

13. Social technology field

13.1. Overview

(1) Social technology

The social technology field is a new addition to this foresight survey. This field covers technologies that contribute to the solution of social problems and the socialization of technologies. The nature of these technologies means that many of them cross fields. Therefore, topics such as those related to a safe and secure society, an aging society with a declining birthrate, and a knowledge society include matters related to other technology fields. The social technology field therefore forms the core of this combination and coordination across fields. We took care both to avoid redundancy and to ensure that important topics were not omitted.

The social technology field comprises 11 individual topics. Topics handled as social technology in this field fit one of the following two general categories.

- A. Technologies that are applied to the solutions of problems caused by socialization of technologies and to the solutions of general social problems
- B. Technologies that are applied directly to the solution of social problems

Of the field's 11 areas, 2 areas, “technology for solving international problems” and “technology assessment”, belong to A. The remaining 9 areas, “safety, security, and stability of day to day life”, “urban safety, security, and stability”, “universal availability of services”, “support for the elderly and the disabled”, “social application of brain research”, “technology that supports education and learning”, “handing down and preserving culture and technology”, “knowledge production system” and “entertainment technology”, belong to B. However, because all 9 areas are technologies predicated upon application to society, they must be taken into view during the development stage in order to smooth the social application of their topics.

The common thread of these social technologies is that they are technologies to respond to social needs and they require the integration of knowledge from multiple specialized areas in order to address problems. In many cases, the necessary specialized areas are in both the natural sciences and the social sciences or humanities.

(2) Expected impacts and times of social application

This analysis investigated expected current and medium-term impacts for each area. For social impacts related to safety and security and to social vitality, the 4 areas in the field with the highest scores are “urban safety, security, and stability”, “support for the elderly and the disabled”, “safety, security, and stability of day to day life” and “universal availability of services”. The areas receiving the lowest scores were “entertainment technology”, “handing down and preserving culture and technology” and “knowledge production system”, but these received relatively high scores on increased intellectual assets.

Paying attention to the time of social application for technology is especially important with social technology. Social technology typically requires a great deal of time from technological realization until social application. Comparing times of technological realization and social application based on the median values in the foresight survey results, for most social technology areas about twice as much time is required to reach the time of social application as is needed to reach technological realization. The reasons so much

time is required for social application are that in most cases related systems must be developed and social consensus obtained, and it is known that these are not necessarily easy tasks.

The above time frame is an average characteristic for all areas in the field, so some areas require more than twice as much time, while others require less. The former are “universal availability of services”, “safety, security, and stability of day to day life” and “handing down and preserving culture and technology”; the latter is “support for the elderly and the disabled.”

“Social application of brain research” is an average area in that the time frame applies, but it is predicted to require the longest time of any area for both technological realization and social application.

(3) Fields for integration and collaboration and the realization of a desirable society

The results for science and technology in other fields that are targets for integration and collaboration differ by whether the time is "the coming 5 to 10 years" or "2016 or later." Three fields, "information and communications; health, medical care, and welfare; and environment, were named in at least 50 percent of responses for the former, while 2 fields, life science and energy and resources, received the same amount of responses for the latter. This change is probably due to respondents seeing the fields related to topics that should be engaged as social technology as gradually shifting in emphasis from the former fields to the latter.

As for the predictions of respondents in the social technology field on society 30 years from now, 75 percent see science and technology contributing to a certain degree to solve problems related to secure lives. However, in answer to the question of how science and technology and social technology will change people's sense of security in their lives, 56.0 percent said it will lower it, and 38.5 percent said it will make no difference.

Respondents in the social technology field understand that seed technologies are not all that is needed to solve social problems and calmly accept the general difficulty of the social application of technology, so they gave calm responses such as those above.

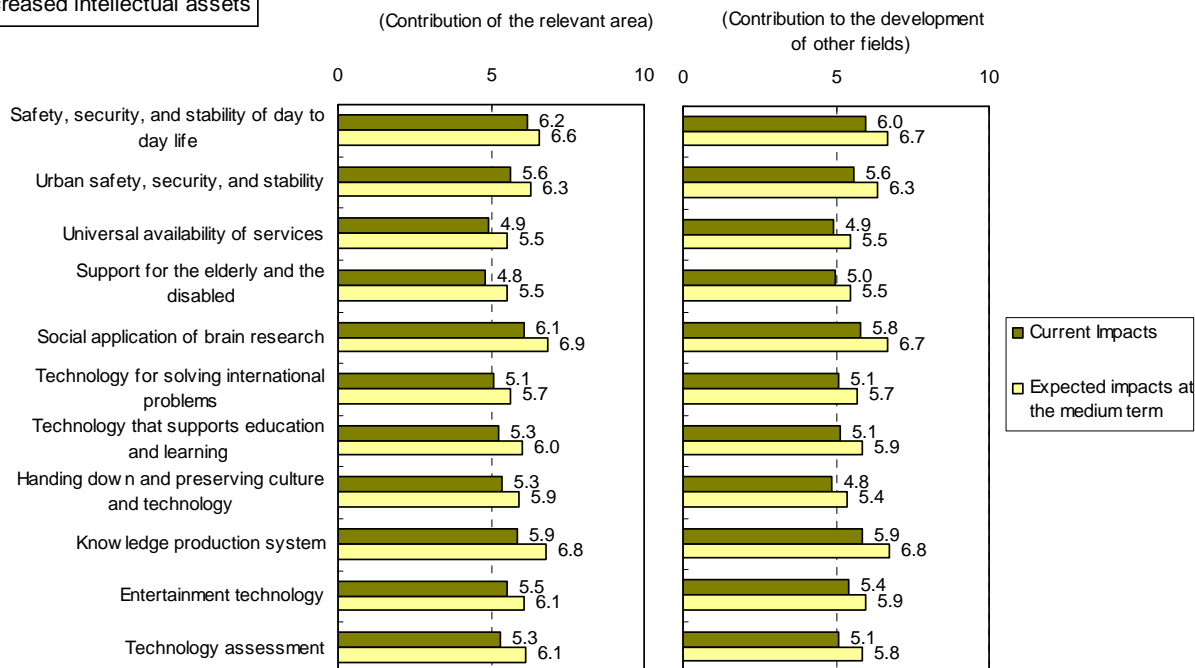
The discretion of the social technology field's respondents also seems to be reflected in the survey results for the contributions of the field's topics to the achievement of a desirable society. Although the field's degree of contribution is high in terms of direct contributions to safety and security, health, population decline, and global problems and in terms of indirect contributions to population decline, a sustainable society, and global problems, compared to other fields the answers seem somewhat cautious.

(NAKAJIMA Naomasa)

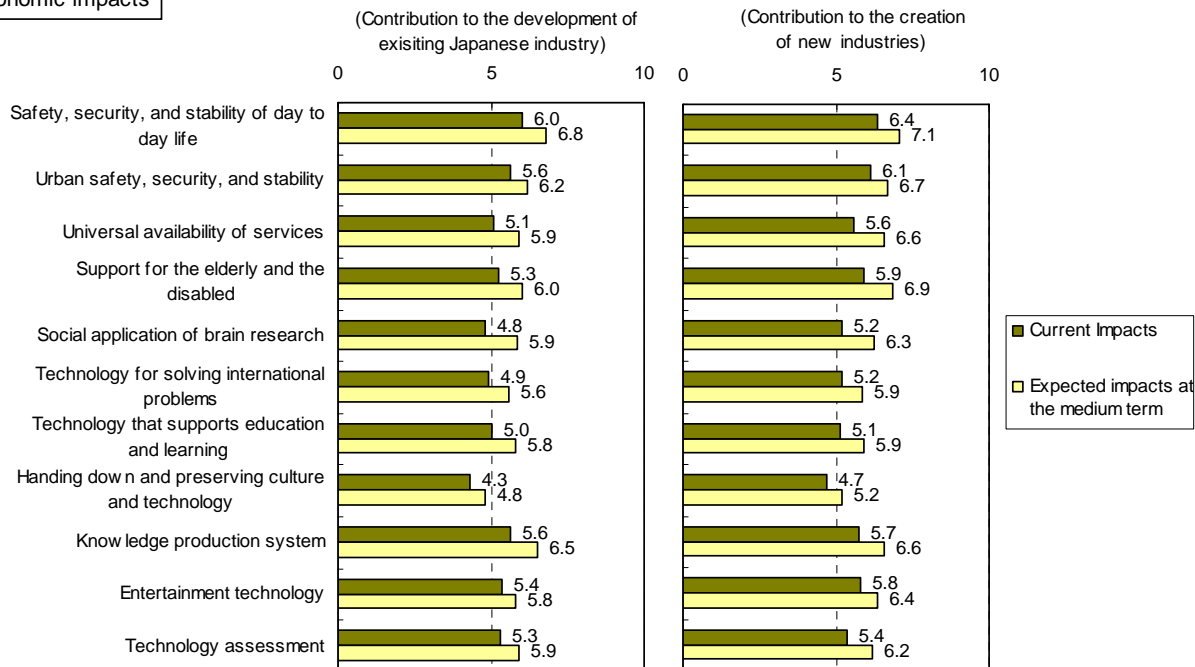
13.2. Main results

A. Impacts

Increased intellectual assets

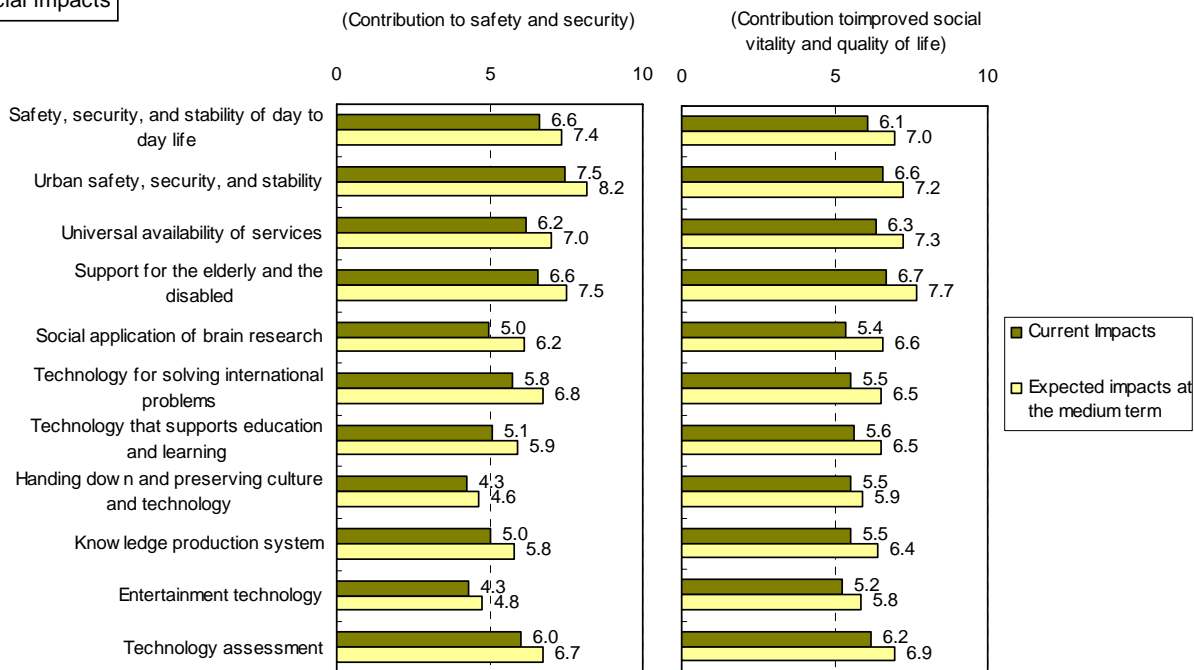


Economic impacts



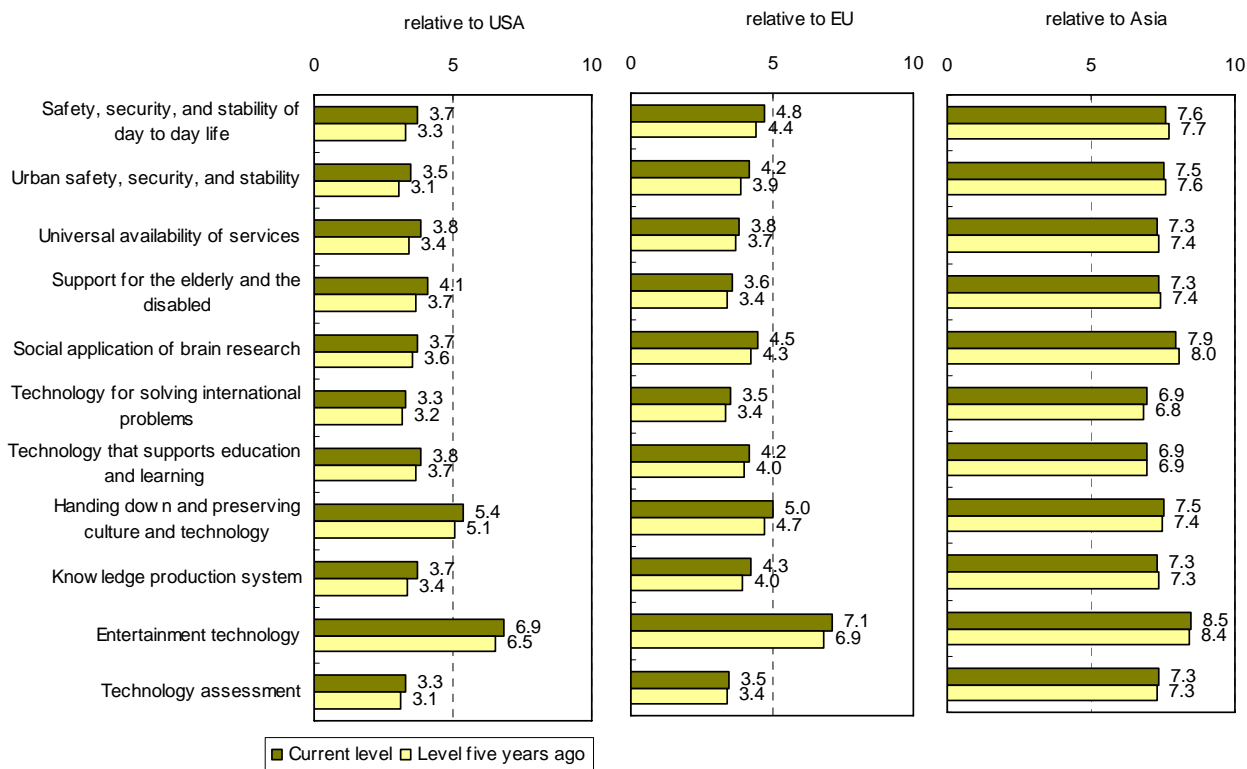
*Responses are indexed on a 10-point scale.

