

11. Industrial infrastructure field

11.1. Overview

This survey was the first to cover the field of industrial infrastructure. In addition, this was the first use of the current method for establishing areas. “Areas” and “topics” in industrial infrastructure were established as follows.

First, for the field of industrial infrastructure, we envisioned the Japanese economy over the long term of 30 to 50 years and established the question of what sort of industrial infrastructure will be necessary in order to promote corporate activity in Japan and overseas activities of Japanese corporations effectively. At that time, we identified in detail the unresolved problems in Japan that form major broad-based barriers to corporate activities.

Next, we examined how technology would be specified as a means of solving such problems. Industrial infrastructure technology is not necessarily as clear as technology in natural science. In particular, industrial infrastructure itself is developed by technology, and emphasizing the point that it is inseparable from the corporations, governments, and other social systems that adopt it, we included management technology as "technology." Furthermore, we established "topics" in the form of questions for the selected technologies. We used these topics as the basis to categorize the “areas”.

The 10 areas were classified as follows. First, we turned our attention to the geographical and population elements that are natural elements upon which corporate activity is predicated. These are reflected in Area 1, "optimization of industrial infrastructure through regional dispersion and concentration" and Area 6, "human resources management." Second, we identified knowledge management, human resources management, risk management, financial management, environmental management, and so on, as corporate management technologies. These are included in various appropriate areas. Third, we reflected the governance of corporate activity in Area 3, and corporations and market competition in Area 7. Fourth, we established Area 4, "public-sector governance and management," to target central and local government, and nonprofit organization in a sector where numerous issues must be resolved. Based on awareness that low productivity and stagnant quality in Japan's service industries and service sector are issues that need to be resolved, we addressed them as Area 8. Finally, anticipating the development of new industries centered on the arts, culture, and leisure, we named that as an independent area. Although policy is an important element of industrial infrastructure, we reflect this in individual topics rather than in an independent area. Each of the 10 areas thus arranged is a basic condition of corporate management and is vital to Japan's industrial infrastructure. The areas are also closely related to one another.

We bore the following points in mind while establishing as a topic the proper form of promotion measures for this kind of technology. First, government-led funding supply and the introduction of special projects are insufficient to realize these industrial infrastructure technologies. More refined promotion measures are necessary. Methods that are based on consideration of the individual conditions of the entities developing and utilizing the technologies, which are inseparable from corporations, government, and social systems, and that are coordinated by the relevant entities are necessary. For example, in order to realize industrial or research clusters in regional areas, various policies must be combined, and refined methods to achieve the concentration of corporations and research institutions are necessary.

Second, government or political leadership is still essential. Government leadership is vital to regional decentralization of industrial infrastructure, corporate governance, education, technology policy, and so on. In public-sector management, it is the action of government itself that is at issue.

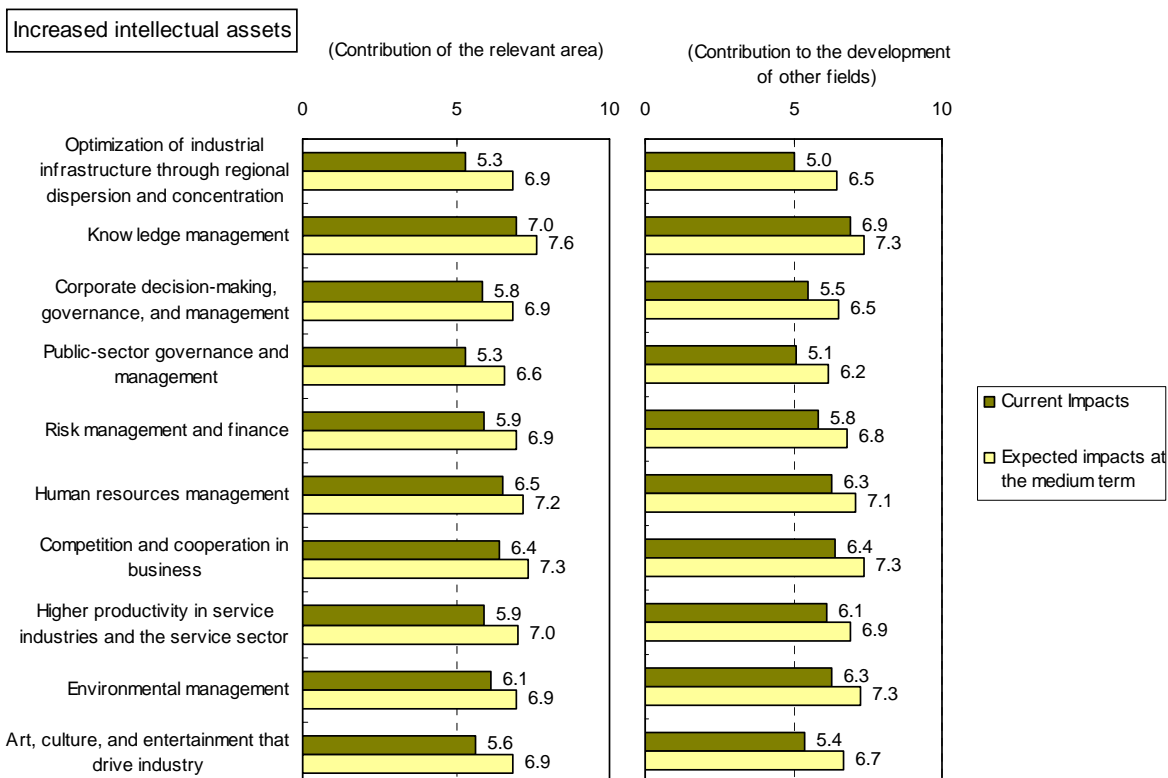
Third is the importance of human resources development. In particular, advanced training at the university and graduate school level of human resources who can develop and disseminate such technologies is vital. At the same time, however, the division between science and humanities education forms a barrier, and a proper form of education to integrate them is necessary. As measures towards this end, the fusion of science and the humanities education at the department level and the implementation of multiple majors and degrees at the graduate school level are important. For example, education in risk management or financial technology clearly requires integration of the sciences and the humanities.

