Understanding the plurality of public interests for open strategy in science and innovation

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Abstract
Public engagement may guarantee the diversity of evidence for policymaking as public opinions are qualitatively different from expert knowledge. It has been addressed in science, technology and innovation (STI) policy world-wide, but left unanswered the question of with what type of publics we need to engage. This study aims to identify new population segments that are more relevant to policy matters relating to aspects of innovation. The nation-wide face-to-face interview survey in 2013 collected 887 samples from Japanese citizens. A combinative method of factor analysis and decision tree analysis shows that only four questions are sufficient to characterise six population segments for public engagement in STI policy – ‘Discouraged’, ‘Independent Engagers’, ‘Uninterested’, ‘Empowered Sceptics’, ‘Trustful Engagers’, and ‘Interested Followers’. This segment model thus demonstrates practical feasibility, global applicability and methodological extendibility.
Introduction: public engagement as evidence for policy

Evidence-based practice or policy was first introduced in the 1990s in the medical field. This has invoked a number of attempts to evaluate effectiveness for decision makers by ordering a variety of evidences measures, such as systematic review (Young et al. 2002; Leigh 2009). However, it has been well known in policy studies since the 1970s that this kind of scientific knowledge and research is not as useful in social policy (Lipsky 1971; Nelson 1974), which has often resulted in a division between ‘two communities’ of knowledge producers and policy makers (Caplan 1979). When evidence-based activities in medicine, social welfare and education are not confined to the policy level, but spread to the practice level, on-site practitioners can be regarded as creators of a third knowledge culture (Shonkoff 2000). In creating a typology of evidence (e.g. Sebba 2004; Banks 2009) a division can be observed between scientific knowledge, political knowledge, and professional knowledge (Head 2008). However, this typology places disproportionate emphasis on rational expertise and faces challenges from real issues, such as illogical sentiments in criminal policy and social inclusion of aboriginal groups (Head 2013). In the person-centred care approach, evidence sources can include patients and clients, and be composed of local contexts and environments surrounding stakeholders (Rycroft-Malone et al. 2004). Such stakeholders and service users do not merely bring empirical knowledge as the fourth type of evidence (Gough 2007; Head 2010) – they are rather those who can provide epistemological knowledge concerning the value-laden question of ‘why we need this policy’ (Nutley, Walter & Davies 2003; Mingers 2008). While defining evidence is by itself a social act and a part of the policy process (Parsons 2002; Wesselink, Colebatch & Pearce 2014) and there are diverse perspectives among stakeholders on what evidence is trustworthy (Glasby & Beresford 2006), a reflexive act to redefine the nature of evidence would entail a more democratic process. This would be an attempt to facilitate interaction between knowledge producers and knowledge users for democratic policymaking (Torgerson 1986) under the term ‘policy sciences’ (Lasswell 1951). In short, public engagement may guarantee the diversity of evidence in the sense that public opinions are qualitatively different from expert knowledge. However, this does not mean that there is any order of evidence between experts and citizens. The process of public engagement provides a valuable opportunity to increase awareness of and develop discussions on what is evidence among stakeholders.

In Japan, over the last twenty years, the government has promoted science and technology under Science and Technology Basic Plans, which are revised every five years. The 4th Basic Plan (2011-15) provides for integrated development of science, technology and innovation (STI). As the interrelationship between science, technology and society becomes even more complex, STI policy
needs increased public understanding, public trust and public engagement to produce the public good. For this, policymakers pursue a more rational policymaking process and greater public accountability by planning and implementing evidence-based policies. Against this background, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) has promoted the ‘Science for RE-designing Science, Technology and Innovation Policy (SciREX)’ program since 2011. The SciREX program proposes a ‘rational process’ and provides ‘objective evidence’ aiming to reform STI policymaking.

In Europe, there is a significant degree of correlation between research and innovation intensity in a country and the role of society in the adoption and dissemination of scientific results (Tsipouri 2012). Accepting cluster and open-innovation policies as promising (Vigier 2007), the European Commission recently declared an open strategy in science and innovation (Moedas 2015). As one of the strategy tools, public engagement has been addressed in various phases and levels of STI policy, not only in human subject research or labour-intensive research, but also in research and innovation projects (e.g. crowd funding, citizen science), project design (e.g. science shops, user innovation), program development (e.g. advisory boards), and policy formation (e.g. technology assessment) (Hennen 2015). Yet, this trend has left unanswered the questions of how to measure and evaluate public engagement activities, and more importantly, with what type of publics we need to engage (Godin & Doré 2005; Rowe et al. 2005; Rowe et al. 2008; Bauer, Allum & Miller 2007; Neresini & Bucchi 2011).

Who are the publics?
In identifying citizen profiles for marketing research, there is a long history of segmenting the whole population into several groups (Smith 1956). Readers may find tension between marketing research for the private sector and policy studies for the public sector, but given the effectiveness of marketing research in public service, civil servants are no longer able to manage public administration without citizen input (Kotler & Lee 2007). This is concurrent with the new public management (NPM), which stresses ‘hands-on professional management, explicit standards, and measures of performance; managing by results; value for money; and, more recently, closeness to the customer’ (Rhodes 1996: 655). From the perspective of innovation studies, population segmentation enables the characterisation of people and the identification of target customers when going beyond the ‘chasm’ in innovation dissemination (Moore 2014).

Asano (2010) categorised segmentation methods into three generations. The first generation witnessed the still most popular method based on demographics, such as age, sex,
marital status, residence area, literacy/education, employment status, occupation, nationality, religion, and ethnicity. In this generation, there are already a number of surveys on public attitudes towards science and scientific literacy, such as the Science Indicators and Eurobarometers (Pardo and Calvo 2002; Nissen 2014) and the Programme for the International Assessment of Adult Competencies (PIAAC) (Sellar & Lingard 2014). However, these surveys segment the targeted population a priori without taking into account their perceptions, behaviours, and attitudes in relation to STI policy. The second generation appeared on the research scene in the 1970s, when marketing researchers realised that demographics do not successfully segment people according to their needs and values. A typical example is the Public Attitudes to Science (PAS) survey in the UK, conducted five times since 2000. These surveys cluster the British population into six distinct categories of similar attitudes to science: ‘confident engagers’, ‘distrustful engagers’, ‘late adopters’, ‘concerned’, ‘disengaged sceptics’, and ‘indifferent’ (Castell et al. 2014). Similarly, a cluster analysis of the Japanese population based on ten questions derives four distinct categories: ‘Inquisitive’, ‘sciencephiles’, ‘life-centred’, and ‘low interest’ (Kawamoto et al. 2013). Here, demographic data served as explanatory (independent) variables, and served as response (dependent) variables in these surveys. One of major limitations of this method is that it is impossible to predict with which segment a respondent will be clustered. This becomes a critical flaw when we wish to engage the public on a real-time basis in a workshop or similar situation. We are not able to segment the public participants into individual clusters and consequently identify who they are – segmentation always occurs in hindsight and is not practically usable.

The third generation of segmentation has been developed to overcome the above limitations. It combines factor analysis and decision tree analysis and enables the segmentation of respondents into one of several distinct groups according to their responses to simple questions. A study of the State of Victoria in Australia (2008) is one example of this generation. In 2007 and 2011, the state government conducted surveys on attitudes to science and technology and identified six population segments using a combination of the following three questions:

1. Can you please tell me how interested you are in science?
2. Do you actively search for information about science and/or technology?
3. When you have looked for information about science and technology in the past, have you generally been able to find what you were looking for?

A study adopting this segment model in the Japanese context demonstrates that a less-engaged
public may have different opinions and perspectives that might have never been collected through the current public comment system or other conventional engagement tools for policymaking (Kano et al. 2016). This idea is a cognate of the concept of civic epistemologies, which make no a priori assumptions about what publics should know or understand of science and asks how some knowledge claims are perceived as reliable (Jasanoff 2005).

**New segment model**

As aforementioned, Japanese STI policymakers have faced an increasing demand of public engagement for evidence-based policy. We initially assumed that policymakers might have different kinds of people in mind for public engagement – those who trust in policymakers and would like to say engage with them; those who do not trust in policymakers and would like to engage; those who neither trust nor wish to engage with policymakers (Table 1). The most important target group in our initial assumption is those who neither trust in nor speak with policymakers, but want to make a complaint.

<table>
<thead>
<tr>
<th>People …</th>
<th>make a complaint</th>
<th>do not make a complaint</th>
</tr>
</thead>
<tbody>
<tr>
<td>trust in policymakers</td>
<td>Policymakers persuade them</td>
<td>Policymakers ignore them</td>
</tr>
<tr>
<td>distrust in policymakers</td>
<td>Policymakers involve them</td>
<td>but want to:</td>
</tr>
<tr>
<td></td>
<td>(public participation)</td>
<td>Policymakers make them deliberate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(public engagement)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and do not want to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Policymakers ignore them</td>
</tr>
</tbody>
</table>

Nevertheless, the most crucial problem is, as our preliminary interviews reveal, that STI policymakers do not have a clear idea of who is the ‘public’ or how to approach them. On the other hand, most citizens have never thought about commenting to policymakers or participating in public policy.

Under these circumstances, we have recently developed a novel and tangible segment model under the ‘Framework for Broad Public Engagement in Science, Technology and Innovation Policy’ (PESTI) project funded by the Research Institute of Science and Technology for Society
(RISTEX) in Japan (Kano 2014). Under the umbrella of the SciREX program, RISTEX organises a research funding scheme to promote research and innovation projects to develop new analytical methodologies, models and indicators, which are expected to contribute to evidence-based policymaking for STI policy in the mid- to long-term. PESTI is a transdisciplinary project consisting of a wide variety of experts on science communication, science education, marketing research, science and technology policy, psychology, information science, business science, communication science, and university-industry-government links.