Social impacts



*Responses are indexed on a 10-point scale.

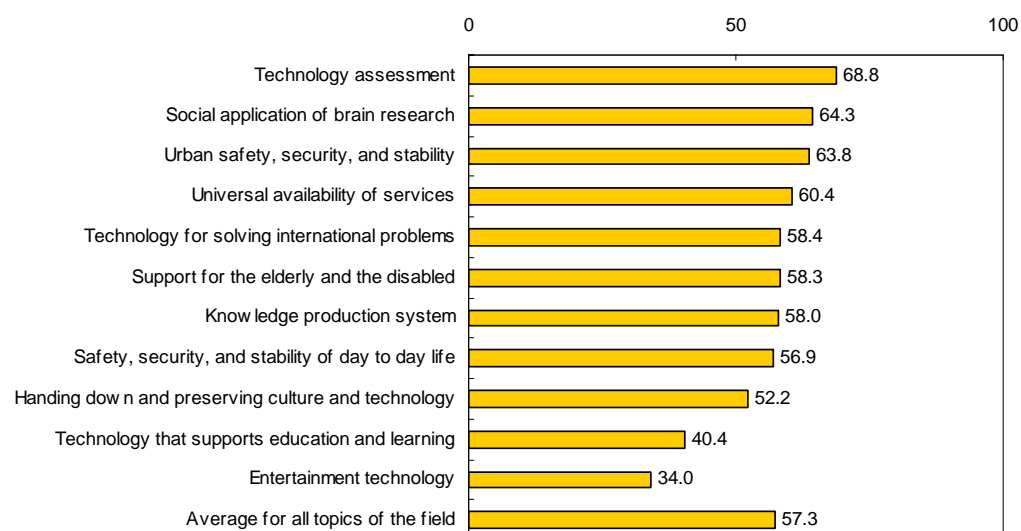
B. Japan's R&D Level



*Responses are indexed on a 10-point scale.

C. Importance to Japan

Average important index by area



The most important 10 topics

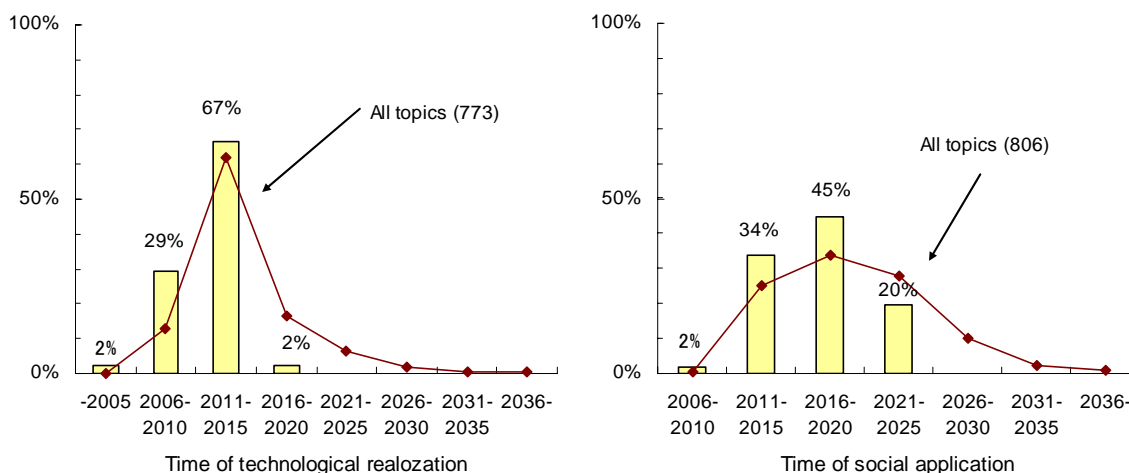
Topic	Index	Year T*	Year S*
1 09: A wide-area disaster monitoring system that monitors, when a major disaster occurs, the impacts of the disaster widely across the affected area, by using satellite images and the analysis by laser radar equipment, to help provide prompt and safe evacuation guidance.	88	2011	2018
2 10: A system for quickly and accurately detecting trace amounts of explosives, drugs, radioactive substances, and pathogenic microorganisms in public and other crowd-attracting facilities and public transportation such as airports, seaports, and railroads.	86	2013	2020
3 51: Systems for early warning and prediction by experts (e.g. early detection of human/livestock infection and prediction of its impacts, early warning of the environmental effects of an accident or disaster) are established, enabling early detection and impact assessment of the problems that should be solved by science and technology.	85	2013	2021
4 19: A system that supports women's social participation by ensuring mothers the future availability of child-rearing support such as nursery schools, at the time of pregnancy or childbirth.	84	-	2012
5 26: A system that prevents senile dementia by inhibiting impairment of an elderly person's brain function.	82	2015	2022
6 52: Systems for assessing the long-term impacts of artificial and natural substances and systems on health and the environment are established, so that the government can systematically provide monitoring/surveillance results on potential threats and other negative issues.	79	2013	2021
7 56: To address the NIMBY (not in my backyard) problem, the form of discussion and the procedure intended for convincing the interested parties are established.	75	-	2018
8 46: Establishment of global rules concerning the copyright of multimedia information to promote the production and distribution of multimedia content.	69	-	2014
9 02: Technology for promoting the formation of local communities using disaster prevention, crime prevention, and welfare as the key concepts.	69	2011	2018
10 06: Low-cost, fast, and secure biometrics authentication technology as a means of identification verification to prevent crime.	68	2009	2014

Year T: Time of technological realization Year S: Time of social application

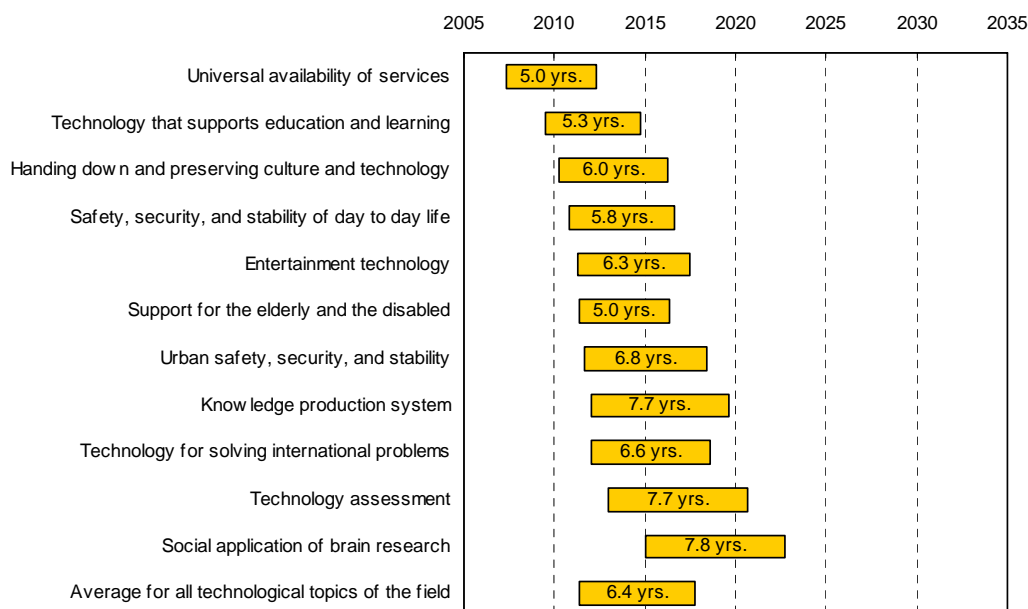
*Responses were indexed on a 100-point scale.

D. Time of realization

Distribution of topics



Gap between technological realization and social application



Topics with short or long periods until social application

Topic	Year T*	Period*	Area
28: Technology for assisting people who cannot make oral or written conversation because of disease or other reasons in communicating smoothly with others by reading their thoughts based on brain activities.	2015	9	Social application of brain research
08: Automobiles with automatic driving function for preventing traffic accidents.	2012	8	Urban safety, security, and stability
25: Media technology that facilitates the sound development of children's brain functions for thinking, creating, and communicating.	2014	8	Social application of brain research
29: Technology for promoting international communication and mutual understanding by not only interpreting words, but displaying wider information such as the culture, custom, and social principle behind the utterance.	2013	8	Technology for solving international problems
42: Reconstruction of educational and communication systems as a result of the establishment of a knowledge production method independent of space, time, and language.	2013	8	Knowledge production system

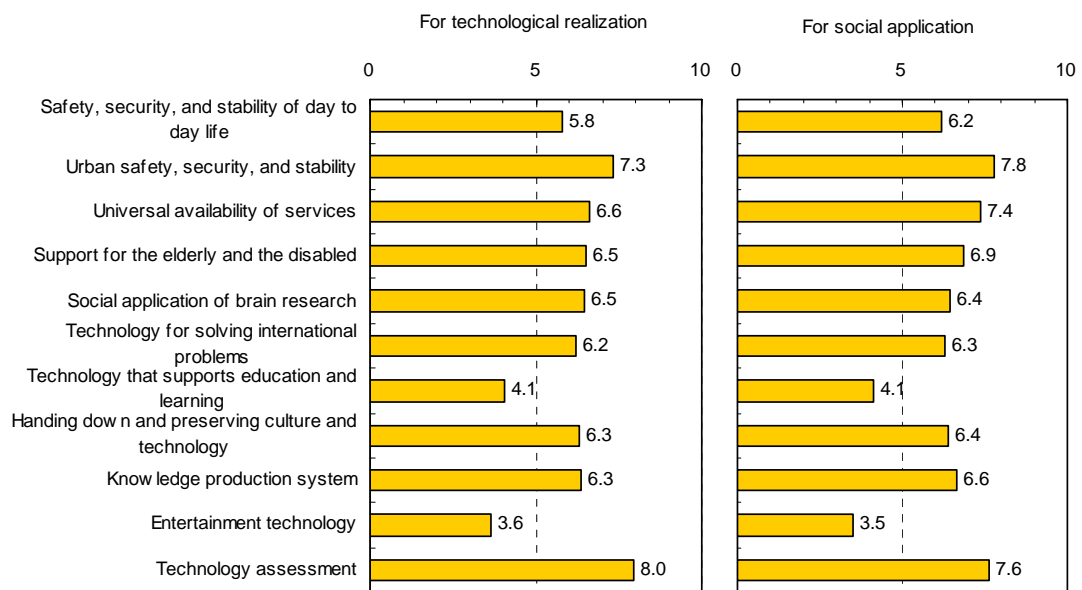
Topic	Year T*	Period*	Area
45: Construction of a public database that gives centralized access to a collection of the data owned by public institutions and universities, and serves as the infrastructure for knowledge production in society.	2010	8	Knowledge production system
48: Robot leasing service in which customers can lease robots suited to their needs, such as gardening, nursing care, and household chores.	2013	8	Entertainment technology
50: A robot that acts as the user's sibling or friend and allows the user to experience pseudo-brotherhood, -sisterhood or -friendship to improve social skills.	2014	8	Entertainment technology
51: Systems for early warning and prediction by experts (e.g. early detection of human/livestock infection and prediction of its impacts, early warning of the environmental effects of an accident or disaster) are established, enabling early detection and impact assessment of the problems that should be solved by science and technology.	2013	8	Technology assessment
52: Systems for assessing the long-term impacts of artificial and natural substances and systems on health and the environment are established, so that the government can systematically provide monitoring/surveillance results on potential threats and other negative issues.	2013	8	Technology assessment
Topic	Year T*	Period*	Area
24: A nursing-care robot that can assist a caregiver in bathing without making the patient feel uncomfortable or uneasy.	2012	4	Support for the elderly and the disabled
49: Technology for expanding leisure time, such as a system in which people can easily find a substitute who performs their office work or household chores, for encouraging the proposal of new ways of spending leisure time.	2011	4	Entertainment technology
01: A robot that provides diverse information and services to enrich people's lives and allows distant family members to monitor each other's safety and health.	2012	5	Safety, security, and stability of day to day life
05: A multi-function smart card that performs personal authentication and other security functions, electronic payments, etc. and may be used for almost all transactions and purchases across the world.	2009	5	Safety, security, and stability of day to day life
06: Low-cost, fast, and secure biometrics authentication technology as a means of identification verification to prevent crime.	2009	5	Safety, security, and stability of day to day life
12: A centralized food safety management system that covers all processes of food, including production, distribution, processing, and sales.	2009	5	Urban safety, security, and stability
16: An information terminal and software with which elderly and disabled people can easily access information networks.	2009	5	Universal availability of services
18: Governmental services through which applications and other formal documents may be submitted to government offices over the Internet.	2005	5	Universal availability of services
20: A secure wide-area medical information system in which individuals can access their own electronic patient charts from their homes.	2008	5	Universal availability of services
22: A work environment in which disabled and elderly people can comfortably work fully using their abilities, and work support technology for constructing such an environment.	2011	5	Support for the elderly and the disabled
31: Traceability technology with which the transport history of every item distributed and traded may be recorded, inspected, and looked up.	2009	5	Technology for solving international problems
34: A scientific system that allows the youth who cannot engage in ordinal communication to acquire sociability even without face-to-face communication.	2012	5	Technology that supports education and learning
36: A learning system that can enhance scientific thinking by allowing learners to experiment/experience unrealistic phenomena/events in a virtual space created by simulation or other technology.	2010	5	Technology that supports education and learning
37: Advances in web-based language translation function allow people to search through online information in any language and retrieve results in a specific language, resulting in the construction of a knowledge repository system from which desired information is instantly retrievable from any part of the world.	2010	5	Technology that supports education and learning

