analysis showed that the Japanese had stronger positive images of science as “something wonderfully advanced” than the respondents in the U.S.A. and U.K., and gave higher evaluations of science and technology as “New,” “Futuristic,” “Convenient,” etc. than the respondents in the U.S.A. and U.K. On the other hand, the Japanese also held stronger negative images of science as difficult to approach, “difficult for me, distant”, giving higher evaluations as “Difficult” and “Artificial” than the respondents in the U.S.A. and U.K.

Figure 5 Total average values of image (Semantic Differential evaluation) of various fields of science and technology



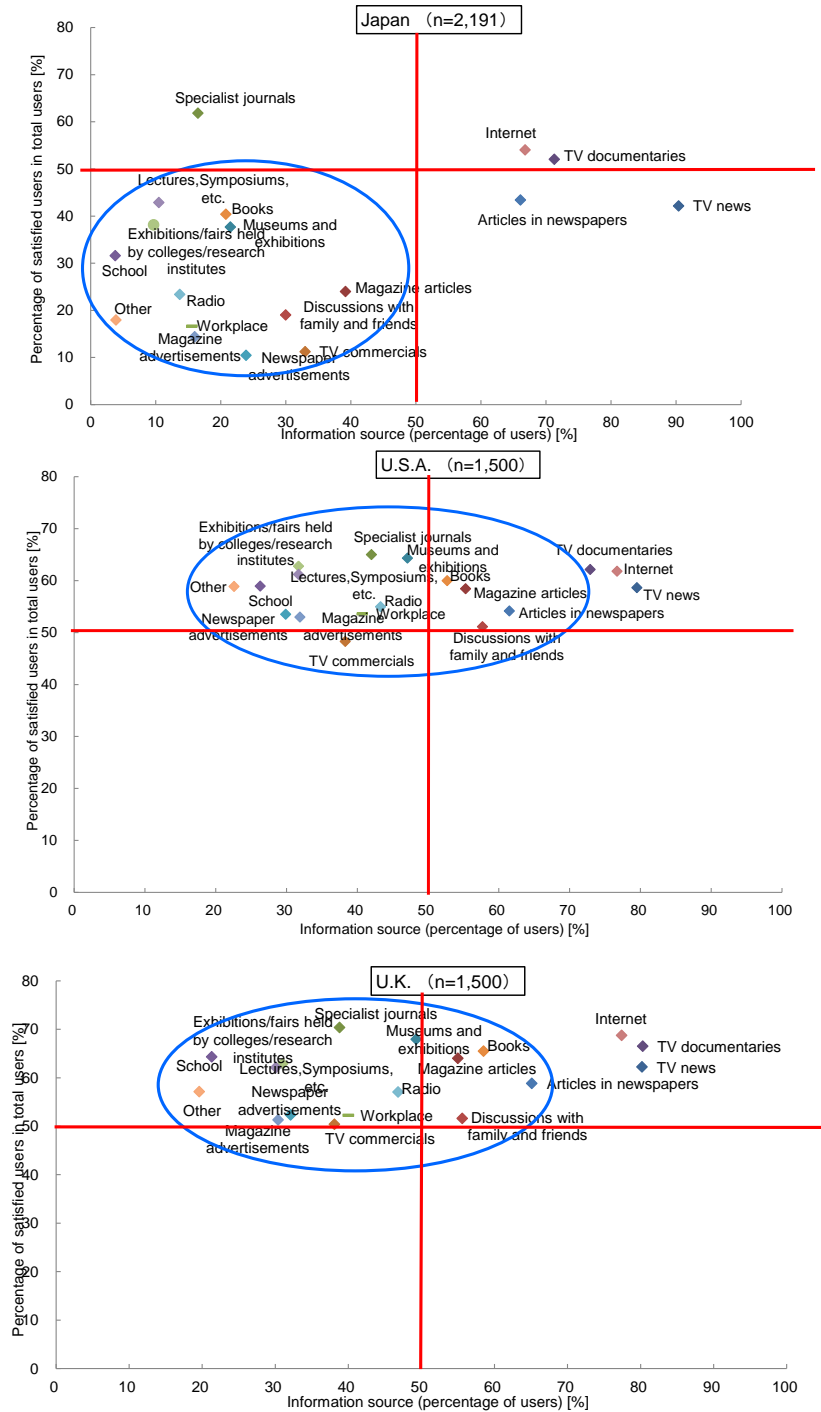
Notes:

- 1) Six fields of science and technology were used in measurements of image, such as “Robotics,” “Electrical engineering,” “Information technology,” “Mechanical engineering,” “Nanotechnology,” and “Life sciences.”
- 2) A separate analysis confirmed that the overall trends shown in this figure are also generally the same for the individual fields.

(5) Methods of acquiring information on science and technology and satisfaction of users

- In Japan, only three methods of acquiring information on science and technology had high frequencies of use, these being “Television,” “Internet,” and “Newspapers” (Figure 6, Japan).
- On the other hand, in the U.S.A. and U.K., there are diverse “Platforms for science communication” which have both high use frequency and user satisfaction. These enable conversation with friends and colleagues, participants in events, etc. and include, for example, “Workplace,” “Discussions with family and friends,” “Exhibitions/fairs held by colleges/research institutes,” etc. (Figure 6, U.S.A. and U.K.).

Figure 6 Methods of acquiring information on science and technology (percentage of users) and satisfaction of users



5 Future Issues

The results described above confirmed anew that the level of interest in science and technology in Japan is lower than in the U.S.A and U.K., and as in the past, the level of understanding of the basic concepts of science and technology (level of basic knowledge of science and technology) in Japan is also still lower than in the U.S.A. and U.K. In particular, the low level of interest among the younger generation of Japanese was a concern.

As one conceivable background reason for the lower interest/understanding of science and technology in Japan, the Japanese respondents also perceived science as a quite distant presence, although they evaluated science and technology more highly than their counterparts in the U.S.A. and U.K.. In the results of measurements of the image of various fields of science and technology, the Japanese held a positive image of science as “something wonderfully advanced” more strongly than respondents in the U.S.A. and U.K., but they also held a negative image of science and technology as “difficult and unapproachable” more strongly than their counterparts in the other countries. This suggests the necessity of efforts to make science and technology more familiar and approachable for the general public in the future.

To achieve this, it will be necessary to disseminate information effectively, by making it easy to understand and attractive that there are various results on science and technology, and how those results are useful.

Regarding the methods necessary for this kind of information dissemination, a variety of methods other than the major methods (internet, television, newspapers, etc.) are available in Japan. However, the results of this comparative study revealed that the frequency of use of other methods and the user satisfaction with those methods are both extremely low in Japan in comparison with the U.S.A. and U.K.

One feature of the U.S.A. and U.K. is that there are diverse “platforms for information communication” where people can discuss issues with friends, colleagues, participants in events, etc. These include “Workplace,” “Discussions with family and friends,” and “Exhibitions and fairs held by colleges and research institutes,” among others. The study showed that these methods of acquiring information are used more actively in the U.S.A. and U.K. than in Japan.

In future dissemination of information, it will be necessary to diversify the sources of information to have greater contact with information on science and technology by the general public, and to use ingenuity so that the content of information presents a message that makes information recipients feel that science and technology are familiar, accessible issues and wish to actively acquire information themselves.

In addition to methods by which individuals acquire information (internet, newspapers, etc.), it is also important to enrich and expand “platforms for science communication” so as to enable dialogue and exchanges of information with friends, colleagues, and participants in events.

Finally, the target audience for science and technology information is the entire population of the country. However, considering the low interest in science and technology in Japan, particularly among young people, it is important to encourage young people’s interest/concern with regard to science and technology, and to enable them to come into contact information on science and technology.