Our new assumption is that a person’s interest in STI does not necessarily and clearly correspond to his/her willingness to engage in STI policy. As the concept of governance proliferates, interested people may prefer other engagement options over participation in public policy. If those who are less interested in science and technology are to be engaged with STI policymaking, such policy should be based on a wide range of public needs and values and will be more democratically legitimate (Kano 2014; Maenami, Yoshizawa & Kano 2016). Our strategy is thus two-fold. One is making an achievement in public segmentation for policymaking. The other is facilitating citizens to make them consider engagement in STI governance that covers STI policy. This idea was further elaborated to integrate the idea of innovation marketing that reflects Rogers’ model (1983), because citizens are merely interested in tangible technologies and products provided by the market. Some policymakers are reluctant to use the term ‘market’ as it connotes neo-liberalistic new public management, so we deliberately discuss ‘living activity’ rather than ‘consumption behaviour’. We also wanted to relativise STI policy among all public policies, including pension policy, medical policy and national defence policy. By so doing, we have endeavoured to acquire a more general profile of respondents as citizens living in this society. This is critical, particularly when policymakers wish to approach those who are less interested in STI. From their daily activities, policymakers should find a hook to attract citizens to public engagement in STI policy.

Method
While the Victorian study aimed to foster community engagement and little is known about what type of publics support government spending on science and technology (Sanz-Menéndez, Van Ryzin & del Pino 2013), our study aims to identify new population segments that are more relevant to policy matters relating to aspects of innovation. This focus arises from a rapidly growing political demand for more application-oriented public-research performance measurements (Ernø-Kjølhede & Hansson 2011).

Following a number of pilot web surveys and focus group interviews on interest in science
and technology, we conducted a full-scale survey as detailed in Table 2.

<table>
<thead>
<tr>
<th>Table 2. Survey details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targeted region</td>
</tr>
<tr>
<td>Targeted respondents</td>
</tr>
<tr>
<td>Survey method</td>
</tr>
<tr>
<td>Survey period</td>
</tr>
<tr>
<td>Sampling</td>
</tr>
<tr>
<td>Number of samples</td>
</tr>
<tr>
<td>Number of subgroups</td>
</tr>
<tr>
<td>Number of valid responses</td>
</tr>
<tr>
<td>Response rate</td>
</tr>
</tbody>
</table>

The questionnaire included the three questions from the Victorian segmentation [Q1-3], the adoptability of new technologies and products (Rogers 1983) [Q4], expectations of STI policy [Q5], current and ideal levels of interviewees’ own influence on policy related to science and technology [Q6-7], the level of importance interviewees placed on various policies, including STI policy [Q8], desirable bodies and collaborations to lead the development of science and technology [Q9], factors facilitating STI [Q10], and reliable sources of information on science and technology [Q11]. Questions 9 and 11 were included to judge if citizens think they do not have to be engaged in STI policy when they are aware of trusted bodies and collaborations. Question 10 aimed to grasp how much citizens observe government policy affecting the development of STI. Simulation of budget allocation to various policies [Q12] and respondents’ reflections on the simulation [Q13] can be regarded as a novel challenge in this kind of public survey. These questions make citizens articulate how they can think and behave like policymakers. In the context of policymaking, policymakers cannot only focus on STI policy. Likewise, our approach to public engagement in STI policy should be relativised within the whole policy and political arena. The subsequent questions are to be used for constructing a more general profile of individual respondents, including trends following Rogers’ innovation model [Q14], basic daily activities [Q15-17], information resources [Q18] and opportunities for understanding science and technology [Q19]. Questions 18 and 19 served to follow the first three questions from the Victorian segment model.
Analysis

As floor or ceiling effects of Likert scale data were not found in descriptive analysis (Table 3), all of the scale data were proven to be valid for statistical analysis.

Table 3. Descriptive statistics

<table>
<thead>
<tr>
<th>Questions</th>
<th>Min</th>
<th>Max</th>
<th>Ave</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest in S&amp;T [Q1]</td>
<td>1</td>
<td>5</td>
<td>2.76</td>
<td>1.049</td>
</tr>
<tr>
<td>Active search for information about S&amp;T [Q2]</td>
<td>1</td>
<td>2</td>
<td>1.80</td>
<td>0.403</td>
</tr>
<tr>
<td>S&amp;T information literacy [Q3]</td>
<td>1</td>
<td>3</td>
<td>2.17</td>
<td>0.752</td>
</tr>
<tr>
<td>Adoptability of new technologies and products [Q4]</td>
<td>1</td>
<td>4</td>
<td>2.67</td>
<td>0.812</td>
</tr>
<tr>
<td>Current level of your own influence on policy related to S&amp;T [Q6]</td>
<td>1</td>
<td>5</td>
<td>2.93</td>
<td>0.963</td>
</tr>
<tr>
<td>Ideal level of your own influence on policy related to S&amp;T [Q7]</td>
<td>1</td>
<td>5</td>
<td>2.58</td>
<td>0.924</td>
</tr>
<tr>
<td>Deregulation [Q10(1)]</td>
<td>1</td>
<td>5</td>
<td>2.36</td>
<td>0.879</td>
</tr>
<tr>
<td>Science education [Q10(2)]</td>
<td>1</td>
<td>5</td>
<td>1.85</td>
<td>0.783</td>
</tr>
<tr>
<td>Access to comprehensible science information [Q10(3)]</td>
<td>1</td>
<td>5</td>
<td>2.04</td>
<td>0.867</td>
</tr>
<tr>
<td>Public comments to the government [Q10(4)]</td>
<td>1</td>
<td>5</td>
<td>2.32</td>
<td>0.913</td>
</tr>
<tr>
<td>Public support and engagement in STI policy [Q10(5)]</td>
<td>1</td>
<td>5</td>
<td>2.20</td>
<td>0.837</td>
</tr>
<tr>
<td>STI-driven business growth [Q10(6)]</td>
<td>1</td>
<td>5</td>
<td>2.00</td>
<td>0.850</td>
</tr>
</tbody>
</table>

Setting Q10(5) as an observable variable, the rest of the questions in Table 3 were factor-analysed by SPSS 21.0. As illustrated in Table 4, the factor analysis identified the STI-facilitating factors [Q10(3), Q10(6), Q10(2), Q10(4), Q10(1)], the scientific-literacy factors [Q3, Q2, Q1], and the policy-influence factors [Q7, Q6] with high-reliability coefficients (α>0.7).

Table 4. Factor analysis (principal factor method, promax rotation)

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>Communality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F1: STI-facilitating factor</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q10(3)</td>
<td>.851</td>
<td>-.085</td>
<td>-.028</td>
<td>.654</td>
</tr>
<tr>
<td>Q10(6)</td>
<td>.787</td>
<td>.026</td>
<td>-.025</td>
<td>.618</td>
</tr>
<tr>
<td>Q10(2)</td>
<td>.786</td>
<td>.104</td>
<td>-.030</td>
<td>.671</td>
</tr>
<tr>
<td>Q10(4)</td>
<td>.786</td>
<td>-.123</td>
<td>.067</td>
<td>.603</td>
</tr>
<tr>
<td>Q10(1)</td>
<td>.626</td>
<td>.080</td>
<td>-.016</td>
<td>.428</td>
</tr>
</tbody>
</table>
The stepwise multiple linear regression analysis, considering the above three factors as independent variables and Q10(5) as a dependent variable, showed that the STI-facilitating factor (F1) and the policy-influence factor (F3) are statistically significant at the 0.1% level, but the science-literacy factor (F2) is not statistically significant (p=0.085). Reflecting this result, the second stepwise multiple linear regression analysis more precisely identified four independent variables as statistically significant at the 0.1% level: (1) deregulation [Q10(1)], (2) access to comprehensible science information [Q10(3)], (3) public comments to the government [Q10(4)], and (4) STI-driven business growth [Q10(6)] (Table 5).

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Coefficient</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q10(1)</td>
<td>.099</td>
<td>.000</td>
</tr>
<tr>
<td>Q10(3)</td>
<td>.163</td>
<td>.000</td>
</tr>
<tr>
<td>Q10(4)</td>
<td>.223</td>
<td>.000</td>
</tr>
<tr>
<td>Q10(6)</td>
<td>.427</td>
<td>.000</td>
</tr>
<tr>
<td>Q6</td>
<td>.059</td>
<td>.014</td>
</tr>
<tr>
<td>Q7</td>
<td>.095</td>
<td>.032</td>
</tr>
<tr>
<td>R2</td>
<td>.661</td>
<td></td>
</tr>
<tr>
<td>R2 adjusted</td>
<td>.658</td>
<td></td>
</tr>
<tr>
<td>F value</td>
<td>284.338</td>
<td>.000</td>
</tr>
</tbody>
</table>
By k-means clustering with the resulting four variables (Table 6), samples were clustered into six segments by decision tree analysis (Figure 1). Following the Victorian segment model, the number of clusters was set as six. The decision tree indicates a logical classification rule according to which respondents were classified into one of the six segments by answering the four questions. Note that (+ +), (+), (0), (-) and (DK), marked on lines in Figure 1, respectively indicate an answer with strongly positive, fairly positive, neutral, fairly negative, strongly negative, and do not know.

### Table 6. K-means clustering

<table>
<thead>
<tr>
<th>Cluster (Segment)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deregulation</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Access to comprehensible science information</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Public comments to the government</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>STI-driven business growth</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

![Decision tree for segmentation](image-url)

Figure 1. Decision tree for segmentation
Results
The above analysis shows six population segments as labelled and summarised in Table 7.

<table>
<thead>
<tr>
<th>Segment</th>
<th>Label</th>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Discouraged</td>
<td>Less confident about their ability to access the information and policy process on STI</td>
<td>25.0%</td>
</tr>
<tr>
<td>2</td>
<td>Independent Engagers</td>
<td>Independent but keen about interaction between the government and the public</td>
<td>5.8%</td>
</tr>
<tr>
<td>3</td>
<td>Uninterested</td>
<td>Ignorant of and unconcerned about any issues</td>
<td>6.3%</td>
</tr>
<tr>
<td>4</td>
<td>Empowered Sceptics</td>
<td>Aware of their own policy influence but negative about public engagement</td>
<td>3.9%</td>
</tr>
<tr>
<td>5</td>
<td>Trustful Engagers</td>
<td>Positive about STI policy and reliant on all the stakeholders</td>
<td>38.0%</td>
</tr>
<tr>
<td>6</td>
<td>Interested Followers</td>
<td>Attracted to the development of government policies and respectful to professional experts</td>
<td>21.0%</td>
</tr>
</tbody>
</table>

A brief profile of each segment is described as follows. Note that the highest or the lowest percentage of an answer among all the segments is shown in parentheses.