Topic	Year T*	Period*	Area
41: Preserving and protecting intangible cultural properties, such as traditional performing arts, and handing down relevant skills, through the use of digital images, virtual reality technology, etc.	2009	5	Handing down and preserving culture and technology
47: An intelligent transport system (ITS) that makes a motor trip more enjoyable and comfortable by, for example, providing voice guidance on nearby tourist attractions and events for those who make a stop at a roadside station or an expressway toll booth.	2007	5	Entertainment technology

*Year T: Time of technological realization Period: Period until social application (years)

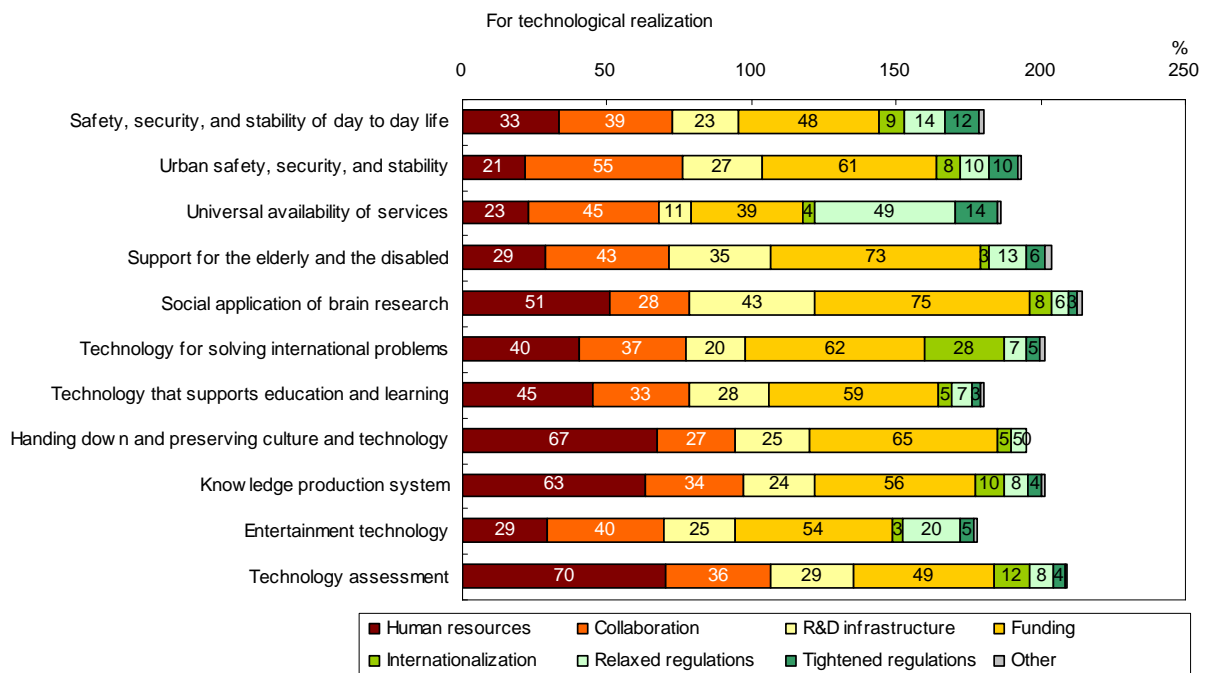
E. Effective measures that should taken by government

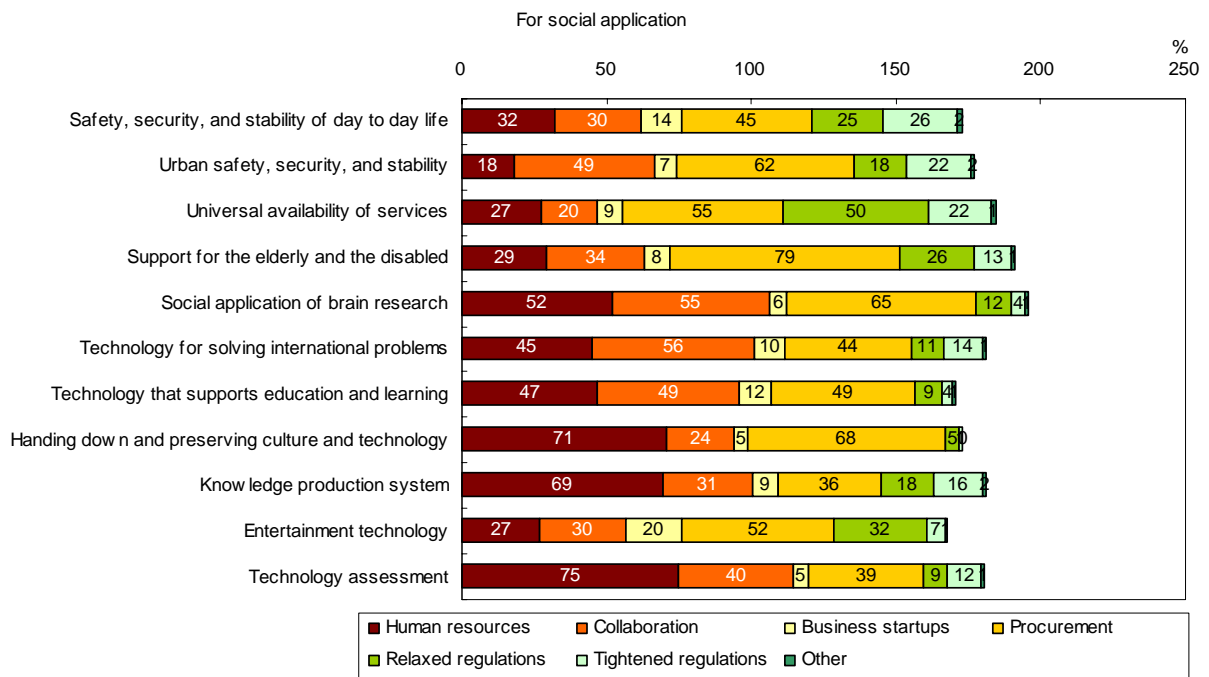
Necessity of government involvement



*Responses were indexed on a 10-point scale

Effective measures





F. Time-line of topics

Technological realization

year	topic
2005	18: Governmental services through which applications and other formal documents may be submitted to government offices over the Internet.
2006	35: An electronic book that makes full use of multimedia technology for reversing the growing trend of illiteracy or people not reading books.
2007	47: An intelligent transport system (ITS) that makes a motor trip more enjoyable and comfortable by, for example, providing voice guidance on nearby tourist attractions and events for those who make a stop at a roadside station or an expressway toll booth.
2008	20: A secure wide-area medical information system in which individuals can access their own electronic patient charts from their homes.
2009	05: A multi-function smart card that performs personal authentication and other security functions, electronic payments, etc. and may be used for almost all transactions and purchases across the world. 06: Low-cost, fast, and secure biometrics authentication technology as a means of identification verification to prevent crime. 12: A centralized food safety management system that covers all processes of food, including production, distribution, processing, and sales. 14: A secure information storage service widely applicable to central and local government offices. 16: An information terminal and software with which elderly and disabled people can easily access information networks. 31: Traceability technology with which the transport history of every item distributed and traded may be recorded, inspected, and looked up.
2010	40: Handing down skills of producing tangible cultural properties, such as pottery, painting, and woven fabric, through the use of digital images, virtual reality technology, etc. 41: Preserving and protecting intangible cultural properties, such as traditional performing arts, and handing down relevant skills, through the use of digital images, virtual reality technology, etc. 36: A learning system that can enhance scientific thinking by allowing learners to experiment/experience unrealistic phenomena/events in a virtual space created by simulation or other technology. 37: Advances in web-based language translation function allow people to search through online information in any language and retrieve results in a specific language, resulting in the construction of a knowledge repository system from which desired information is instantly retrievable from any part of the world. 45: Construction of a public database that gives centralized access to a collection of the data owned by public institutions and universities, and serves as the infrastructure for knowledge production in society.

year	topic
2011	<p>02: Technology for promoting the formation of local communities using disaster prevention, crime prevention, and welfare as the key concepts.</p> <p>09: A wide-area disaster monitoring system that monitors, when a major disaster occurs, the impacts of the disaster widely across the affected area, by using satellite images and the analysis by laser radar equipment, to help provide prompt and safe evacuation guidance.</p> <p>21: Technology for advanced mobility/walking support equipment and systems that can dramatically improve the social lives of elderly and disabled people.</p> <p>22: A work environment in which disabled and elderly people can comfortably work fully using their abilities, and work support technology for constructing such an environment.</p> <p>39: Information storage technology that enables the restoration of tangible cultural properties in the event of loss or damage.</p> <p>49: Technology for expanding leisure time, such as a system in which people can easily find a substitute who performs their office work or household chores, for encouraging the proposal of new ways of spending leisure time.</p>
2012	<p>01: A robot that provides diverse information and services to enrich people's lives and allows distant family members to monitor each other's safety and health.</p> <p>03: An assessment system for the domestic risk of individual households and a system for supporting concrete safeguards against each risk item.</p> <p>04: An information service system that contributes to reducing anxieties about old age by supporting the decision-making process based on future prediction.</p> <p>08: Automobiles with automatic driving function for preventing traffic accidents.</p> <p>13: An interactive risk management system that applies the conversational knowledge process.</p> <p>24: A nursing-care robot that can assist a caregiver in bathing without making the patient feel uncomfortable or uneasy.</p> <p>33: A portable voice translation device that enables smooth international communication.</p> <p>34: A scientific system that allows the youth who cannot engage in ordinal communication to acquire sociability even without face-to-face communication.</p> <p>38: Technology for protecting, restoring, and preserving tangible cultural properties by making full use of nanotechnology, biotechnology, and materials technology.</p>
2013	<p>07: A robot that incorporates sensors capable of quickly detecting explosives, drugs, and toxic substances with as high a sensitivity as animals such as a bomb- or drug-sniffer dog and a canary, which is sensitive to toxic substances.</p> <p>10: A system for quickly and accurately detecting trace amounts of explosives, drugs, radioactive substances, and pathogenic microorganisms in public and other crowd-attracting facilities and public transportation such as airports, seaports, and railroads.</p> <p>11: A robot applicable to contamination treatment activities at the site of an NBC terror attack (a terror attack aimed at mass killing with nuclear, biological, or chemical material/weapons).</p> <p>15: A regional security system in which home security systems are interconnected and use personal robots whose services are not limited to disaster prevention, crime prevention, and nursing care, but much more diverse.</p> <p>29: Technology for promoting international communication and mutual understanding by not only interpreting words, but displaying wider information such as the culture, custom, and social principle behind the utterance.</p> <p>30: Technology for predicting the occurrence and spread of infectious diseases by combining data on global social and economic activities with a model of infectious disease occurrence.</p> <p>32: Technology that assists the interested nations of an international problem in making rational decisions by showing diverse scientific knowledge, arguments, and value judgments in an organized and analytical manner to give an overview of the problem.</p> <p>42: Reconstruction of educational and communication systems as a result of the establishment of a knowledge production method independent of space, time, and language.</p> <p>44: Widespread use of an evidence-based policy making approach as a result of the clarification and visualization of social problems.</p> <p>48: Robot leasing service in which customers can lease robots suited to their needs, such as gardening, nursing care, and household chores.</p> <p>51: Systems for early warning and prediction by experts (e.g. early detection of human/livestock infection and prediction of its impacts, early warning of the environmental effects of an accident or disaster) are established, enabling early detection and impact assessment of the problems that should be solved by science and technology.</p>

year	topic
	52: Systems for assessing the long-term impacts of artificial and natural substances and systems on health and the environment are established, so that the government can systematically provide monitoring/surveillance results on potential threats and other negative issues.
	55: Participatory technology assessment (TA) methods involving NPOs and citizens are established to adapt to Japanese society, and over 200 of such assessments are performed in Japan.
2014	25: Media technology that facilitates the sound development of children's brain functions for thinking, creating, and communicating.
	50: A robot that acts as the user's sibling or friend and allows the user to experience pseudo-brotherhood, -sisterhood or -friendship to improve social skills.
2015	26: A system that prevents senile dementia by inhibiting impairment of an elderly person's brain function.
	28: Technology for assisting people who cannot make oral or written conversation because of disease or other reasons in communicating smoothly with others by reading their thoughts based on brain activities.
2016	27: Remedies for truant students, classroom chaos, and learning disabilities as a result of the elucidation of the brain mechanisms behind them.