Segment 1: Discouraged
The largest population of those in their 20s (13.4%) were categorised into this segment. People in this segment are likely to work as an employee (16.8%) who cannot use time for leisure activities on weekdays (26.3%). They often cannot find the information about science and technology that they are looking for (33.0%). While assigning lower priority to national defence policy (58.1%), tourism policy (38.5%), and culture/sports policy (41.3%) for Japan and Japanese citizens, they do not feel assured when public needs/opinions (27.4%) or collaboration between the government and citizens (39.1%) lead the advancement of science and technology. This segment has the least trust in universities (58.7%) and municipal governments (35.8%). In summary, a stereotype of this segment is a young employee who is less confident about his/her ability to access the information and policy process on STI, and does not trust in established authorities (e.g. universities, municipal governments) or public engagement activities.
Segment 2: *Independent Engagers*

This segment has self-employed workers in commercial, manufacturing, and service industries (10.7%), as well as other industries (10.7%). They often use the radio as an information source for science and technology (22.7%). They observe science and technology developed by universities (53.3%) and science and technology information provided by leading Japanese companies (24.0%) as not trustable. They also feel that there are too many issues for Japan in policymaking (82.7%), but they allocated budget based on their personal point of view instead of a policymaker’s viewpoint (62.7%). This segment is the most keen to receive a copy of this survey result (58.7%). In summary, a stereotype of this segment is a self-employed worker who is rather interested in the interaction between the government and the public.

Segment 3: *Uninterested*

 Females (80.2%) and individuals in their 70s (53.8%) dominate this segment, while people in their 20s, 30s and 40s are least likely to be classed in this segment. Most of them live with their children (86.8%) in a small city (34.0%) and tend to undertake labour work (33.3%). They do not frequently go out with their friends and acquaintances (42.5%). They have time for leisure activities in the daytime on weekdays (42.5%), but do not visit a specific place. They are the least interested in science and technology (24.5%), and the least active in searching for information on science and technology (1.9%). They also do not actively use new technologies or products (28.3%). They do not indicate any policies as important, and any organizations as trustable to developing science and technology or to provide such information. In summary, a stereotype of this segment is a female homemaker in her 70s, who is ignorant of and unconcerned with any issues – whether STI-related, policy-related, or not.

Segment 4: *Empowered Sceptics*

This segment largely consists of bachelors (42.4%). It also has relatively high-income (between 6-8 million yen per year) workers (24.2%). Most of people in this segment observe that they do not have enough opportunities to deepen interest in and understanding of science and technology (64.2%). While they are fairly interested in science and technology, they seem less interested in any kind of public policy. Their distrust of policy is also evident from the figure that, among all the segments, they trust least in collaboration between the government and leading companies for the development of science and technology (39.4%) and the government for the dissemination of information on science and technology (21.4%). They do not even trust in scientists for the
dissemination of information (45.5%). In summary, a stereotype of this segment is a relatively educated, high-income worker who is aware of his/her own policy influence, but feels negatively about ongoing public engagement activities, reflecting the general distrust in policy and science experts.

Segment 5: **Trustful Engagers**

This segment is polarised between low-income (between 2-4 million yen/year) households (29.2%) and high-income (between 10-15 million yen/year) households (4.2%). It also has the lowest percentage of those who do not frequently go out with their friends and acquaintances (26.7%). People in this segment find sufficient opportunities for public engagement in science and technology (42.1%), while actively searching for information on science and technology by themselves (23.1%). They utilise various information sources, including TV (88.6%), newspapers and magazines (70.2%), and libraries (12.3%). They also believe that they have (40.1%) and should have (65.5%) their own influence on issues related to science and technology. In their view, any kind of policy is to be prioritised and any kind of organization, person, or collaboration is to be well performed in the development of science and technology. Science education is one of the most promising ways to advance STI (92.8%). The budget allocation simulation made them think about the government policy (65.2%), through which they, as policymakers, think that there are too many unnecessary policies (41.8%) and the budget is too limited for the number of issues (73.8%). In summary, a stereotype of this segment is positive about STI policy and reliant on all of the stakeholders.

Segment 6: **Interested Followers**

Males (60.6%) and individuals in their 30s (16.7%) are the major population of this segment. This segment has the lowest rate of respondents who have children (68.2%). People in this segment are likely to have visited different leisure facilities, such as amusement parks (35.6%), sports grounds (31.8%), museums (27.3%) and pachinko (13.6%). They also have various information sources on science and technology, such as the internet (60.6%), books (28.0%), promotions at companies, advertisements, catalogues (20.5%), and symposium, lectures, and events at universities and research institutions (10.6%). They are clearly interested in science and technology (56.8%), being confident in finding information they were looking for (22.7%). For them, universities are reliable in the development of science and technology (78.0%) and trust well-known scientists in the dissemination of information (89.4%). They express a relatively neutral attitude toward
policymaking, but face difficulty in budget allocation (90.2%). In summary, a stereotype of this segment is a single man in his 30s, who has relatively ample spare time for his own. Having high interest and literacy in science and technology, he is attracted to the development of government policies and respectful to professional experts.

Discussion

The above results illustrate that there are different views on public engagement in STI policy and suggest that the government should take different approaches to different population segments for this engagement. For instance, trustful engagers (Seg. 5) and independent engagers (Seg. 2) are those who willingly participate in conventional engagement policies, whereas the government may need to provide the discouraged (Seg. 1) with tangible information to stimulate basic interest and impress interested followers (Seg. 6) with the policy relevance of public engagement. For empowered sceptics (Seg. 4) and the uninterested (Seg. 3), the government must be patient and continue to try to make them informed, interested and involved in STI policy. It is noteworthy that only four questions are sufficient to characterise the six population segments for public engagement in STI policy. Despite reservations that evidence is just a source for policymaking (Nutley, Walter & Davies 2007), the term ‘evidence’ incorporates uncertain and ambiguous realities in certain policy agendas for which public opinion can be mobilised (Pawson 2011; Pawson & Wong 2013). By broadening the range of data collected, opening up diverse perspectives in policy appraisal (Rafols et al. 2012), and facilitating reflexive and relational learning (Felt & Wynne 2007; Chilvers & Kearnes 2016), this segment model demonstrates practical feasibility, global applicability, and methodological extendibility.

Acknowledgements

This study is based on the ‘Framework for Broad Public Engagement in Science, Technology and Innovation Policy’ (PESTI) project funded by the Research Institute of Science and Technology for Society (RISTEX) in Japan. The publication of this article has been greatly motivated by the SciREX Center at the National Graduate Institute for Policy Studies (GRIPS). The authors would also like to thank Noriko Suzuki and Nobuya Fujiwara for their statistical elaboration (Suga et al. 2016) and PESTI members for their practical application of this segment model.
Annex
1. Survey questionnaire
2. Infographics of the survey overview
3. Infographics of the population segments

References


Smith, W.R. (1956) “Product differentiation and market segmentation as alternative marketing
State of Victoria (2008) Community Interest and Engagement with Science and Technology in
Victoria Research Report - June 2007, prepared for the Victorian Department of Innovation,
segmentation for broad public engagement in science, technology and innovation policy: from an opinion poll on science, technology and innovation [in Japanese]. Venture Review, in
preparation.
Awareness survey on life and science & technology

December 2013
(Survey planned by) Institute for Integrated Cell–Material Sciences, Kyoto University
Science Communication Group
(Survey implemented by) Central Research Services, Inc.

<table>
<thead>
<tr>
<th>Branch No.</th>
<th>Point No.</th>
<th>Target No.</th>
<th>Inspected by</th>
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<tbody>
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<td>(1-7)</td>
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<td></td>
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<td></td>
<td>(8-10)=101</td>
</tr>
</tbody>
</table>

Q1. **[Answer sheet 1]** How much are you interested in science and technology? Please select only one.

1. (a) Very interested
2. (b) Quite interested
3. (c) Neither interested nor disinterested
4. (d) Not very interested
5. (e) Not interested at all
6. Don’t know

Q2. Do you actively search for information about science and technology?

1. Yes
2. No
3. Don’t know

Q3. **[Answer sheet 2]** When you have looked for information about science and technology in the past, have you generally been able to find what you were looking for? Please select the closest answer.

1. (a) Yes, and it tends to be easy to understand
2. (b) Yes, but it is often difficult to understand
3. (c) No, I often can’t find what I am looking for
4. Don’t know

Q4. **[Answer sheet 3]** Which of the following statements would you say best describes how you feel about new technology and products? Please select one.

1. (a) I always try new technologies and products before anyone else does
2. (b) I always use new technologies and products after observing some people who try them
3. (c) I always use new technologies and products after observing most of the people around me try them
4. (d) I do not actively use new technologies or products
5. Don’t know

Go to Q6 in the following page.
(For those who answered “Don’t know” in Q5 and Q5S and Q4.)

Q5. [Answer sheet 4] Do the following items 1) – 3) raise your expectation for science and technology, or science, technology and innovation policy? Please mark for individual item. Consider science, technology and innovation as creating intellectual/cultural value based on scientific findings and inventions, and innovation that develops and connects this knowledge with economic, social and public value. Firstly, does “Civil perspective is incorporated into the policy” raise your expectation? (Note on survey: Mark for item 1) – 3) individually.)