Social application

year	topic
2010	18: Governmental services through which applications and other formal documents may be submitted to government offices over the Internet.
2012	17: A human resources database and a system for coordinating human resources placement and outsourcing, for eliminating regional disparities in human resources.
	19: A system that supports women's social participation by ensuring mothers the future availability of child-rearing support such as nursery schools, at the time of pregnancy or childbirth.
	35: An electronic book that makes full use of multimedia technology for reversing the growing trend of illiteracy or people not reading books.
	47: An intelligent transport system (ITS) that makes a motor trip more enjoyable and comfortable by, for example, providing voice guidance on nearby tourist attractions and events for those who make a stop at a roadside station or an expressway toll booth.
2013	20: A secure wide-area medical information system in which individuals can access their own electronic patient charts from their homes.
2014	05: A multi-function smart card that performs personal authentication and other security functions, electronic payments, etc. and may be used for almost all transactions and purchases across the world.
	06: Low-cost, fast, and secure biometrics authentication technology as a means of identification verification to prevent crime.
	12: A centralized food safety management system that covers all processes of food, including production, distribution, processing, and sales.
	16: An information terminal and software with which elderly and disabled people can easily access information networks.
	23: Proliferation of terminal-care environments, facilities, and technology in which patients can end their lives comfortably and peacefully.
	31: Traceability technology with which the transport history of every item distributed and traded may be recorded, inspected, and looked up.
	41: Preserving and protecting intangible cultural properties, such as traditional performing arts, and handing down relevant skills, through the use of digital images, virtual reality technology, etc.
	46: Establishment of global rules concerning the copyright of multimedia information to promote the production and distribution of multimedia content.
2015	14: A secure information storage service widely applicable to central and local government offices.
	36: A learning system that can enhance scientific thinking by allowing learners to experiment/experience unrealistic phenomena/events in a virtual space created by simulation or other technology.
	37: Advances in web-based language translation function allow people to search through online information in any language and retrieve results in a specific language, resulting in the construction of a knowledge repository system from which desired information is instantly retrievable from any part of the world.
	40: Handing down skills of producing tangible cultural properties, such as pottery, painting, and woven fabric, through the use of digital images, virtual reality technology, etc.

year	topic
	49: Technology for expanding leisure time, such as a system in which people can easily find a substitute who performs their office work or household chores, for encouraging the proposal of new ways of spending leisure time.
	53: A cycle is established in which ELSI (Ethical, Legal and Social Issues) research is promoted, in parallel with advanced research, and the results contribute to the formulation of research strategy, and subsequently, the ELSI research funds exceed 3% of the total research funds.
2016	22: A work environment in which disabled and elderly people can comfortably work fully using their abilities, and work support technology for constructing such an environment.
	24: A nursing-care robot that can assist a caregiver in bathing without making the patient feel uncomfortable or uneasy.
2017	01: A robot that provides diverse information and services to enrich people's lives and allows distant family members to monitor each other's safety and health.
	21: Technology for advanced mobility/walking support equipment and systems that can dramatically improve the social lives of elderly and disabled people.
	34: A scientific system that allows the youth who cannot engage in ordinal communication to acquire sociability even without face-to-face communication.
	39: Information storage technology that enables the restoration of tangible cultural properties in the event of loss or damage.
	54: An bioethical public debate involving diverse and numerous people of Japan is held to form a consensus on how to combine bioethics and research activities.
2018	02: Technology for promoting the formation of local communities using disaster prevention, crime prevention, and welfare as the key concepts.
	03: An assessment system for the domestic risk of individual households and a system for supporting concrete safeguards against each risk item.
	09: A wide-area disaster monitoring system that monitors, when a major disaster occurs, the impacts of the disaster widely across the affected area, by using satellite images and the analysis by laser radar equipment, to help provide prompt and safe evacuation guidance.
	33: A portable voice translation device that enables smooth international communication.
	45: Construction of a public database that gives centralized access to a collection of the data owned by public institutions and universities, and serves as the infrastructure for knowledge production in society.
	56: To address the NIMBY (not in my backyard) problem, the form of discussion and the procedure intended for convincing the interested parties are established.
2019	04: An information service system that contributes to reducing anxieties about old age by supporting the decision-making process based on future prediction.
	13: An interactive risk management system that applies the conversational knowledge process.
	38: Technology for protecting, restoring, and preserving tangible cultural properties by making full use of nanotechnology, biotechnology, and materials technology.
2020	07: A robot that incorporates sensors capable of quickly detecting explosives, drugs, and toxic substances with as high a sensitivity as animals such as a bomb- or drug-sniffer dog and a canary, which is sensitive to toxic substances.
	08: Automobiles with automatic driving function for preventing traffic accidents.
	10: A system for quickly and accurately detecting trace amounts of explosives, drugs, radioactive substances, and pathogenic microorganisms in public and other crowd-attracting facilities and public transportation such as airports, seaports, and railroads.
	11: A robot applicable to contamination treatment activities at the site of an NBC terror attack (a terror attack aimed at mass killing with nuclear, biological, or chemical material/weapons).
	15: A regional security system in which home security systems are interconnected and use personal robots whose services are not limited to disaster prevention, crime prevention, and nursing care, but much more diverse.
	30: Technology for predicting the occurrence and spread of infectious diseases by combining data on global social and economic activities with a model of infectious disease occurrence.
	32: Technology that assists the interested nations of an international problem in making rational decisions by showing diverse scientific knowledge, arguments, and value judgments in an organized and analytical manner to give an overview of the problem.
	44: Widespread use of an evidence-based policy making approach as a result of the clarification and visualization of social problems.

year	topic
2021	<p>55: Participatory technology assessment (TA) methods involving NPOs and citizens are established to adapt to Japanese society, and over 200 of such assessments are performed in Japan.</p> <p>29: Technology for promoting international communication and mutual understanding by not only interpreting words, but displaying wider information such as the culture, custom, and social principle behind the utterance.</p> <p>42: Reconstruction of educational and communication systems as a result of the establishment of a knowledge production method independent of space, time, and language.</p> <p>43: Introduction of a new social decision-making approach as a result of the dissolution of the boundary between experts and non-experts through fusion between knowledge producers and knowledge consumers.</p> <p>48: Robot leasing service in which customers can lease robots suited to their needs, such as gardening, nursing care, and household chores.</p> <p>51: Systems for early warning and prediction by experts (e.g. early detection of human/livestock infection and prediction of its impacts, early warning of the environmental effects of an accident or disaster) are established, enabling early detection and impact assessment of the problems that should be solved by science and technology.</p> <p>52: Systems for assessing the long-term impacts of artificial and natural substances and systems on health and the environment are established, so that the government can systematically provide monitoring/surveillance results on potential threats and other negative issues.</p>
2022	<p>25: Media technology that facilitates the sound development of children's brain functions for thinking, creating, and communicating.</p> <p>26: A system that prevents senile dementia by inhibiting impairment of an elderly person's brain function.</p> <p>50: A robot that acts as the user's sibling or friend and allows the user to experience pseudo-brotherhood, -sisterhood or -friendship to improve social skills.</p>
2023	<p>27: Remedies for truant students, classroom chaos, and learning disabilities as a result of the elucidation of the brain mechanisms behind them.</p>
2024	<p>28: Technology for assisting people who cannot make oral or written conversation because of disease or other reasons in communicating smoothly with others by reading their thoughts based on brain activities.</p>

Appendix: Results of R1 and R2

I. Safety, security, and stability of day to day life

1. Questions regarding the relevant area



2. Questions regarding topics

No	Topic	Questionnaire	Respondents (persons)	Degree of expertise				Importance to Japan				Time of technological realization															
				High	Moderate	Low	None	Index	High	Moderate	Low	None	Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know							
				(%)				(%)				(%)															
1	A robot that provides diverse information and services to enrich people's lives and allows distant family members to monitor each other's safety and health.	1	97	12	20	68	-	58	28	50	20	2										2	4				
		2	86	7	19	74	-	54	19	61	20	0												1	1		
		E	6	100	0	0	-	90	80	20	0	0													0	0	
2	Technology for promoting the formation of local communities using disaster prevention, crime prevention, and welfare as the key concepts.	1	105	10	27	63	-	70	46	46	6	2												3	10		
		2	89	4	21	75	-	69	40	57	3	0												0	7		
		E	4	100	0	0	-	88	75	25	0	0													0	0	
3	An assessment system for the domestic risk of individual households and a system for supporting concrete safeguards against each risk item.	1	76	11	25	64	-	46	12	52	31	5													5	13	
		2	76	5	24	71	-	46	7	66	24	3													3	5	
		E	4	100	0	0	-	56	25	50	25	0														0	0
4	An information service system that contributes to reducing anxieties about old age by supporting the decision-making process based on future prediction.	1	84	8	23	69	-	55	29	41	24	6													8	13	
		2	82	4	20	76	-	50	19	50	25	6													4	6	
		E	3	100	0	0	-	58	34	33	33	0														0	33
5	A multi-function smart card that performs personal authentication and other security functions, electronic payments, etc. and may be used for almost all transactions and purchases across the world.	1	100	9	19	72	-	54	27	41	27	5													3	3	
		2	85	2	11	87	-	54	22	53	21	4													2	2	
		E	2	100	0	0	-	63	50	0	50	0														0	50
6	Low-cost, fast, and secure biometrics authentication technology as a means of identification verification to prevent crime.	1	96	9	20	71	-	66	40	46	13	1														0	3
		2	81	2	16	82	-	68	39	55	6	0														0	1
		E	2	100	0	0	-	75	50	50	0	0															0

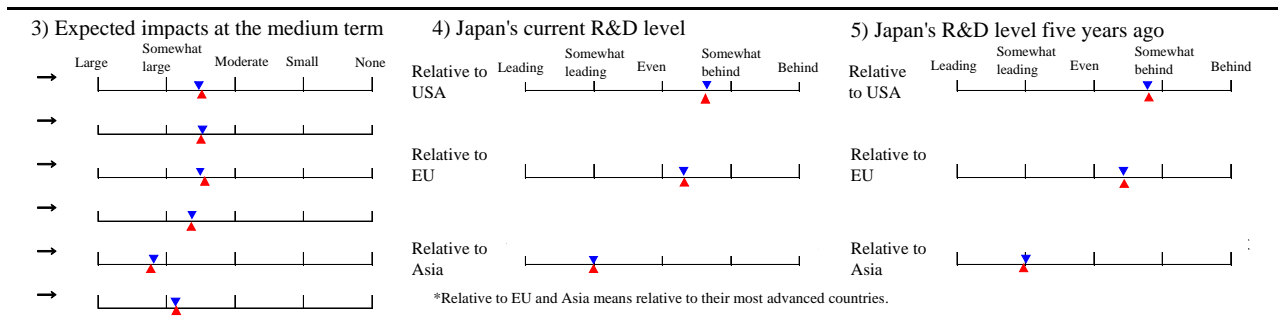
II. Urban safety, security, and stability

1. Questions regarding the relevant area

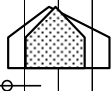
1) Degree of expertise in the area		2) Current impacts	
High	Moderate	Low	
[Increased intellectual assets]	Contribution of the relevant area itself to increased intellectual assets	Contribution to the development of other fields	
[Economic impacts]	Contribution to the development of existing Japanese industry	Contribution to the creation of new industries or businesses	
[Social impacts]	Contribution to safety and security	Contribution to improved social vitality and quality of life	

2. Questions regarding topics

No	Topic	Questionnaire	Respondents (persons)	Degree of expertise				Importance to Japan				Time of technological realization											
				High	Moderate	Low	None	Index	High	Moderate	Low	None	Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know			
				(%)				(%)				(%)											
7	A robot that incorporates sensors capable of quickly detecting explosives, drugs, and toxic substances with as high a sensitivity as animals such as a bomb- or drug-sniffer dog and a canary, which is sensitive to toxic substances.	1	82	11	24	65	-	64	36	52	10	2									2	2	
		2	74	7	14	79	-	57	19	70	11	0										0	3
		E	5	100	0	0	-	90	80	20	0	0											0
8	Automobiles with automatic driving function for preventing traffic accidents.	1	95	13	17	70	-	64	39	40	20	1										1	4
		2	81	5	10	85	-	57	25	55	19	1										1	4
		E	4	100	0	0	-	100	100	0	0	0											0
9	A wide-area disaster monitoring system that monitors, when a major disaster occurs, the impacts of the disaster widely across the affected area, by using satellite images and the analysis by laser radar equipment, to help provide prompt and safe evacuation guidance.	1	90	12	30	58	-	81	67	28	4	1										1	2
		2	77	4	22	74	-	88	76	21	3	0										0	1
		E	3	100	0	0	-	83	67	33	0	0											0
10	A system for quickly and accurately detecting trace amounts of explosives, drugs, radioactive substances, and pathogenic microorganisms in public and other crowd-attracting facilities and public transportation such as airports, seaports, and railroads.	1	87	20	24	56	-	73	53	35	8	4										6	1
		2	78	9	22	69	-	86	76	18	6	0										0	3
		E	7	100	0	0	-	93	86	14	0	0											0
11	A robot applicable to contamination treatment activities at the site of an NBC terror attack (a terror attack aimed at mass killing with nuclear, biological, or chemical material/weapons).	1	83	10	25	65	-	65	40	43	15	2										4	4
		2	72	4	15	81	-	65	34	59	7	0										0	3
		E	3	100	0	0	-	50	0	100	0	0											0
12	A centralized food safety management system that covers all processes of food, including production, distribution, processing, and sales.	1	86	8	27	65	-	67	39	53	8	0										0	6
		2	73	4	16	80	-	67	38	56	6	0										0	1
		E	3	100	0	0	-	67	33	67	0	0											0
13	An interactive risk management system that applies the conversational knowledge process.	1	76	20	28	52	-	51	23	43	26	8										3	7
		2	72	7	32	61	-	46	11	55	30	4										0	4
		E	5	100	0	0	-	75	60	20	20	0											0
14	A secure information storage service widely applicable to central and local government offices.	1	87	9	24	67	-	64	39	40	21	0										1	3
		2	76	4	22	74	-	58	23	64	12	1										0	3
		E	3	100	0	0	-	58	34	33	33	0											0



Countries at the leading edge						Regarding technological realization										Time of social application					Regarding social application														
						Necessity of gov't involvement				Effective measures that should be taken by gov't											Necessity of gov't involvement		Effective measures that should be taken by gov't												
Japan	USA	EU	Asia	Other	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Development of R&D infrastructure	Expansion of R&D funding	Internationalization of R&D activities	Relaxation or elimination of relevant regulations	Tightened or new regulations	Other	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be applied	Do not know	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Improvement of environment for business startups	Support through taxation, subsidies, and procurement	Relaxation or elimination of relevant regulations	Tightened or new regulations	Other	
(%)						(%)				(%)						(%)					(%)														
10	89	0	0	1	44	36	14	6	25	49	36	67	23	4	5	0							1	5	50	33	8	9	23	46	23	56	14	24	0
8	92	0	0	0	49	40	10	1	18	56	29	72	8	7	3	1							0	4	62	26	11	1	10	52	10	68	10	17	1
40	60	0	0	0	75	25	0	0	50	75	50	75	25	0	0	0							0	0	80	20	0	0	40	80	0	80	0	20	0
69	21	10	0	0	17	30	33	20	17	51	23	46	11	31	17	1							1	7	31	27	24	18	17	33	14	46	44	38	0
81	16	3	0	0	10	49	35	6	12	62	16	57	4	22	7	1							1	4	29	42	23	6	8	34	5	56	51	29	1
100	0	0	0	0	25	75	0	0	25	25	0	50	0	0	25	0							0	0	50	50	0	0	25	50	0	25	25	25	0
17	81	2	0	0	68	25	7	0	25	47	44	69	25	8	5	0							0	2	71	21	7	1	30	49	14	54	19	18	2
9	90	0	0	1	75	20	4	1	17	55	35	81	13	5	3	1							0	3	77	21	1	1	21	58	3	73	8	7	1
67	33	0	0	0	67	33	0	0	67	67	33	100	0	0	0	0							0	0	67	33	0	0	67	33	0	33	0	33	0
10	89	1	0	0	60	28	8	4	33	45	43	65	28	10	14	0							4	2	65	25	6	4	23	50	22	54	21	26	3
4	95	1	0	0	73	19	5	3	21	55	32	79	12	8	7	1							0	3	74	19	4	3	12	68	9	66	11	14	1
29	71	0	0	0	86	14	0	0	43	86	29	57	14	29	29	0							0	0	83	17	0	0	17	83	0	33	17	17	0
25	72	3	0	0	52	33	12	3	32	45	45	64	25	8	7	0							5	5	58	29	10	3	27	45	20	61	18	22	3
6	94	0	0	0	63	29	7	1	21	45	30	75	15	8	4	1							0	3	75	23	1	1	9	59	7	74	10	13	1
67	33	0	0	0	67	33	0	0	67	33	0	100	0	33	33	0							0	0	100	0	0	0	33	67	0	100	0	33	0
50	28	21	0	1	42	33	20	5	33	48	33	33	15	16	39	1							0	6	48	30	17	5	31	39	11	40	28	54	1
76	10	14	0	0	59	32	5	4	17	74	17	30	4	14	34	1							1	4	70	25	1	4	9	40	4	59	15	60	3
67	33	0	0	0	33	67	0	0	33	67	33	0	0	0	67	0							0	0	67	33	0	0	33	67	0	33	0	67	0
22	62	13	0	3	10	39	36	15	35	35	34	44	13	8	6	0							4	8	16	34	36	14	48	39	21	39	16	16	2
6	87	6	0	1	1	56	36	7	46	35	22	55	5	8	3	2							4	3	6	44	41	9	61	33	5	48	10	7	2
40	60	0	0	0	0	80	20	0	80	0	40	40	0	0	0	0							0	0	0	60	40	0	80	20	0	40	20	0	0
4	83	13	0	0	40	42	18	0	30	43	34	30	6	18	24	4							2	6	50	33	16	1	30	38	10	43	28	38	3
1	95	4	0	0	37	47	15	1	25	65	27	28	6	8	21	1							0	1	68	19	10	3	25	41	4	45	24	39	1
0	67	33	0	0	34	33	33	0	33	33	67	33	67	0	0	0							0	0	67	0	33	0	33	67	0	33	33	33	0

Countries at the leading edge					Regarding technological realization										Time of social application					Regarding social application															
					Necessity of gov't involvement				Effective measures that should be taken by gov't											Necessity of gov't involvement				Effective measures that should be taken by gov't											
Japan	USA	EU	Asia	Other	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Development of R&D infrastructure	Expansion of R&D funding	Internationalization of R&D activities	Relaxation or elimination of relevant regulations	Tightened or new regulations	Other	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be applied	Do not know	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Improvement of environment for business startups	Support through taxation, subsidies, and procurement	Relaxation or elimination of relevant regulations	Tightened or new regulations	Other	
(%)					(%)				(%)						(%)				(%)																
47	44	6	0	3	23	41	30	6	25	47	48	57	12	17	14	3							6	9	27	43	23	7	20	45	24	61	27	19	4
53	44	3	0	0	10	66	18	6	15	46	39	67	3	12	6	1							3	1	17	61	16	6	9	53	17	67	24	12	2
75	0	25	0	0	25	50	25	0	50	75	75	75	0	0	25	0							0	0	25	50	25	0	50	50	50	100	25	50	0

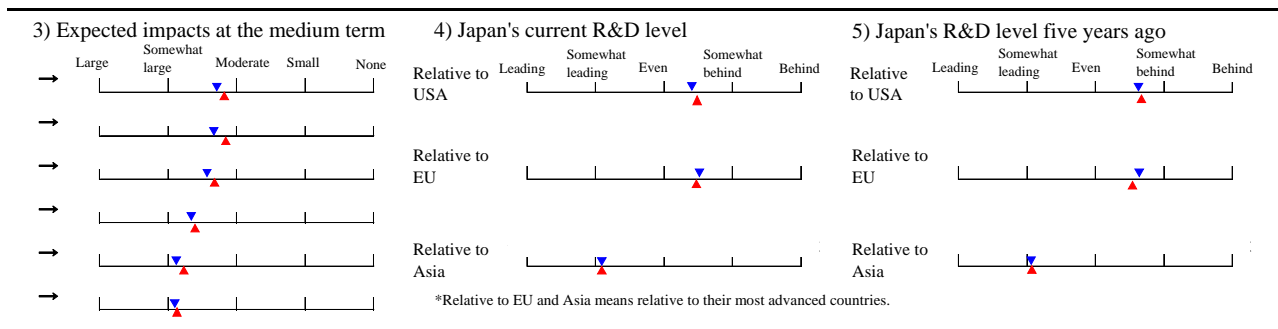
III. Universal availability of services

1. Questions regarding the relevant area

1) Degree of expertise in the area		2) Current impacts	
High	Moderate	Low	
[Increased intellectual assets]	Contribution of the relevant area itself to increased intellectual assets		
	Contribution to the development of other fields		
[Economic impacts]	Contribution to the development of existing Japanese industry		
	Contribution to the creation of new industries or businesses		
[Social impacts]	Contribution to safety and security		
	Contribution to improved social vitality and quality of life		

2. Questions regarding topics

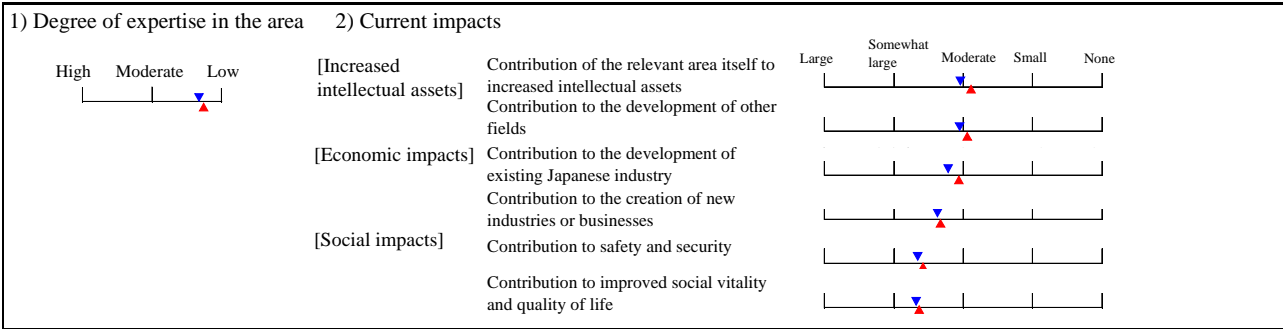
No	Topic	Questionnaire	Degree of expertise				Importance to Japan					Time of technological realization										
			Respondents (persons)				Index	High	Moderate	Low	None	Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know			
			High	Moderate	Low	None														(%)	(%)	(%)
16	An information terminal and software with which elderly and disabled people can easily access information networks.	1	94	9	27	64	-	63	34	53	12	1								0	1	
		2	83	4	18	78	-	57	18	73	9	0									0	1
		E	3	100	0	0	-	67	33	67	0	0									0	0
17	A human resources database and a system for coordinating human resources placement and outsourcing, for eliminating regional disparities in human resources.	1	76	8	28	64	-	53	22	51	23	4										
		2	71	3	21	76	-	51	13	67	17	3										
		E	2	100	0	0	-	63	50	0	50	0										
18	Governmental services through which applications and other formal documents may be submitted to government offices over the Internet.	1	92	11	21	68	-	59	30	47	21	2								0	1	
		2	81	5	15	80	-	58	20	73	6	1								0	1	
		E	4	100	0	0	-	63	25	75	0	0								0	0	
19	A system that supports women's social participation by ensuring mothers the future availability of child-rearing support such as nursery schools, at the time of pregnancy or childbirth.	1	77	12	18	70	-	77	56	40	4	0										
		2	77	4	13	83	-	84	69	27	4	0										
		E	3	100	0	0	-	75	50	50	0	0										
20	A secure wide-area medical information system in which individuals can access their own electronic patient charts from their homes.	1	85	12	25	63	-	59	29	48	22	1								2	5	
		2	79	5	19	76	-	53	13	75	9	3								1	3	
		E	4	100	0	0	-	63	25	75	0	0								0	0	



Countries at the leading edge	Regarding technological realization										Time of social application					Regarding social application														
	Necessity of gov't involvement					Effective measures that should be taken by gov't					2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be applied		Do not know		Necessity of gov't involvement					Effective measures that should be taken by gov't					
Japan	USA	EU	Asia	Other	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration						Development of R&D infrastructure	Expansion of R&D funding	Internationalization of R&D activities	Relaxation or elimination of relevant regulations	Tightened or new regulations	Other	(%)	(%)	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Improvement of environment for business startups
21	45	33	0	1	24	43	26	7	37	42	32	56	6	13	11	0		0	5	26	43	24	7	30	36	29	60	24	14	4
7	76	17	0	0	11	69	13	7	25	55	17	71	7	8	4	1		0	1	15	70	10	5	21	32	18	81	15	8	1
33	67	0	0	0	33	67	0	0	33	100	67	100	67	0	0	0		0	0	33	67	0	0	67	67	67	67	33	0	0
																		3	7	21	38	31	10	37	27	17	46	38	16	5
																		0	1	10	65	19	6	39	16	11	64	30	11	2
																		0	0	0	50	50	0	100	0	0	0	0	0	0
19	57	19	5	0	35	30	19	16	21	33	8	16	5	49	32	4		0	2	44	31	18	7	19	18	8	27	60	37	6
5	90	4	1	0	58	23	8	11	24	37	6	11	1	72	23	1		0	1	73	16	6	5	16	12	4	23	81	32	1
0	50	50	0	0	25	25	25	25	67	67	33	33	33	67	33	33		0	0	50	25	25	0	50	25	25	50	75	75	25
																		0	9	60	29	10	1	33	20	14	56	47	37	3
																		0	5	84	12	3	1	35	13	7	76	50	24	1
																		0	0	67	33	0	0	100	0	0	100	33	33	0
13	63	20	0	4	20	45	23	12	24	39	20	37	7	50	29	3		2	11	26	46	21	7	31	28	12	37	52	40	3
4	92	4	0	0	14	65	9	12	19	44	10	34	4	66	16	1		3	3	19	64	9	8	27	26	4	33	76	33	1
25	75	0	0	0	50	50	0	0	50	50	0	75	0	50	0	0		0	0	50	50	0	0	50	25	0	75	50	0	0