<table>
<thead>
<tr>
<th>Item</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Incorporating a civil perspective into the policy</td>
<td>(a) It does very much. (b) It does a little. (c) Neutral (d) Not very much (e) Not at all</td>
</tr>
<tr>
<td>2) Creating a structure for citizens to participate in policy-making</td>
<td></td>
</tr>
<tr>
<td>3) Citizens can feel that the policies they need are implemented</td>
<td></td>
</tr>
</tbody>
</table>

Q5S. Please write anything else you expect of science and technology or science, technology and innovation. If not, please circle “No.”

<table>
<thead>
<tr>
<th>Mark</th>
</tr>
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<tbody>
<tr>
<td>No</td>
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</tbody>
</table>

(To all respondents)

Q6. [Answer sheet 5] How much influence if any, do you feel you personally have on policy making about science and technology issues that are important to you? Please select one.

<table>
<thead>
<tr>
<th>Mark</th>
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<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>(a) A great deal</td>
</tr>
</tbody>
</table>

Q7. [Answer sheet 6] How much influence if any, do you think you personally should have on policy making about science and technology issues that are important to you? Please select one.

<table>
<thead>
<tr>
<th>Mark</th>
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</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>(a) A great deal</td>
</tr>
</tbody>
</table>
Q8. [Answer sheet?] How important are the following policy items 1) – 19) to Japan and Japanese citizens? Please mark for individual item. Firstly, how important is “Pension policy” (Note on survey: Mark for 1) – 19) individually.)

<table>
<thead>
<tr>
<th>Policy Item</th>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Pension policy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
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<tr>
<td>2) Medical/nursing care policy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
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<tr>
<td>3) Policy on parenting support</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4) Policy of safety/security of life</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5) Information and communications policy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
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<tr>
<td>6) Energy policy</td>
<td>1</td>
<td>2</td>
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<td>4</td>
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<td>6</td>
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<tr>
<td>7) Environmental policy</td>
<td>1</td>
<td>2</td>
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<td>6</td>
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<tr>
<td>8) Employment policy</td>
<td>1</td>
<td>2</td>
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<td>6</td>
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<td>9) Industrial policy</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
<td>6</td>
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<tr>
<td>10) Agriculture, forestry and fishery policy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
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<tr>
<td>11) Disaster recovery policy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
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<tr>
<td>12) Disaster prevention/disaster reduction policy</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
<td>6</td>
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<tr>
<td>13) Public works policy</td>
<td>1</td>
<td>2</td>
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<td>4</td>
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<td>6</td>
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<tr>
<td>14) Policy on assistance to developing countries</td>
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<td>2</td>
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<td>6</td>
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<tr>
<td>15) National defence policy</td>
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<td>2</td>
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<td>16) Tourism policy</td>
<td>1</td>
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<td>6</td>
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<tr>
<td>17) Culture/sports policy</td>
<td>1</td>
<td>2</td>
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<tr>
<td>18) Education policy</td>
<td>1</td>
<td>2</td>
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<td>4</td>
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<td>6</td>
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<tr>
<td>19) Science, technology and innovation (*) policy</td>
<td>1</td>
<td>2</td>
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<td>6</td>
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</table>

*Note*: State the following note in the answer sheet

“Science and technology innovation is the creation of intellectual/cultural value based on scientific findings and inventions, and technological revolution that develops this knowledge into economic, social and public value.”
Q9. **[Answer sheet 8]** Which of the following organizations, persons, or collaboration in 1) – 14) make you feel assured as a citizen when they lead the advancement of science/technology? Please mark for individual item. Firstly, does "University" make you feel assured? (Note on survey: Mark for 1) – 14) individually.)

<table>
<thead>
<tr>
<th></th>
<th>(a) I feel very assured</th>
<th>(b) I feel somewhat assured</th>
<th>(c) Neutral</th>
<th>(d) I do not feel assured at all</th>
<th>(e) I do not feel assured</th>
<th>Don't know.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) University</td>
<td>...1...</td>
<td>...2...</td>
<td>...3...</td>
<td>...4...</td>
<td>...5...</td>
<td>...6...</td>
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<tr>
<td>2) Municipal government</td>
<td>...1...</td>
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<td>...4...</td>
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<td>...6...</td>
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<tr>
<td>3) Scientist</td>
<td>...1...</td>
<td>...2...</td>
<td>...3...</td>
<td>...4...</td>
<td>...5...</td>
<td>...6...</td>
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<tr>
<td>4) Government</td>
<td>...1...</td>
<td>...2...</td>
<td>...3...</td>
<td>...4...</td>
<td>...5...</td>
<td>...6...</td>
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<tr>
<td>5) Leading Japanese companies</td>
<td>...1...</td>
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<td>...3...</td>
<td>...4...</td>
<td>...5...</td>
<td>...6...</td>
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<tr>
<td>6) Public needs/opinions</td>
<td>...1...</td>
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<tr>
<td>7) Specified non-profit organization (NPO)</td>
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<tr>
<td>8) National/public laboratory</td>
<td>...1...</td>
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<td>...4...</td>
<td>...5...</td>
<td>...6...</td>
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<tr>
<td>9) Collaboration between the government and citizens</td>
<td>...1...</td>
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<td>...4...</td>
<td>...5...</td>
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<tr>
<td>10) Research of various fields jointly</td>
<td>...1...</td>
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<td>...4...</td>
<td>...5...</td>
<td>...6...</td>
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<tr>
<td>11) Government and national/public laboratories jointly</td>
<td>...1...</td>
<td>...2...</td>
<td>...3...</td>
<td>...4...</td>
<td>...5...</td>
<td>...6...</td>
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<tr>
<td>12) Collaboration between the government and leading companies</td>
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<td>...3...</td>
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<tr>
<td>13) Collaboration between national/public laboratories and leading companies</td>
<td>...1...</td>
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<td>...3...</td>
<td>...4...</td>
<td>...5...</td>
<td>...6...</td>
</tr>
<tr>
<td>14) Collaboration between universities, public administration, and companies</td>
<td>...1...</td>
<td>...2...</td>
<td>...3...</td>
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</tbody>
</table>
Q10. [Answer sheet 9] Which of the following items 1) – 6) do you think would advance science and technology innovation? Please mark for individual item. Firstly, do you think “Relaxation of regulations” prompts science and technology innovation? (Note on survey: Mark for 1) – 6) individually.)

<table>
<thead>
<tr>
<th>Item</th>
<th>(a) It would advance very much</th>
<th>(b) It would advance a little</th>
<th>(c) Neutral</th>
<th>(d) It would not advance much</th>
<th>(e) It would not advance at all</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Relaxation of regulations</td>
<td>1...</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
</tr>
<tr>
<td>2) Science education</td>
<td>1</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
</tr>
<tr>
<td>3) Easy-to-understand communication of information on science and technology</td>
<td>1...</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
</tr>
<tr>
<td>4) Conveying opinions from citizens to the government</td>
<td>1...</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
</tr>
<tr>
<td>5) Support and involvement of citizens in the policy of science, technology and innovation</td>
<td>1...</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
</tr>
<tr>
<td>6) Increase of successful companies in science, technology and innovation</td>
<td>1...</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
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</tbody>
</table>

Q11. [Answer sheet 10] How much trust do you have in the science and technology information provided by the following groups? Please mark for individual items. Firstly, are “Universities” reliable? (Note on survey: Mark for 1) – 11) individually.)

<table>
<thead>
<tr>
<th>Group</th>
<th>(a) Very reliable</th>
<th>(b) Somewhat reliable</th>
<th>(c) Neutral</th>
<th>(d) Not very reliable</th>
<th>(e) Not reliable</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Universities</td>
<td>1...</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
</tr>
<tr>
<td>2) Municipal governments</td>
<td>1...</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
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<tr>
<td>3) Scientists</td>
<td>1...</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
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<tr>
<td>4) Government</td>
<td>1...</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
</tr>
<tr>
<td>5) National/public laboratories</td>
<td>1...</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
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<tr>
<td>6) Mass communication (TV/newspaper, etc.)</td>
<td>1...</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
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<tr>
<td>7) Leading Japanese companies</td>
<td>1...</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
</tr>
<tr>
<td>8) Japanese government</td>
<td>1...</td>
<td>2...</td>
<td>3...</td>
<td>4...</td>
<td>5...</td>
<td>6...</td>
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</tbody>
</table>
Q12. **[Answer sheet 11]** Assume Japan’s budget for policymaking is 10. If you are a person in charge of policymaking, how would you allocate the budget to the following policies 1) – 19)? Please state a number 0 – 10 to make the total 10. Please give whole numbers. Also note that “0” means that no budget is given to the policy.

<table>
<thead>
<tr>
<th>Policy</th>
<th>Allocation</th>
</tr>
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<tbody>
<tr>
<td>Pension policy</td>
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<tr>
<td>Medical/nursing care policy</td>
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<td>Policy on parenting support</td>
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<tr>
<td>Policy of safety/security of life</td>
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<tr>
<td>Information and communications policy</td>
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<tr>
<td>Energy policy</td>
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<tr>
<td>Environmental policy</td>
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<tr>
<td>Employment policy</td>
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<tr>
<td>Industrial policy</td>
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<tr>
<td>Agriculture, forestry and fishery policy</td>
<td></td>
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<tr>
<td>Disaster recovery policy</td>
<td></td>
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<tr>
<td>Disaster prevention/disaster reduction policy</td>
<td></td>
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<tr>
<td>Public works policy</td>
<td></td>
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<tr>
<td>Policy on assistance to developing countries</td>
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<td>National defence policy</td>
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<td>Tourism policy</td>
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<tr>
<td>Culture/sports policy</td>
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</tr>
</tbody>
</table>

### Answer sheet 11

9) Global companies

- Popular TV shows on science and technology (“Galileo,” “Kasouken-no-onna,” “Emergency ward 24,” “Jin,” etc.)

10) Well-known scientists (Dr Koichi Tanaka, Dr Masatoshi Koshiba, Dr Toshihide Masukawa, etc.)

(8-10)=102

<table>
<thead>
<tr>
<th>Policy</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pension policy</td>
<td></td>
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<tr>
<td>Medical/nursing care policy</td>
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<td>Policy on parenting support</td>
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<td>Policy of safety/security of life</td>
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<tr>
<td>Information and communications policy</td>
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</tr>
<tr>
<td>Energy policy</td>
<td></td>
</tr>
<tr>
<td>Environmental policy</td>
<td></td>
</tr>
<tr>
<td>Employment policy</td>
<td></td>
</tr>
<tr>
<td>Industrial policy</td>
<td></td>
</tr>
<tr>
<td>Agriculture, forestry and fishery policy</td>
<td></td>
</tr>
<tr>
<td>Disaster recovery policy</td>
<td></td>
</tr>
<tr>
<td>Disaster prevention/disaster reduction policy</td>
<td></td>
</tr>
<tr>
<td>Public works policy</td>
<td></td>
</tr>
<tr>
<td>Policy on assistance to developing countries</td>
<td></td>
</tr>
<tr>
<td>National defence policy</td>
<td></td>
</tr>
<tr>
<td>Tourism policy</td>
<td></td>
</tr>
<tr>
<td>Culture/sports policy</td>
<td></td>
</tr>
</tbody>
</table>

Ensure to have whole numbers, and that the total of 1) – 19) is “10.”
(Note on survey: If the total of 1) – 19) is not “10” or if the numbers include small numbers, ask the question again as much as possible. Note that “0” means that no budget is given.)

X  Don’t know

Q13. [Answer sheet 12] As you answered Q12 as if you are a person in charge of policymaking, what did you feel or think? Please mark for individual items. Firstly, what did you think about “It is difficult to allocate budget from the viewpoint of policymaker”? (Note on survey: mark 1) – 9) individually.)

<table>
<thead>
<tr>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>agree</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
</tbody>
</table>

| 1) It is difficult to allocate budget from the viewpoint of policymaker | …1… | …2… | …3… | …4… | …5… | …6… | (69) |
| 2) More budget should be allocated to human resources | …1… | …2… | …3… | …4… | …5… | …6… | (70) |
| 3) It made me think of the government’s policies | …1… | …2… | …3… | …4… | …5… | …6… | (71) |
| 4) We should allocate budget for the future | …1… | …2… | …3… | …4… | …5… | …6… | (72) |
| 5) There are too many unnecessary policies | …1… | …2… | …3… | …4… | …5… | …6… | (73) |
| 6) They are all necessary policies | …1… | …2… | …3… | …4… | …5… | …6… | (74) |
| 7) There are too many issues for Japan | …1… | …2… | …3… | …4… | …5… | …6… | (75) |
| 8) Budget is too limited for the number of issues | …1… | …2… | …3… | …4… | …5… | …6… | (76) |
| 9) I allocated budget from my personal point of view, instead of policymaker’s viewpoint | …1… | …2… | …3… | …4… | …5… | …6… | (77) |
Q13SQ. Please write any other things that you felt or thought while making the budget allocation from the viewpoint of policymaker. If not, state “No.”

2 No

Q14. [Answer sheet 13] Do you think you are quick to catch on to a trend? Please select one.

<table>
<thead>
<tr>
<th></th>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I think I am very quick.</td>
<td>I think I am quick.</td>
<td>Neutral</td>
<td>I don’t think I am quick.</td>
<td>I don’t think I am quick at all.</td>
</tr>
</tbody>
</table>

Q15. [Answer sheet 14] Do you go out with your friends and acquaintances? Please select only one.

<table>
<thead>
<tr>
<th></th>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Very frequently</td>
<td>Frequently</td>
<td>Neutral</td>
<td>Not frequently</td>
<td>Very rarely</td>
</tr>
</tbody>
</table>

Q16. [Answer sheet 15] When do you use time for leisure activities such as your hobby, culture lessons and other amusement? Please select all the relevant answers.

<table>
<thead>
<tr>
<th></th>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Daytime between Monday to Friday</td>
<td>Daytime on Saturdays</td>
<td>Daytime on Sunday and public holidays</td>
<td>Evening between Monday to Friday</td>
<td>Evening on Saturdays</td>
</tr>
<tr>
<td>2</td>
<td>Evening on Sunday and public holidays</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Never (I cannot take time for leisure.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Don’t know</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q17. [Answer sheet 16] What leisure facilities you have visited in the past one year using your leisure time? Please select all the relevant answers.

<table>
<thead>
<tr>
<th></th>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
<th>(f)</th>
<th>(g)</th>
<th>(h)</th>
<th>(i)</th>
<th>(j)</th>
<th>(k)</th>
<th>(l)</th>
<th>(m)</th>
<th>(n)</th>
<th>(o)</th>
<th>(p)</th>
<th>(q)</th>
<th>(r)</th>
<th>(s)</th>
<th>(t)</th>
<th>(u)</th>
<th>(v)</th>
<th>(w)</th>
<th>(x)</th>
<th>(y)</th>
<th>(z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Library</td>
<td>Aquarium/Zoo</td>
<td>Botanical garden</td>
<td>Science museum</td>
<td>Museum</td>
<td>Art museum</td>
<td>Movie theatre</td>
<td>Theatre</td>
<td>Children’s center</td>
<td>Amusement park</td>
<td>Theme parks and leisure facility including Tokyo Disneyland, Universal Studios Japan</td>
<td>Pachinko</td>
<td>Horse race/motorboat race/bicycle race</td>
<td>Temple or shrine</td>
<td>Pool or gym</td>
<td>Sports ground for baseball, soccer, tennis, etc.</td>
<td>Sports stadium</td>
<td>Other (In specific )</td>
<td>None of the above</td>
<td>Don’t know</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q18. [Answer sheet 17] Where do you usually come across information or news on science and technology? Please select all the relevant answers.

<p>| | | | | | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(a) TV</td>
<td>8</td>
<td>(h) Symposium, lectures, events at universities and research institutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>(b) Radio</td>
<td>9</td>
<td>(i) Promotion event at companies, advertisement, catalogues</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>(c) Internet</td>
<td>10</td>
<td>(j) Conversations with family and friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>(d) Newspaper, magazine</td>
<td>11</td>
<td>(k) Other (In specific)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>(e) Books</td>
<td>12</td>
<td>(l) None in particular</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>(f) Science museum/museum</td>
<td>13</td>
<td>Don’t know</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>(g) Library</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Q19. [Answer sheet 18] There are opportunities for scientists and engineers to introduce science and technology in a comprehensive way through experiences at science museums and museums, or open house of laboratories, lectures and science cafés. In addition, TV programs and articles on science and technology are introduced on TV, the Internet, newspapers and magazines. Do you think these opportunities are sufficient to deepen interest and understanding on science and technology?

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(a) Strongly agree</td>
<td>2</td>
<td>(b) Tend to agree</td>
<td>3</td>
<td>(c) Tend to disagree</td>
</tr>
</tbody>
</table>

(84,85)
Lastly, we would like to ask about yourself in order to analyse your answers statistically.

F1. Gender (Researcher makes a judgment)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
</tr>
</tbody>
</table>

F2. [Answer sheet 19] Which one of the following age groups do you belong to?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(a) 16 – 19</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>(b) 20 – 24</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>(c) 25 – 29</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>(d) 30 – 34</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>(e) 35 – 39</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>(k) 65 – 69</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>(l) 70 – 74</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>(m) 75 – 79</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>(n) 80 and over</td>
<td></td>
</tr>
</tbody>
</table>

F3. [Question 20] What is your educational background? Consider graduated if you are still in school or left school without diploma.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(a) Elementary/junior high school (and old-education-system elementary school)</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>(c) Two-year college/vocational school</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>(e) Graduate school</td>
<td>6</td>
</tr>
</tbody>
</table>

F4. (For those who selected "c" – “e” at F3)

[Answer sheet 21] What is your expertise? Please select only one.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(a) Science and Engineering (Physics)</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>(b) Science and Engineering (Chemistry)</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>(c) Science and Engineering (Biology)</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>(d) Science and Engineering (Geology)</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>(e) Science and Engineering (Mathematics)</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>(f) Agriculture, forestry and fishery</td>
<td></td>
</tr>
</tbody>
</table>
F5. (To all respondents)

[Answer sheet 22] Where did you mainly live until the age of 15? Please select one from the following category.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(a)</td>
<td>Major city</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>(b)</td>
<td>Suburbs or outskirts of major city</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>(c)</td>
<td>Medium-sized city in rural area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>(d)</td>
<td>Town or village in rural area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Don’t know</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**F6. [Answer sheet 23]** What is your current occupation? Please select one main occupation from the following list.

1. (a) Agriculture, forestry, and fishery industry (Self-owned)
2. (b) Agriculture, forestry, and fishery (Family employee)
3. (c) Commercial, manufacturing and service industries (Self-owned)
4. (d) Commercial, manufacturing and service industries (Member of family employee)
5. (e) Freelance (Self-owned)
6. (f) Freelance (Member of family business)
7. (g) Management position (Employee)
8. (h) Specialist / Technical work (Employee)
9. (i) Clerical work (Employee)
10. (j) Labor work (Employee)
11. (k) Homemaker (Unemployed)
12. (l) Student (Unemployed)
13. (m) Other (Unemployed)
14. Don't know

**F7. [Answer sheet 24]** (For those who selected "k" – "m" at F6)
What is the occupation you have had the longest period of time? Please select only one from the following list.

1. (a) Agriculture, forestry, and fishery (Self-owned)
2. (b) Agriculture, forestry, and fishery (Member of family business)
3. (c) Commercial, manufacturing and service industries (Self-owned)
4. (d) Commercial, manufacturing and service industries (Member of family business)
5. (e) Freelance (Self-owned)
6. (f) Freelance (Member of family business)
7. (g) Management position (Employee)
8. (h) Specialist / Technical work (Employee)
9. (i) Clerical work (Employee)
10. (j) Labor work (Employee)
11. (k) Homemaker (Unemployed)
12. (l) Student (Unemployed)
13. (m) Other (Unemployed)
14. (n) I have never worked before.
15. Don't know
F8. (To all respondents) Do you have any children?  

1 Yes  

2 No  

→ Go to F10 on the next page.