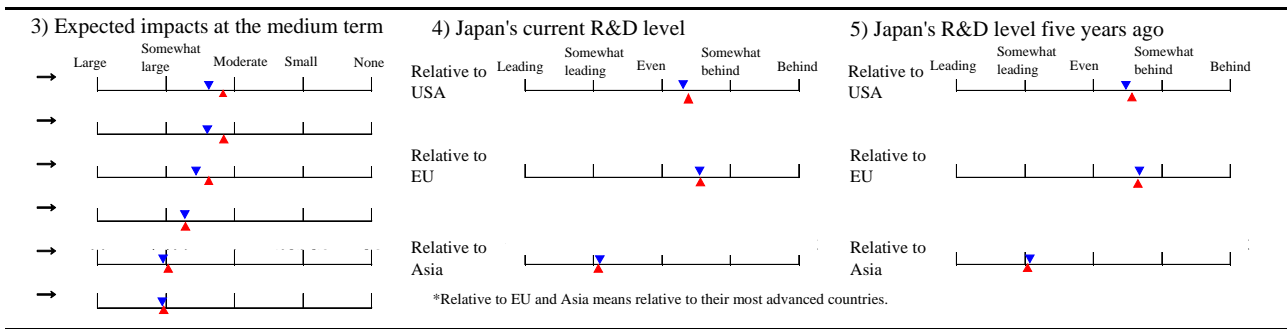
IV. Support for the elderly and the disabled

1. Questions regarding the relevant area



2. Questions regarding topics

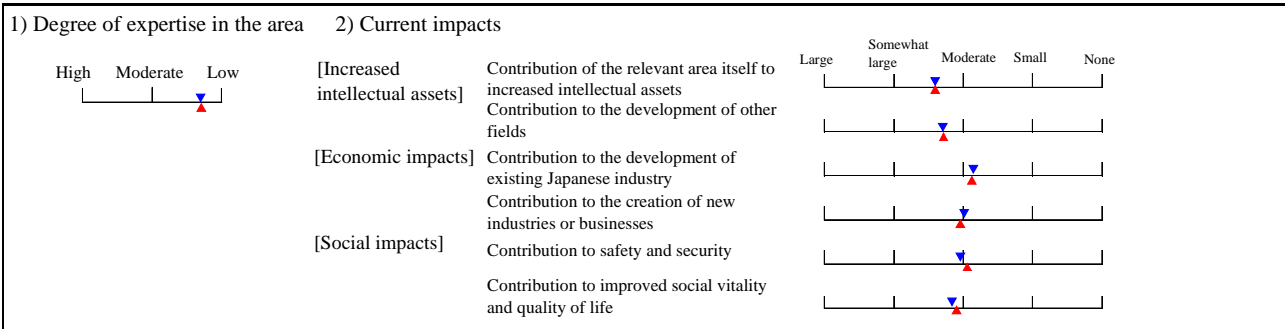
No	Topic	Questionnaire	Degree of expertise				Importance to Japan				Time of technological realization											
			Respondents (persons)				Index				Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know				
			High	Moderate	Low	None	High	Moderate	Low	None	(%)											
21	Technology for advanced mobility/walking support equipment and systems that can dramatically improve the social lives of elderly and disabled people.	1	82	5	30	65	-	64	35	53	11	1								0	1	
		2	78	3	14	83	-	60	23	72	5	0									0	1
		E	2	100	0	0	-	100	100	0	0	0		0								0
22	A work environment in which disabled and elderly people can comfortably work fully using their abilities, and work support technology for constructing such an environment.	1	80	5	24	71	-	69	42	49	9	0								0	6	
		2	76	3	16	81	-	64	32	63	4	1									0	1
		E	2	100	0	0	-	100	100	0	0	0		0								0
23	Proliferation of terminal-care environments, facilities, and technology in which patients can end their lives comfortably and peacefully.	1	83	7	24	69	-	64	34	54	11	1										
		2	80	1	19	80	-	54	14	74	9	3										
		E	1	100	0	0	-	100	100	0	0	0		0								
24	A nursing-care robot that can assist a caregiver in bathing without making the patient feel uncomfortable or uneasy.	1	89	9	26	65	-	64	35	52	11	2								0	2	
		2	78	5	14	81	-	55	14	77	9	0									0	1
		E	4	100	0	0	-	63	25	75	0	0		0								0



Countries at the leading edge	Regarding technological realization														Time of social application					Regarding social application														
	Necessity of gov't					Effective measures that should be taken by gov't									Will not be applied	Do not know	Necessity of gov't					Effective measures that should be taken by gov't												
Japan	USA	EU	Asia	Other	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Development of R&D infrastructure	Expansion of R&D funding	Internationalization of R&D activities	Relaxation or elimination of relevant regulations			Tightened or new regulations	Other	2006-2010	2011-2015	2016-2025	2026-2035	2036-	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Improvement of environment for business startups	Support through taxation, subsidies, and procurement	Relaxation or elimination of relevant regulations	Tightened or new regulations	Other
(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	
41	28	30	0	1	22	50	23	5	26	42	46	72	9	14	11	3						1	1	31	39	26	4	25	40	29	66	32	19	3
61	14	25	0	0	12	74	13	1	13	45	37	76	1	11	4	3						0	1	27	60	9	4	20	45	8	77	27	8	1
50	0	50	0	0	50	50	0	0	50	50	0	100	0	0	0	0						0	0	100	0	0	0	50	50	0	100	50	50	0
10	27	60	0	3	37	49	13	1	42	36	33	46	5	29	16	1						0	4	38	45	14	3	36	36	23	64	31	34	1
4	12	83	0	1	19	69	9	3	51	31	29	67	4	17	11	1						0	3	28	64	5	3	30	30	9	84	24	20	1
0	0	100	0	0	50	50	0	0	50	50	0	100	0	0	0	0						0	0	100	0	0	0	50	50	0	100	50	50	0
																						3	13	29	44	18	9	34	24	19	50	41	31	1
																						1	3	23	60	11	6	47	19	7	69	30	12	1
																						0	0	100	0	0	0	100	0	0	100	0	0	0
66	14	19	0	1	20	51	22	7	26	45	44	73	10	19	9	4						0	3	26	44	23	7	21	39	23	69	36	21	3
79	8	13	0	0	8	73	16	3	21	53	39	76	3	12	4	3						0	1	17	67	12	4	19	42	10	88	23	10	1
100	0	0	0	0	50	50	0	0	50	50	50	100	0	0	0	0						0	0	50	50	0	0	50	75	0	100	0	0	0

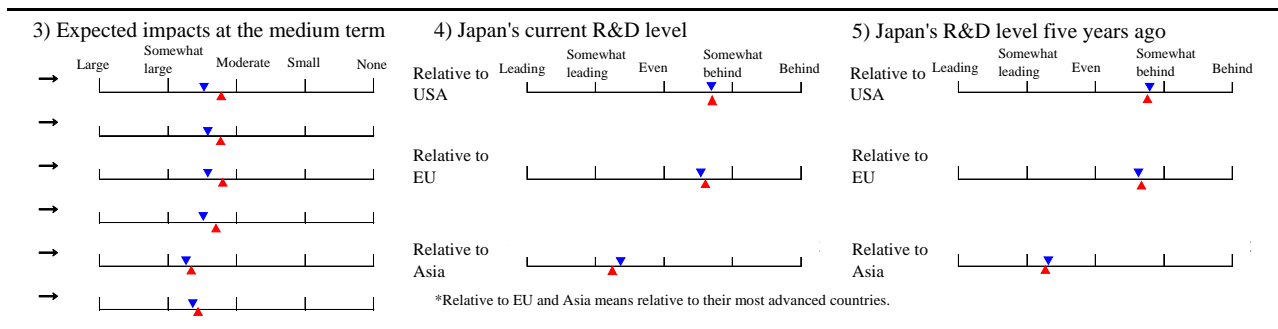
V. Social application of brain research

1. Questions regarding the relevant area



2. Questions regarding topics

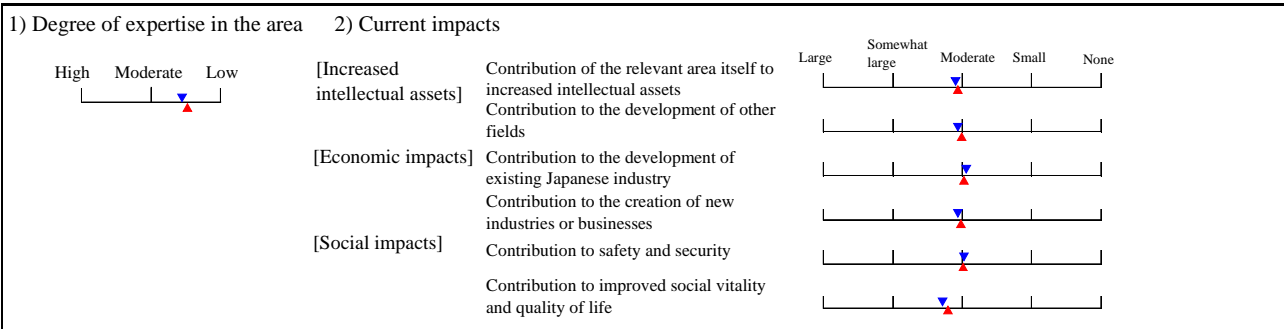
No	Topic	Questionnaire	Respondents (persons)	Degree of expertise				Importance to Japan				Time of technological realization								
				High (%)	Moderate (%)	Low (%)	None (%)	Index	High (%)	Moderate (%)	Low (%)	None (%)	Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized (%)	Do not know
25	Media technology that facilitates the sound development of children's brain functions for thinking, creating, and communicating.	1	80	11	24	65	-	62	37	37	23	3							8	19
		2	76	7	16	77	-	60	31	50	15	4							4	7
		E	5	100	0	0	-	100	100	0	0	0							0	0
26	A system that prevents senile dementia by inhibiting impairment of an elderly person's brain function.	1	77	8	21	71	-	69	47	38	12	3							4	16
		2	71	7	11	82	-	82	66	31	3	0							0	6
		E	5	100	0	0	-	100	100	0	0	0							0	0
27	Remedies for truant students, classroom chaos, and learning disabilities as a result of the elucidation of the brain mechanisms behind them.	1	78	5	26	69	-	55	26	44	26	4							21	25
		2	71	6	18	76	-	58	23	65	9	3							14	4
		E	4	100	0	0	-	88	75	25	0	0							0	0
28	Technology for assisting people who cannot make oral or written conversation because of disease or other reasons in communicating smoothly with others by reading their thoughts based on brain activities.	1	76	7	24	69	-	57	24	56	20	0							4	12
		2	71	3	13	84	-	58	20	70	10	0							1	4
		E	2	100	0	0	-	75	50	50	0	0							0	0



Countries at the leading edge						Regarding technological realization										Time of social application					Regarding social application														
						Necessity of gov't involvement				Effective measures that should be taken by gov't											Necessity of gov't involvement				Effective measures that should be taken by gov't										
Japan	USA	EU	Asia	Other	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Development of R&D infrastructure	Expansion of R&D funding	Internationalization of R&D activities	Relaxation or elimination of relevant regulations	Tightened or new regulations	Other	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be applied	Do not know	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Improvement of environment for business startups	Support through taxation, subsidies, and procurement	Relaxation or elimination of relevant regulations	Tightened or new regulations	Other	
(%)						(%)				(%)						(%)					(%)														
16	48	23	2	11	20	37	35	8	52	37	38	55	45	8	2	2							9	18	24	29	36	11	51	49	25	49	8	5	2
9	76	14	0	1	9	54	30	7	57	20	18	63	35	5	3	5							7	7	10	44	36	10	67	48	10	46	6	3	2
0	100	0	0	0	0	100	0	0	50	50	50	100	50	0	0	0							0	0	50	50	0	0	50	50	0	50	0	0	0
14	76	7	0	3	36	51	13	0	42	44	41	58	47	11	6	2							2	8	39	46	12	3	48	59	16	51	16	19	2
1	96	3	0	0	29	63	7	1	39	42	19	75	37	3	1	1							1	3	30	65	4	1	40	74	4	53	4	7	0
0	0	100	0	0	100	0	0	0	0	0	0	100	100	0	0	0							0	0	0	100	0	0	100	0	0	0	0	0	0
28	57	14	0	1	33	41	21	5	14	45	26	40	34	26	25	0							0	5	38	36	21	5	19	47	13	36	38	49	3
19	76	5	0	0	25	60	12	3	11	68	19	50	35	15	14	1							0	1	38	50	9	3	12	59	9	35	26	54	3
50	50	0	0	0	50	50	0	0	50	100	0	50	50	0	0	0							0	0	50	0	50	0	50	100	0	0	0	50	0
6	50	28	0	16	31	37	24	8	55	32	35	45	38	10	3	4							13	16	35	34	24	7	60	47	16	34	10	6	10
5	77	15	3	0	22	56	16	6	77	19	13	53	20	6	3	0							7	4	29	54	11	6	76	47	5	32	3	2	0
0	50	50	0	0	100	0	0	0	100	0	0	0	0	0	0	0							50	0	100	0	0	0	100	0	0	0	0	0	0
50	36	10	1	3	17	33	34	16	32	38	43	57	29	11	3	2							4	5	20	24	35	21	40	48	33	45	17	7	0
77	15	8	0	0	7	43	41	9	18	37	32	69	11	8	2	2							1	3	12	26	52	10	30	53	23	53	15	3	2
50	50	0	0	0	0	100	0	0	50	50	100	100	50	0	0	0							0	0	50	50	0	0	100	50	50	50	0	0	0