F9. [Answer sheet 25](For those who selected “Yes” at F8)  

Please select current educational status of all of your children. Please select all the relevant items.

1 (a) Pre-school  
2 (b) Lower grade at elementary school  
3 (c) Middle grade at elementary school  
4 (d) Higher grade at elementary school  
5 (e) Junior high school  
6 (f) High school  
7 (g) Vocational school  
8 (h) Two-year college  
9 (i) University  
10 (k) Graduate school  
11 (l) Working  
12 (m) Other (In specific )  
13 Don’t know
F10. (To all respondents)

[Answer sheet 26] What is the approximate pre-tax income of your entire household per year?

1 (a) Less than 2 million yen  5 (e) Between 8 - 10 million yen
2 (b) Between 2 - 4 million yen  6 (f) Between 10 - 15 million yen
3 (c) Between 4 - 6 million yen  7 (g) Over 15 million yen
4 (d) Between 6 - 8 million yen  8 Don’t know

F11. We will be publishing the results of this survey on the Internet, and we will be happy to send a copy to the respondents who are interested. Would you like to receive a copy?

1 Yes  2 No

That completes the survey. Thank you very much for your cooperation.
SURVEY OVERVIEW

Opinion poll on science technology and innovation

Objective of the survey
Survey public needs/opinions and involvement in science, technology and innovation policy, to foster the development of a social system in which citizens can widely participate in the process of policy making.

Key items of survey
1 Interest, understanding and information-gathering regarding science and technology
2 Subjective evaluation of the citizens’ own influence over formation of policies on science, technology and innovation
3 Various policies in Japan, and citizens’ interest in and evaluation of science, technology and innovation
4 Organizations/persongs/associations that contribute to the advancement of science and technology
5 Attitude to new technologies and new products
6 Lifestyle
* The survey was conducted with the title of “Awareness survey on life and science & technology.”

Design of the survey
1 Region of survey: The whole country
2 Target of the survey: Japanese citizens aged 16 and over
3 No. of sample: 2,000
4 No. of valid responses: 887 (44.4%)
5 Method of survey: Interview by researcher
6 Period of survey: December 12 – 23, 2013

Sample planning
1 Population: Japanese citizens aged 16 and over
2 No. of sample: 2,000
3 No. of points: 140 points
4 Sampling process: Stratified two-stage random sampling

---

Q1
How much are you interested in science and technology?

<table>
<thead>
<tr>
<th>Interest Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very interested</td>
<td>19.6%</td>
</tr>
<tr>
<td>Quite interested</td>
<td>34.0%</td>
</tr>
<tr>
<td>Neither interested nor disinterested</td>
<td>27.3%</td>
</tr>
<tr>
<td>Not very interested</td>
<td>17.2%</td>
</tr>
<tr>
<td>Not interested at all</td>
<td>6.9%</td>
</tr>
</tbody>
</table>

Q2
Do you actively search for information about science and technology?

<table>
<thead>
<tr>
<th>Search Status</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>6.0%</td>
</tr>
<tr>
<td>No</td>
<td>39.9%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>49.3%</td>
</tr>
</tbody>
</table>

Q3
When you have looked for information about science and technology in the past, have you generally been able to find what you were looking for?

<table>
<thead>
<tr>
<th>Search Success</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A great deal</td>
<td>6.0%</td>
</tr>
<tr>
<td>A fair amount</td>
<td>25.4%</td>
</tr>
<tr>
<td>Not very much</td>
<td>39.9%</td>
</tr>
</tbody>
</table>

Q4
Which of the following statements would you say best describes how you feel about new technology and products?

<table>
<thead>
<tr>
<th>Statement Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I always try new technologies and products before anyone else does</td>
<td>6.9%</td>
</tr>
<tr>
<td>I always use new technologies and products after observing some people who try them</td>
<td>32.4%</td>
</tr>
<tr>
<td>I always use new technologies and products after observing most of the people around me try them</td>
<td>12.4%</td>
</tr>
<tr>
<td>I do not actively use new technologies or products</td>
<td>14.6%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>2.9%</td>
</tr>
</tbody>
</table>

Q5
How much influence if any, do you feel you personally have on policy making about science and technology issues that are important to you?

<table>
<thead>
<tr>
<th>Influence Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A great deal</td>
<td>6.0%</td>
</tr>
<tr>
<td>A fair amount</td>
<td>49.3%</td>
</tr>
<tr>
<td>Not very much</td>
<td>10.8%</td>
</tr>
</tbody>
</table>

Q6
Do you actively try to search for information about science and technology issues that are important to you?

<table>
<thead>
<tr>
<th>Search Status</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>6.0%</td>
</tr>
<tr>
<td>No</td>
<td>39.9%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>49.3%</td>
</tr>
</tbody>
</table>

Q7
When you have looked for information about science and technology in the past, have you generally been able to find what you were looking for?

<table>
<thead>
<tr>
<th>Search Success</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A great deal</td>
<td>6.0%</td>
</tr>
<tr>
<td>A fair amount</td>
<td>25.4%</td>
</tr>
<tr>
<td>Not very much</td>
<td>39.9%</td>
</tr>
</tbody>
</table>

---
Q8 How important are the following policy to Japan and Japanese citizens? [%]

- Pension policy
- Medical/nursing care policy
- Policy on parenting support
- Policy on safety/security of life
- Information and communications policy
- Energy policy
- Environmental policy
- Employment policy
- Industrial policy
- Agriculture, forestry, and fishery policy
- Disaster prevention/recovery policy
- Public works policy
- Policy on assistance to developing countries
- National defence policy
- Tourism policy
- Culture/sports policy
- Education policy
- Science, technology and innovation policy

Q9 Which of the following organizations, persons, or collaboration make you feel assured as a citizen when they lead the advancement of science/technology? [%]

- University
- Municipal government
- Scientist
- Government
- Leading Japanese companies
- Public needs/options
- Specified non-profit organization (NPO)
- National/public laboratory
- Collaboration between the government and citizens
- Research of various fields/jointy
- Government and national/public laboratory jointly
- Collaboration between the government and leading companies
- Collaboration between national/public laboratories and leading companies
- Collaboration between universities/public administration, and companies

Q10 Which of the following items do you think would advance science and technology innovation? [%]

- Relaxation of regulations
- Science education
- Easy-to-understand communication of information on science and technology
- Conveying opinions from citizens to the government
- Support and involvement of citizens in the policy of science, technology and innovation
- Increase of successful companies in science, technology and innovation
- Conveying opinions from scientists to the government
- Collaboration between the government and scientists
- Collaboration between public administration and companies
- Collaboration between universities/public administration, and companies

Q11 How much trust do you have in the science and technology information provided by the following groups? [%]

- Universities
- Municipal governments
- Scientists
- Government
- National/public laboratories
- Mass communication (TV/newspaper, etc.)
- Leading Japanese companies
- Japanese government
- Global companies
- Popular TV shows on science and technology
- Well-known scientists

Q12 If you are a person in charge of policymaking, what did you feel or think? [%]

- It is difficult to allocate budget from the viewpoint of policymaker
- More budget should be allocated to foreign industries
- It made me think of the government's policy
- We should allocate budget for the future
- There are too many unnecessary policies
- They are all necessary policies
- There are too many issues for Japan
- Budget is too limited for the number of issues
- I allocated budget from my personal point of view, instead of policymaker's viewpoint

Q13 [N/A]
Q14 Did you think you are quick to catch on to a trend?

- Very frequently: 22.5%
- Frequently: 35.3%
- Neutral: 27.6%
- Not frequently: 6.1%
- Very rarely: 0.2%
- Don’t know: 0.0%

Q15 Do you go out with your friends and acquaintances?

- Very frequently: 8.2%
- Frequently: 13.7%
- Neutral: 26.5%
- Not frequently: 25.5%
- Very rarely: 7.1%
- Don’t know: 0.8%

Q16 When do you use time for leisure activities such as your hobby, culture lessons and other amusement?

- Daytime between Monday to Friday: 33.1%
- Daytime on Saturdays: 26.3%
- Daytime on Sundays and public holidays: 44.1%
- Evening between Monday to Friday: 17.1%
- Evening on Saturdays: 14.9%
- Evening on Sundays and public holidays: 12.9%
- Never or cannot take time for leisure: 15.6%
- Don’t know: 1.5%

Q17 What leisure facilities have you visited in the past one year using your leisure time?

- Library: 38.3%
- Aquarium/Zoo: 32.9%
- Botanical garden: 14.6%
- Science museum: 13.8%
- Museum: 17.3%
- Art museum: 29.8%
- Movie theatre: 46.3%
- Theatre: 15.4%
- Children’s center: 7.4%
- Amusement park: 25.1%
- Pachinko: 9.0%
- Horse race/keiba race: 3.8%
- Temple or shrine: 60.0%
- Pool or gym: 17.7%
- Sports ground for football, soccer, tennis, etc.: 3.8%
- Sports stadium: 12.6%
- Other: 6.2%
- None of the above: 11.2%
- Don’t know: 0.3%

Q18 Where do you usually come across information or news on science and technology?

- TV: 83.2%
- Radio: 16.2%
- Internet: 60.0%
- Newspaper/magazine: 60.7%
- Book: 17.5%
- Science museum/museum: 7.4%
- Symposium, lectures, events at universities and research institutions: 5.9%
- Promotion event at companies, advertisement, catalogues: 4.6%
- Conversations with family and friends: 20.4%
- Other: 0.3%
- None in particular: 5.2%
- Don’t know: 0.1%

Q19 There are opportunities for scientists and engineers to introduce science and technology in a comprehensive way through experiences at science museums and museums, or open house of laboratories, lectures and science cafes. In addition, TV programs and articles on science and technology are introduced on TV, the Internet, newspapers and magazines. Do you think these opportunities are sufficient to deepen interest and understanding on science and technology?

- Strongly agree: 9.7%
- Tend to agree: 27.5%
- Tend to disagree: 45.4%
- Strongly disagree: 10.4%
- Don’t know: 4.7%
- N/A: 0.1%
F1  Gender

- Male: 46.8%
- Female: 53.2%

F2  Which one of the following age groups do you belong to?

- 16-19: 5.2%
- 20-24: 4.6%
- 25-29: 4.3%
- 30-34: 4.8%
- 35-39: 4.7%
- 40-44: 10.4%
- 45-49: 8.7%
- 50-54: 10.4%
- 55-59: 9.6%
- 60-64: 10.6%
- 65-69: 8.7%
- 70-74: 10.8%
- 75-79: 6.5%
- 80 and over: 6.3%

F3  What is your educational background?

- N/A: 0.1%
- Graduate school: 12.3%
- University: 43.6%
- Two-year college/vocational school: 19.5%
- High school: 22.2%
- Elementary/junior high school: 2.1%
- Other (old education system): 0.1%

F4  What is your expertise?

- N/A: 0.1%
- Don't know: 0.8%
- Other than science and engineering: 71.5%
- Science and Engineering (Physics): 8.7%
- Science and Engineering (Chemistry): 2.1%
- Science and Engineering (Biology): 2.3%
- Science and Engineering (Geology): 0.3%
- Science and Engineering (Mathematics): 3.6%
- Agriculture, forestry, and fishery: 1.3%
- Medical: 5.7%
- Dentistry: 1.5%
- Medicine: 2.1%

F5  Where did you mainly live until the age of 15?

- N/A: 0.7%
- Don't know: 0.7%
- Medium-size city: 14.7%
- Small or rural area: 21.1%
- Major city: 7.2%
- Suburbs or outskirts of major city: 14.7%
- Other (member of family business): 0.1%
- Other (family employee): 0.1%
- Other (self-employed): 0.1%

F6  What is your current occupation?

- N/A: 0.1%
- Don't know: 0.7%
- Other (unemployed): 13.0%
- Homemaker (unemployed): 10.3%
- Labor work (employee): 14.7%
- Clerical work (employee): 14.7%
- Specialist/technical work (employee): 14.7%
- Management position: 14.7%
- Freelance (member of family business): 2.1%
- Freelance (self-employed): 1.4%
- Commercial, manufacturing and service industries (member of family employee): 4.3%
- Commercial, manufacturing and service industries (self-employed): 3.9%
- Agriculture, forestry, and fishery (member of family employee): 0.7%
- Agriculture, forestry, and fishery (self-employed): 4.3%
What is the occupation you have had the longest period of time?

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Employee</th>
<th>Unemployed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor work</td>
<td>18.1%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Clerical work</td>
<td>23.4%</td>
<td>13.9%</td>
</tr>
<tr>
<td>Specialist / Technical work</td>
<td>10.2%</td>
<td>11.0%</td>
</tr>
<tr>
<td>Management position</td>
<td>70.4%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Freelance</td>
<td>7.0%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Other</td>
<td>0.3%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Student</td>
<td>1.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Homemaker</td>
<td>1.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Commercial, manufacturing,</td>
<td>2.7%</td>
<td>14.4%</td>
</tr>
<tr>
<td>service industries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture, forestry, and</td>
<td>13.9%</td>
<td>1.6%</td>
</tr>
<tr>
<td>fishery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have never worked before.</td>
<td>1.0%</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

Do you have any children?

- Yes: 75.3%
- No: 24.5%

Please select current educational status of all of your children.
(For those who selected “Yes” at F8)

- Pre-school: 12.4%
- Lower grade at elementary school: 5.8%
- Middle grade at elementary school: 3.3%
- Higher grade at elementary school: 5.1%
- Junior high school: 8.2%
- High school: 8.7%
- Vocational school: 1.2%
- Two-year college: 0.7%
- University: 6.0%
- Graduate school: 0.9%
- Working: 70.4%
- Other: 0.3%

What is the approximate pre-tax income of your entire household per year?

<table>
<thead>
<tr>
<th>Income Range</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2 million yen</td>
<td>10.5%</td>
</tr>
<tr>
<td>Between 2 – 4 million yen</td>
<td>25.4%</td>
</tr>
<tr>
<td>Between 4 – 6 million yen</td>
<td>15.9%</td>
</tr>
<tr>
<td>Between 6 – 8 million yen</td>
<td>11.7%</td>
</tr>
<tr>
<td>Between 8 – 10 million yen</td>
<td>5.9%</td>
</tr>
<tr>
<td>Between 10 – 15 million yen</td>
<td>23.3%</td>
</tr>
<tr>
<td>Over 15 million yen</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

We will be publishing the results of this survey on the Internet and we will be happy to send a copy to the respondents who are interested. Would you like to receive a copy?

- Yes: 45.9%
- No: 53.6%
Which of the following items 1 – 4 do you think would advance science, technology and innovation (STI)? Please mark for individual item.

A. Easy-to-understand communication of information on science and technology
B. Conveying opinions from citizens to the government
C. Increase of successful companies in STI
D. Relaxation of regulations

1. It would advance very much.
2. It would advance a little.
3. Neutral
4. It would not advance much.
5. It would not advance at all.
6. Don’t know

The combination of segments 5 and 2 is set as “group of people with participation in STI policy,” the combination of 6 and 1 as “people with potential participation in the STI policy,” segment 4 as “people with low participation in the STI policy,” and segment 3 as “people with no participation in the STI policy.”

The result of the opinion poll conducted by PESTI in December 2013 found that the group of people with participation, people with potential participation, people with low participation and people with no participation accounted for 49.1%, 35.1%, 3.7% and 12.0% respectively.

PESTI segmentation is a method developed by PESTI to classify people with the degree of “participation in the science, technology and innovation (STI) policy” into 6 groups (technically called segments). The people are classified as 5, 2, 6, 1, 4, 3 in the order of degree of “participation in the science, technology and innovation policy.”

The 6 segments are determined by the combination of four answers: “1-1. Easy-to-understand communication of information on science and technology,” “1-2. Conveying opinions from citizens to the government,” “1-3. Increase of successful companies in STI,” and “1-4. Relaxation of regulations” to the question “Q1. Which of the following items do you think would advance STI?”
When do you use time for leisure activities such as your hobby, culture lessons and other amusement?

- **Age**
  - 20 or older: 13.4%
  - 15 or younger: 86.6%

What is your current occupation?

- Clerical work (Employee): 16.8%
- Other (Unemployed): 83.2%

When have you looked for information about science and technology in the past, have you generally been able to find what you were looking for?

- Yes: 26.3%
- No: 73.7%
- Don’t know: 0.0%

How important are the following policy items to Japan and Japanese citizens?

- National defence policy: 58.1%
- Tourism policy: 38.5%
- Culture/sports policy: 41.3%
- Economic development policy: 27.4%
- Environment policy: 39.1%

What leisure facilities you have visited in the past one year using your leisure time?

- Temple or shrine: 33.0%
- Swimming pool: 28.3%
- Other: 38.7%

How much trust do you have in the science and technology information provided by the following groups?

- Universities: 58.7%
- Municipal governments: 35.8%
- Other: 5.5%
PESTI SEGMENT

Would you like to receive a copy of the results of this survey?

- Yes: 58.7%
- No: 41.3%

Where do you usually come across information or news on science and technology?

- Radio: 22.7%
- Internet: 45.4%
- Television: 21.9%
- Newspaper: 10.1%
- Other: 0.9%

Would you like to receive a copy of the results of this survey?

- Yes: 58.7%
- No: 41.3%

What is your current occupation?

- Commercial, manufacturing, and service industries (Self-owned): 10.7%
- Freelance (Self-owned): 10.7%
- Specialist / Technical work (Employee): 4.0%
- Management position (Employee): 7.4%

What is the occupation you have had the longest period of time?

- Management position (Employee): 7.4%
- Specialist / Technical work (Employee): 4.0%
- Freelance (Self-owned): 10.7%
- Small city: 13.3%
- Hokuriku: 10.7%
- University: 53.3%

City scale

- Small city: 13.3%

Region

- Hokuriku: 10.7%

If you are a person in charge of policymaking, what did you feel or think?

- There are too many issues for Japan: 82.7%
- I allocated budget from my personal perspective, instead of policymaker's viewpoint: 22.7%

Which of the following organizations, persons, or collaboration make you feel assured as a citizen when they lead the advancement of science/technology?

- Leading Japanese companies: 24.0%
- University: 53.3%
- Leading Japanese companies: 24.0%
- The largest amount than other segments: XX%+
- The least amount than other segments: XX%−

How much trust do you have in the science and technology information provided by the following groups?