VII. Technology that supports education and learning

1. Questions regarding the relevant area

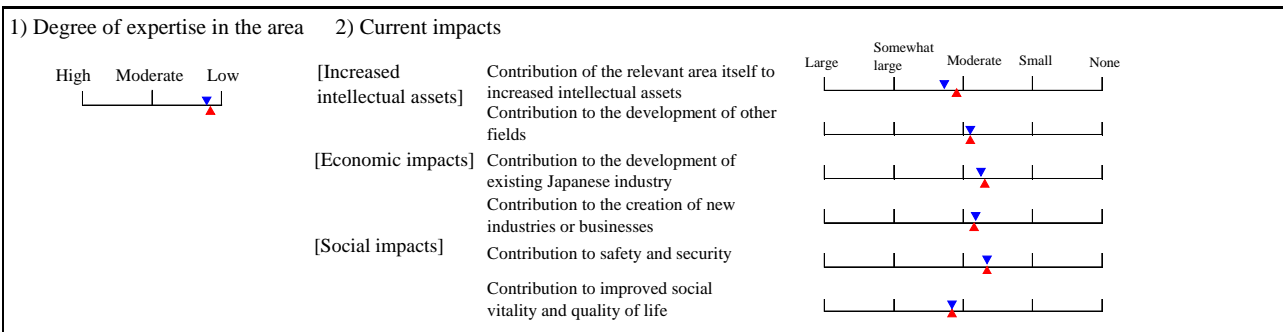


2. Questions regarding topics

No	Topic	Questionnaire	Degree of expertise				Importance to Japan				Time of technological realization											
			Respondents (persons)				Index				Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know				
			High	Moderate	Low	None	High	Moderate	Low	None									(%)	(%)	(%)	
34	A scientific system that allows the youth who cannot engage in ordinal communication to acquire sociability even without face-to-face communication.	1	74	14	28	58	-	46	22	32	32	14								18	18	
		2	75	7	19	74	-	38	9	40	35	16								19	5	
		E	5	100	0	0	-	40	20	20	40	20								40	0	
35	An electronic book that makes full use of multimedia technology for reversing the growing trend of aliteracy or people not reading books.	1	86	15	26	59	-	41	14	27	52	7									4	6
		2	81	6	15	79	-	32	5	23	63	9									1	4
		E	5	100	0	0	-	35	0	40	60	0									0	0
36	A learning system that can enhance scientific thinking by allowing learners to experiment/experience unrealistic phenomena/events in a virtual space created by simulation or other technology.	1	94	21	31	48	-	51	22	45	27	6									3	7
		2	93	9	22	69	-	44	4	65	29	2									2	2
		E	8	100	0	0	-	47	13	49	38	0									0	0
37	Advances in web-based language translation function allow people to search through online information in any language and retrieve results in a specific language, resulting in the construction of a knowledge repository system from which desired information is instantly retrievable from any part of the world.	1	82	16	27	57	-	54	23	50	26	1									3	1
		2	81	6	14	80	-	48	4	82	12	2									1	2
		E	5	100	0	0	-	50	20	60	0	20									20	0

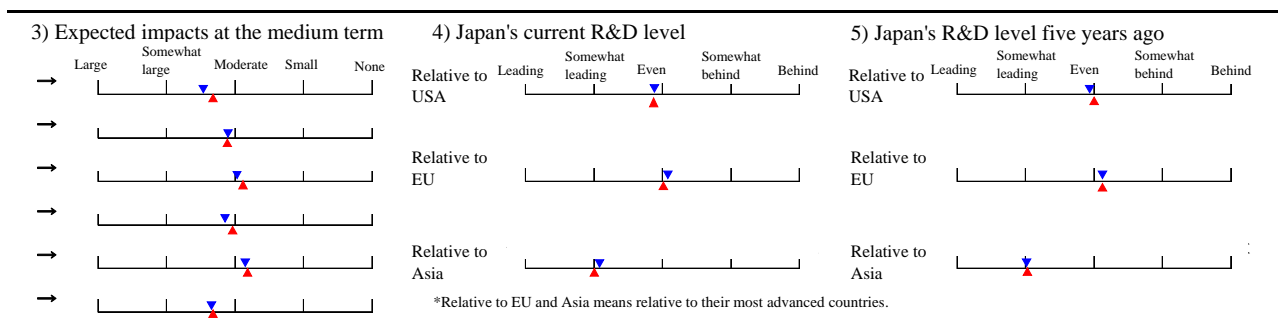
VIII. Handing down and preserving culture and technology

1. Questions regarding the relevant area



2. Questions regarding topics

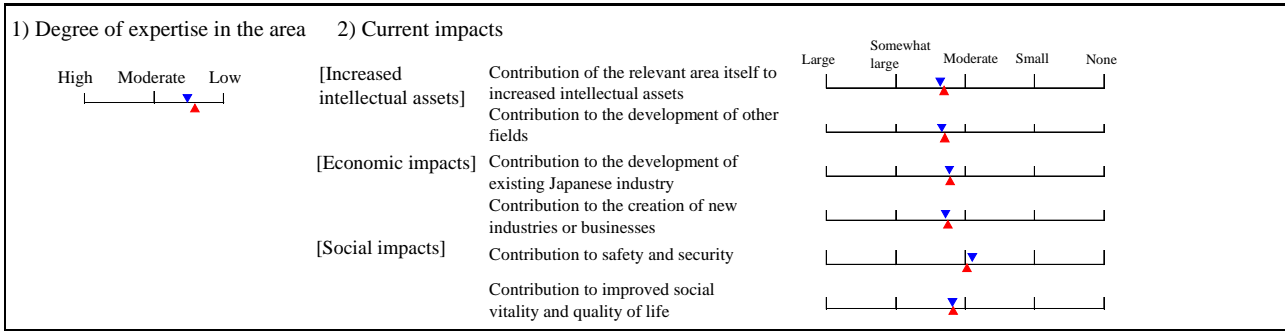
No	Topic	Questionnaire	Respondents (persons)	Degree of expertise				Importance to Japan				Time of technological realization										
				High	Moderate	Low	None	Index	High	Moderate	Low	None	Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know		
				(%)				(%)				(%)										
38	Technology for protecting, restoring, and preserving tangible cultural properties by making full use of nanotechnology, biotechnology, and materials technology.	1	59	8	20	72	-	60	26	64	10	0								0	10	
		2	65	3	12	85	-	54	11	81	8	0									0	3
		E	2	100	0	0	-	75	50	50	0	0										0
39	Information storage technology that enables the restoration of tangible cultural properties in the event of loss or damage.	1	62	6	19	75	-	57	23	61	16	0								2	7	
		2	68	1	9	90	-	54	10	84	6	0									1	3
		E	1	100	0	0	-	50	0	100	0	0										0
40	Handing down skills of producing tangible cultural properties, such as pottery, painting, and woven fabric, through the use of digital images, virtual reality technology, etc.	1	71	7	15	78	-	54	21	53	26	0								1	1	
		2	72	1	15	84	-	50	8	78	13	1									0	1
		E	1	100	0	0	-	25	0	0	100	0										0
41	Preserving and protecting intangible cultural properties, such as traditional performing arts, and handing down relevant skills, through the use of digital images, virtual reality technology, etc.	1	71	7	18	75	-	53	20	55	24	1								1	1	
		2	72	1	11	88	-	51	10	76	13	1									0	1
		E	1	100	0	0	-	25	0	0	100	0										0



Countries at the leading edge	Regarding technological realization													Time of social application					Regarding social application															
	Necessity of gov't involvement					Effective measures that should be taken by gov't								2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be applied		Do not know		Necessity of gov't involvement					Effective measures that should be taken by gov't						
Japan	USA	EU	Asia	Other	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Development of R&D infrastructure	Expansion of R&D funding	Internationalization of R&D activities						Relaxation or elimination of relevant regulations	Tightened or new regulations	Other	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Improvement of environment for business startups	Support through taxation, subsidies, and procurement	Relaxation or elimination of relevant regulations	Tightened or new regulations	Other		
49	23	26	0	2	38	47	13	2	62	35	50	62	21	2	4	0	0	13	35	50	15	0	69	31	17	61	7	13	0					
76	8	16	0	0	20	59	16	5	57	26	33	67	3	3	2	0	0	3	17	66	14	3	68	24	2	65	5	3	0					
100	0	0	0	0	100	0	0	0	100	50	0	50	0	0	50	0	0	0	100	0	0	0	100	50	0	50	0	50	0					
44	22	30	0	4	38	47	13	2	58	36	49	55	16	5	5	0	2	7	38	43	19	0	66	31	12	59	9	12	0					
71	11	18	0	0	16	68	13	3	68	24	29	66	5	6	0	0	1	3	16	69	12	3	72	23	6	68	5	2	0					
100	0	0	0	0	100	0	0	0	100	100	0	100	0	100	0	0	0	0	100	0	0	0	100	100	0	100	0	100	0					
51	35	12	0	2	28	38	28	6	56	38	34	51	20	3	2	2	0	4	25	47	25	3	62	35	18	57	11	6	0					
76	17	7	0	0	13	66	17	4	71	32	21	64	6	5	0	0	0	1	8	73	15	4	69	24	4	71	4	0	0					
100	0	0	0	0	0	0	100	0	100	0	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	100	0	0	0					
34	53	11	0	2	28	35	31	6	62	38	36	51	21	3	3	0	1	4	27	44	28	1	65	35	18	59	8	5	0					
34	60	6	0	0	12	65	17	6	72	28	18	65	5	5	0	0	0	1	8	75	11	6	73	24	6	70	4	0	0					
100	0	0	0	0	0	0	100	0	100	0	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	100	0	0	0					

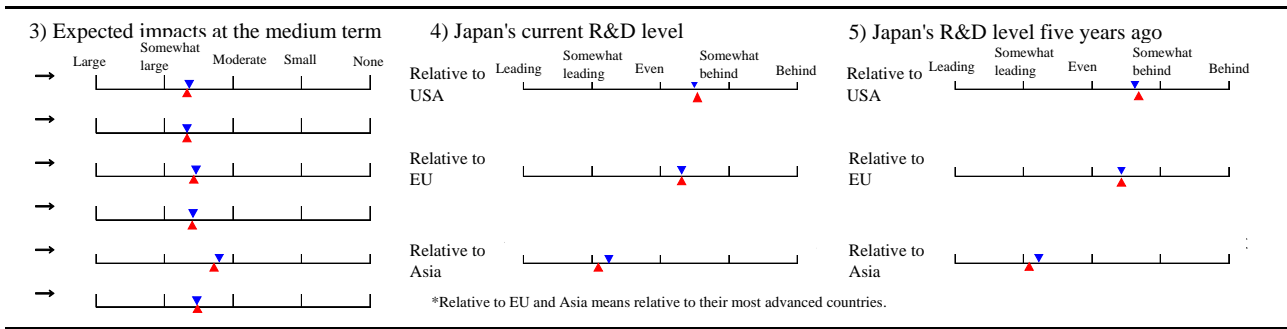
IX. Knowledge production system

1. Questions regarding the relevant area



2. Questions regarding topics

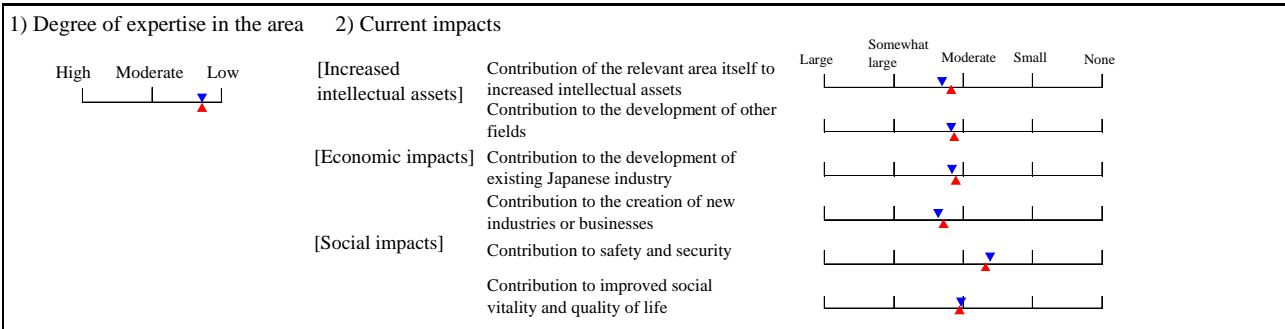
No	Topic	Questionnaire	Respondents (persons)	Degree of expertise				Importance to Japan				Time of technological realization										
				High	Moderate	Low	None	Index	High	Moderate	Low	None	Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know		
				(%)				(%)				(%)										
42	Reconstruction of educational and communication systems as a result of the establishment of a knowledge production method independent of space, time, and language.	1	72	14	43	43	-	59	29	52	16	3									3	14
		2	79	3	38	59	-	51	12	69	19	0		0	4							
		E	2	100	0	0	-	75	50	50	0	0		0	0							
43	Introduction of a new social decision-making approach as a result of the dissolution of the boundary between experts and non-experts through fusion between knowledge producers and knowledge consumers.	1	83	18	37	45	-	60	35	45	11	9										
		2	79	6	29	65	-	55	19	65	12	4										
		E	5	100	0	0	-	90	80	20	0	0										
44	Widespread use of an evidence-based policy making approach as a result of the clarification and visualization of social problems.	1	81	17	36	47	-	62	36	43	18	3									6	8
		2	73	7	25	68	-	56	21	60	19	0		4	1							
		E	5	100	0	0	-	100	100	0	0	0		0	0							
45	Construction of a public database that gives centralized access to a collection of the data owned by public institutions and universities, and serves as the infrastructure for knowledge production in society.	1	95	13	32	55	-	64	39	41	18	2									4	1
		2	81	7	30	63	-	59	25	61	14	0		2	1							
		E	6	100	0	0	-	63	33	50	17	0		0	0							
46	Establishment of global rules concerning the copyright of multimedia information to promote the production and distribution of multimedia content.	1	78	9	26	65	-	64	40	37	20	3										
		2	77	3	21	76	-	69	47	39	13	1										
		E	2	100	0	0	-	50	50	0	0	50										