- Leading Japanese companies: 24.0%
- University: 53.3%
- Radio: 22.7%
- There are too many issues for Japan: 82.7%
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- University: 53.3%
- Leading Japanese companies: 24.0%
- The largest amount than other segments: XX%+
- The least amount than other segments: XX%−
**Group with no participation in STI policy**

**Gender & age**

- Female: 80.2% (+)
- 20s: 2.8% (-)
- 30s: 3.6% (-)
- 40s: 5.7% (-)
- 50s: 53.8% (+)

**What is your educational background?**

- Elementary school: 70.8% (–)
- Junior high school: 45.3% (–)
- High school: 56.6% (–)
- University: 24.5% (–)

**City scale**

- Medium-sized city: 30.2% (+)
- Small city: 34.0% (+)

**Region**

- Kansai: 34.0% (+)
- Hokkaido: 8.5% (+)
- Tohoku: 4.7% (+)
- Shikoku: 8.5% (+)

**What is your current occupation?**

- Other clerical work (Employee): 2.8% (-)
- Housewife/Unemployed: 33.0% (-)
- Other (Employee): 28.3% (-)

**What is the occupation you have had the longest period of time?**

- Commercial, manufacturing, and service industries: 5.8% (-)
- Labor work: 33.3% (-)
- Clerical work (Employee): 13.0% (-)
- Student (Unemployed): 1.4% (-)

**Where did you mainly live until the age of 15?**

- Suburbs or outskirts of major city: 3.6% (-)
- Medium-sized city/rural area: 51.9% (-)
- Other: 45.3% (+)

**Do you go out with your friends and acquaintances?**

- Not frequently: 42.5% (-)

**When do you use leisure activities such as your hobby, culture lessons and other amusement?**

- Daytime between Monday to Friday: 52.5% (+)
- Evening on Saturdays: 14.4% (+)

**Would you like to receive a copy of the results of this survey?**

- Yes: 27.4% (+)

**What is the approximate pre-tax income of your entire household per year?**

- Less than 2 million yen: 24.5% (+)
- Between 2 – 4 million yen: 17.0% (+)
- Between 4 – 6 million yen: 7.7% (+)
- Between 6 – 8 million yen: 5.7% (+)
- More than 8 million yen: 66.0% (+)

**What leisure facilities you have visited in the past one year using your leisure time?**

- Library: 21.7% (+)
- Aquarium/Zoo: 20.8% (+)
- Science museum: 2.8% (+)
- Museum: 7.5% (+)
- Art museum: 19.8% (+)
- Movie theatre: 22.6% (+)
- Theatre: 6.6% (+)
- Amusement park: 12.3% (+)
- Educational and leisure facility including Tokyo Disneyland, Universal Studios Japan: 12.3% (+)
- Pool or gym: 8.5% (+)
- Tennis ground/basketball, soccer, tennis, etc: 9.6% (+)
- None of the above: 33.0% (+)

**Do you think opportunities are sufficient to deepen interest and understanding of science and technology?**

- Agree: 43.4% (+)

**Interest in science and technology?**

- VSEG5: The least interesting: 46.2% (+)
- VSEG3: The second interesting: 1.9% (+)

**How do you feel about new technology and products?**

- I do not actively use: 28.3% (+)
- I am interested in new technologies and products: 21.7% (+)

**About science and technology issues that are important to you.**

- Having influence: 18.9% (+)
- Should have influence: 32.1% (+)

**How important are the following policy items to Japan and Japanese citizens?**

- Pension policy: 88.7% (+)
- Medical/nursing care policy: 93.4% (+)
- Policy on parenting support: 70.8% (+)
- Policy of safety/security of life: 82.1% (+)
- Information and communication-alone policy: 93.4% (+)
- Energy policy: 86.5% (+)
- Environmental policy: 68.9% (+)
- Employment policy: 48.9% (+)
- Industrial policy: 50.9% (+)
- Agriculture, forestry and fishery policy: 61.3% (+)
- Disaster recovery policy: 80.2% (+)
- Policy as assistance to developing countries: 37.7% (+)
- Education policy: 72.6% (+)
- Science, technology and innovation policy: 47.2% (+)

**Which of the following organizations, persons, or collaboration make you feel assured as a citizen when they lead the advancement of science/technology?**

- Government: 30.2% (-)
- Leading Japanese companies: 38.6% (-)
- Specified non-profit corporation (NPO): 16.0% (-)
- National/public laboratory: 37.7% (-)
- Research of various fields: 47.2% (-)
- Science and technology-related organizations jointly: 52.8% (-)
- Collaboration between national/public laboratories and leading companies: 37.7% (-)
- Collaboration between universities, public administration, and companies: 43.4% (-)

**Which do you think would advance science, technology and innovation?**

- Science education: 45.3% (+)

**How much trust do you have in the science and technology information provided by the following groups?**

- National/public laboratories: 50.9% (+)
- Leading Japanese companies: 28.3% (+)
- Japanese government: 28.3% (+)
- Global companies: 24.5% (+)
- Popular TV shows on science and technology: 18.9% (+)
- Well-known scientists: 56.4% (+)

**If you are a person in charge of policymaking, what did you feel or think?**

- It is difficult to allocate budget: 67.9% (+)
- More budget should be allocated to science/technology: 27.4% (+)
- I do not think the government’s policies were: 45.3% (+)
- We should allocate budget for the future: 32.1% (+)
- There are too many issues for Japan: 53.8% (+)
Group with low participation in STI policy

- University (and old-education-system high school): 42.4%
- Agricultural, forestry, and fishery (family employee): 6.1%

What is your educational background?

What is your current occupation?

- Agriculture, forestry, and fishery (family employee): 6.1%

What is the approximate pre-tax income of your entire household per year?

- Between 6-8 million yen: 24.2%

Do you think opportunities are sufficient to deepen interest and understanding on science and technology?

- Disagree: 64.2%

Interesting science and technology?

- VSEB (The third): 17.3%

How important are the following policy items to Japan and Japanese citizens?

- Not policy on parenting support: 15.2%
- Not policy of safety/security of life: 12.1%
- Not information and communication policy: 12.1%
- Not environmental policy: 6.1%
- Not employment policy: 9.1%
- Not industrial policy: 12.1%
- Not disaster recovery policy: 6.1%
- Not disaster prevention/disaster reduction policy: 15.2%
- Not public works policy: 21.2%
- Not policy on assistance for developing countries: 27.3%
- Not national defence policy: 18.2%
- Not tourism policy: 39.4%
- Not cultural/sports policy: 27.3%
- Not education policy: 12.1%
- Not science, technology and innovation policy: 9.1%

Which of the following organizations, persons, or collaboration make you feel assured as a citizen when they lead the advancement of science/technology?

- Collaboration between the government and leading companies: 39.4%

How much trust do you have in the science and technology information provided by the following groups?

- Scientists: 45.5%
- Government: 21.2%

If you are a person in charge of policymaking, what did you feel or think?

- Budget is too limited for the number of issues: 42.4%
What is the approximate pre-tax income of your entire household per year?

- Between 2 - 4 million yen: 29.2%
- Between 10 - 15 million yen: 4.2%

Region

- Hokuriku: 3.6%

Do you go out with your friends and acquaintances?

- Not frequently: 26.7%

Information about science and technology

- Actively search for information: 23.1%

Where do you usually come across information or news on science and technology?

- TV: 88.4%
- Newspaper/magazine: 70.2%
- Library: 12.3%

Interest in science and technology?

- VSEG5: The least?: 13.9%

About science and technology issues that are important to you.

- Should have influence: 65.5%

How important are the following policy items to Japan and Japanese citizens?

- Pension policy: 95.5%
- Medical/nursing care policy: 99.4%
- Policy on parenting support: 92.8%
- Policy for safety/security of life: 95.5%
- Information and communication policy: 81.9%
- Energy policy: 94.2%
- Environmental policy: 95.5%
- Employment policy: 92.5%
- Industrial policy: 87.7%
- Agriculture, forestry and fishery policy: 83.8%
- Disaster recovery policy: 94.2%
- Disaster prevention/disaster reduction policy: 94.2%
- National defence policy: 77.7%
- Tax policy: 83.8%
- Tourism policy: 77.7%
- Cultural/sports policy: 84.1%
- Education policy: 92.5%
- Science, technology and innovation policy: 81.9%

Which of the following organizations, persons, or collaboration make you feel assured as a citizen when they lead the advancement of science/technology?

- Municipal government: 59.3%
- Scientist: 80.5%
- Government: 61.0%
- Leading Japanese companies: 64.1%
- Public needs/opinions: 57.9%
- Research on sea fish, sea life: 85.5%
- Government and national/local public administration: 85.8%
- Collaboration between the government and universities: 77.7%
- Collaboration between the government and leading companies: 73.8%
- Collaboration between the government and national/public laboratories: 79.1%
- Collaboration between the government and global companies: 83.4%

Which do you think would advance science and technology innovation?

- Science education: 92.8%

How much trust do you have in the science and technology information provided by the following groups?

- Universities: 81.6%
- Municipal governments: 61.6%
- Scientists: 84.1%
- Government: 52.9%
- National/public laboratories: 82.5%
- Mass communication (TV/newspaper, etc.): 77.9%
- Leading Japanese companies: 58.5%
- Japanese government: 54.9%
- Global companies: 62.7%
- Popular TV shows on science and technology: 38.4%

If you are a person in charge of policymaking, what did you feel or think?

- It made me think of the government’s policies: 65.2%
- There are becoming too many policies: 41.8%
- Budget is too limited for the number of issues: 73.8%
### PESTI SEGMENT

**Group with the potential to participation in STI policy**

**6**

**Group with the potential to participation in STI policy**

<table>
<thead>
<tr>
<th>Gender &amp; age</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>60.6%+</td>
</tr>
<tr>
<td>Female</td>
<td>16.7%+</td>
</tr>
<tr>
<td>Elementary/junior high school</td>
<td>4.8%+</td>
</tr>
<tr>
<td>Suburbs or outskirts of major city</td>
<td>15.9%+</td>
</tr>
<tr>
<td>Town or village in rural area</td>
<td>30.3%+</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Do you have any children?</th>
<th>Region</th>
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<tr>
<td>Yes</td>
<td>68.2%+</td>
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**What leisure facilities you have visited in the past one year using your leisure time?**

- Museum: 27.3%+
- Amusement park: 35.6%+
- Pachinko: 13.6%+
- Sports ground for baseball, soccer, tennis, etc.: 31.8%+

**Where do you usually come across information or news on science and technology?**

- Internet: 60.6%+
- Books: 28.0%+
- Symposium, lectures, events at universities, large research institutions: 10.6%+
- Promotion event at companies, advertisement, catalogues: 20.5%+

**About science and technology**

- Interested: 56.8%+

**When you have looked for information about science and technology in the past, have you generally been able to find what you were looking for?**

- Yes, and it tends to be easy to understand: 22.7%+

**Interest in science and technology?**

- Yes (The most interesting): 12.1%+

**How important are the following policy items to Japan and Japanese citizens?**

- National pension policy: 7.6%+

**Which of the following organizations, persons, or collaboration make you feel assured as a citizen when they lead the advancement of science/technology?**

- University: 78.0%+
- Municipal government: 34.8%-

**How much trust do you have in the science and technology information provided by the following groups?**

- Well-known scientists: 81.4%+

**If you are a person in charge of policymaking, what did you feel or think?**

- It is difficult to allocate budget: 90.2%+