Countries at the leading edge	Regarding technological realization													Time of social application					Regarding social application																	
	Necessity of gov't				Effective measures that should be taken by gov't									2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be applied		Do not know		Necessity of gov't				Effective measures that should be taken by gov't									
Japan	USA	EU	Asia	Other	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Development of R&D infrastructure	Expansion of R&D funding	Internationalization of R&D activities						Relaxation or elimination of relevant regulations	Tightened or new regulations	Other	(%)	(%)	(%)	(%)	(%)	(%)	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Improvement of environment for business startups	Support through taxation, subsidies, and procurement	Relaxation or elimination of relevant regulations
13	66	13	0	8	21	36	34	9	64	43	39	57	20	5	2	0							3	14	19	37	38	6	63	38	25	44	19	8	3	
4	92	4	0	0	11	56	30	3	68	20	30	64	12	4	1	1							0	4	13	47	37	3	69	34	15	53	9	4	1	
0	100	0	0	0	0	100	0	0	100	0	50	50	0	0	0	0							0	0	50	50	0	100	0	0	50	0	0	0		
																							8	14	17	43	28	12	64	35	21	33	27	14	6	
																							4	3	16	56	23	5	75	31	8	31	14	6	1	
																							0	0	40	60	0	0	80	20	0	40	60	0	0	
4	71	21	0	4	24	46	21	9	65	43	35	41	18	13	10	0							3	15	35	41	19	5	60	36	18	32	25	21	7	
0	97	3	0	0	14	68	15	3	75	36	13	39	9	6	4	1							4	3	23	57	14	6	80	36	6	26	14	8	2	
0	100	0	0	0	80	20	0	0	100	20	0	60	0	0	20	0							0	0	80	20	0	100	20	0	40	40	40	0		
5	90	2	0	3	31	44	18	7	43	45	41	54	19	18	13	0							4	7	39	36	21	4	48	42	16	49	26	20	6	
0	100	0	0	0	19	68	11	2	47	46	30	65	9	15	8	1							2	2	35	50	11	4	64	36	6	60	18	10	1	
0	100	0	0	0	33	67	0	0	33	17	67	33	17	17	17	0							0	0	67	33	0	0	83	0	17	17	33	17	0	
																								1	4	40	48	11	1	46	30	14	17	40	50	7
																								0	5	42	49	6	3	59	19	8	9	36	55	3
																								0	0	0	50	50	0	0	0	50	0	50	50	0

X. Entertainment technology

1. Questions regarding the relevant area

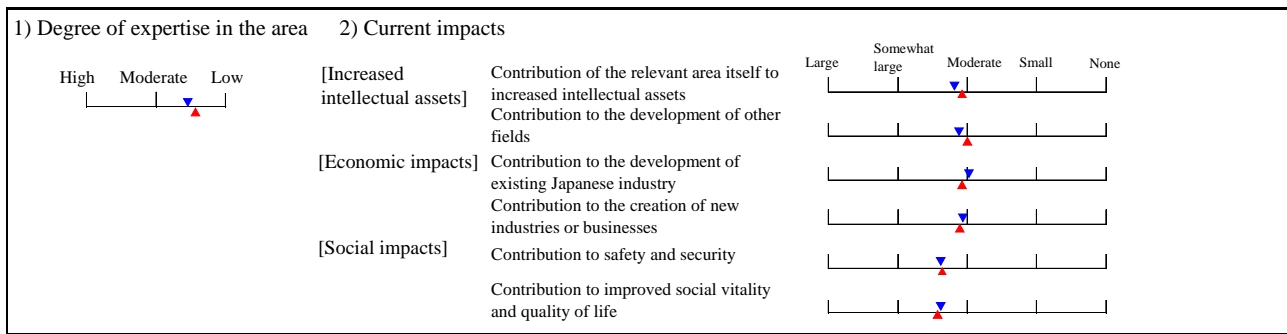


2. Questions regarding topics

No	Topic	Questionnaire	Degree of expertise				Importance to Japan				Time of technological realization											
			Respondents (persons)				Index				Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know				
			High	Moderate	Low	None	High	Moderate	Low	None												
			(%)				(%)															
47	An intelligent transport system (ITS) that makes a motor trip more enjoyable and comfortable by, for example, providing voice guidance on nearby tourist attractions and events for those who make a stop at a roadside station or an expressway toll booth.	1	87	11	20	69	-	44	12	46	35	7								0	2	
		2	80	3	13	84	-	38	1	57	36	6									0	1
		E	2	100	0	0	-	50	0	100	0	0										0
48	Robot leasing service in which customers can lease robots suited to their needs, such as gardening, nursing care, and household chores.	1	76	7	28	65	-	48	15	52	28	5									5	4
		2	77	4	13	83	-	44	7	64	22	7									6	6
		E	3	100	0	0	-	67	33	67	0	0										0
49	Technology for expanding leisure time, such as a system in which people can easily find a substitute who performs their office work or household chores, for encouraging the proposal of new ways of spending leisure time.	1	70	1	30	69	-	41	12	38	38	12									4	9
		2	69	1	9	90	-	32	1	39	43	17									6	12
		E	1	100	0	0	-	50	0	100	0	0										0
50	A robot that acts as the user's sibling or friend and allows the user to experience pseudo-brotherhood, -sisterhood or -friendship to improve social skills.	1	67	10	25	65	-	26	5	24	38	33									17	9
		2	76	3	14	83	-	22	1	16	49	34									14	7
		E	2	100	0	0	-	25	0	0	100	0										0

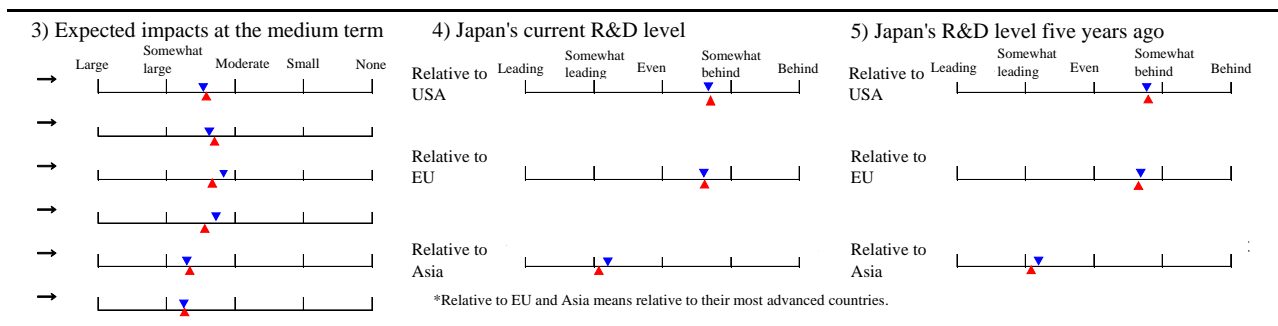
XI. Technology assessment

1. Questions regarding the relevant area



2. Questions regarding topics

No	Topic	Questionnaire	Respondents (persons)	Degree of expertise				Importance to Japan				Time of technological realization										
				High	Moderate	Low	None	Index	High	Moderate	Low	None	Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know		
				(%)				(%)				(%)										
51	Systems for early warning and prediction by experts (e.g. early detection of human/livestock infection and prediction of its impacts, early warning of the environmental effects of an accident or disaster) are established, enabling early detection and impact assessment of the problems that should be solved by science and technology.	1	71	8	34	58	-	73	52	38	9	1								3	10	
		2	71	7	15	78	-	85	73	23	4	0									1	4
		E	5	100	0	0	-	100	100	0	0	0		0								0
52	Systems for assessing the long-term impacts of artificial and natural substances and systems on health and the environment are established, so that the government can systematically provide monitoring/surveillance results on potential threats and other negative issues.	1	76	12	30	58	-	69	47	38	14	1									4	10
		2	74	5	18	77	-	79	61	35	4	0									1	1
		E	4	100	0	0	-	75	50	50	0	0										0
53	A cycle is established in which ELSI (Ethical, Legal and Social Issues) research is promoted, in parallel with advanced research, and the results contribute to the formulation of research strategy, and subsequently, the ELSI research funds exceed 3% of the total research funds.	1	67	16	28	56	-	60	37	38	17	8										
		2	65	6	23	71	-	59	25	62	11	2										
		E	4	100	0	0	-	75	50	50	0	0										
54	An bioethical public debate involving diverse and numerous people of Japan is held to form a consensus on how to combine bioethics and research activities.	1	66	14	30	56	-	59	33	45	14	8										
		2	68	4	28	68	-	61	25	70	4	1										
		E	3	100	0	0	-	83	67	33	0	0										
55	Participatory technology assessment (TA) methods involving NPOs and citizens are established to adapt to Japanese society, and over 200 of such assessments are performed in Japan.	1	76	20	26	54	-	56	30	41	22	7									4	13
		2	71	6	24	70	-	54	17	66	16	1									0	4
		E	4	100	0	0	-	75	50	50	0	0										0
56	To address the NIMBY (not in my backyard) problem, the form of discussion and the procedure intended for convincing the interested parties are established.	1	75	21	28	51	-	66	44	35	14	7										
		2	73	11	30	59	-	75	53	40	7	0										
		E	8	100	0	0	-	81	62	38	0	0										



Countries at the leading edge	Regarding technological realization										Time of social application					Regarding social application														
	Necessity of gov't involvement					Effective measures that should be taken by gov't					2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be applied		Necessity of gov't involvement					Effective measures that should be taken by gov't							
Japan	USA	EU	Asia	Other	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration						Development of R&D infrastructure	Expansion of R&D funding	Internationalization of R&D activities	Relaxation or elimination of relevant regulations	Tightened or new regulations	Other	(%)	(%)	High	Moderate	Low	None	Human resources development	Strengthened industry-academic-government and interdisciplinary collaboration	Improvement of environment for business startups
14	59	25	0	2	53	37	9	1	59	48	48	53	32	14	11	3	1	7	49	38	11	2	52	52	11	54	21	37	3	
1	93	6	0	0	76	14	7	3	66	42	40	55	16	6	6	0	1	1	75	16	6	3	56	47	9	65	6	15	1	
0	100	0	0	0	80	20	0	0	80	20	40	60	20	0	20	0	0	0	80	20	0	0	80	40	0	80	0	0	0	
4	60	32	0	4	53	31	13	3	55	48	45	58	28	14	14	3	4	11	54	35	10	1	58	59	14	45	21	29	3	
0	89	11	0	0	73	19	4	4	64	36	33	64	14	9	4	0	0	1	75	19	3	3	69	59	4	48	10	10	0	
0	67	33	0	0	75	25	0	0	75	25	25	25	25	0	25	0	0	0	75	25	0	0	100	50	0	50	0	0	0	
																		5	24	33	43	14	10	67	47	4	45	16	20	2
																		3	5	31	53	11	5	74	27	5	44	10	13	0
																		0	0	75	25	0	0	75	25	0	25	0	25	0
																		12	19	30	42	14	14	64	43	0	36	15	19	6
																		7	7	37	53	6	4	83	34	3	26	9	9	0
																		0	0	33	67	0	0	100	33	0	33	0	0	0
6	45	46	0	3	21	49	21	9	68	40	21	38	17	17	17	2	5	18	24	47	19	10	59	49	16	30	24	25	5	
1	48	51	0	0	16	65	16	3	81	31	13	27	4	10	3	1	1	7	17	69	10	4	78	43	6	25	9	7	1	
0	67	33	0	0	25	75	0	0	67	0	33	33	0	0	33	0	0	0	25	75	0	0	75	25	25	25	0	25	0	
																		12	26	33	41	16	10	73	30	8	28	17	28	3
																		7	10	29	57	10	4	88	29	4	29	9	16	1
																		0	0	62	38	0	0	88	25	0	25	0	13	0