Fourth, the proper form of research and development funding is an issue. Direct distribution of research funding alone is insufficient. The question is how to form a system in Japan that can distinguish between early-stage and middle-stage corporate technical development and effectively allocate funds.

(ANEGAWA Tomofumi)

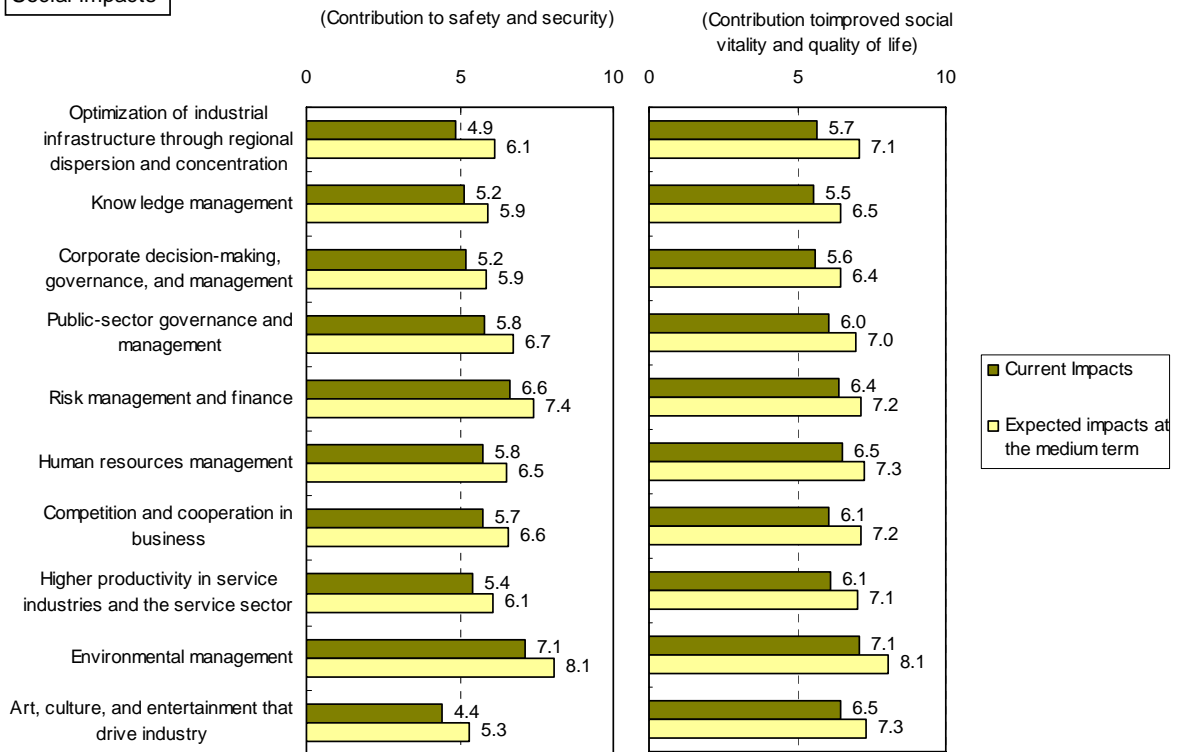
11.2. Main results

A. Impacts

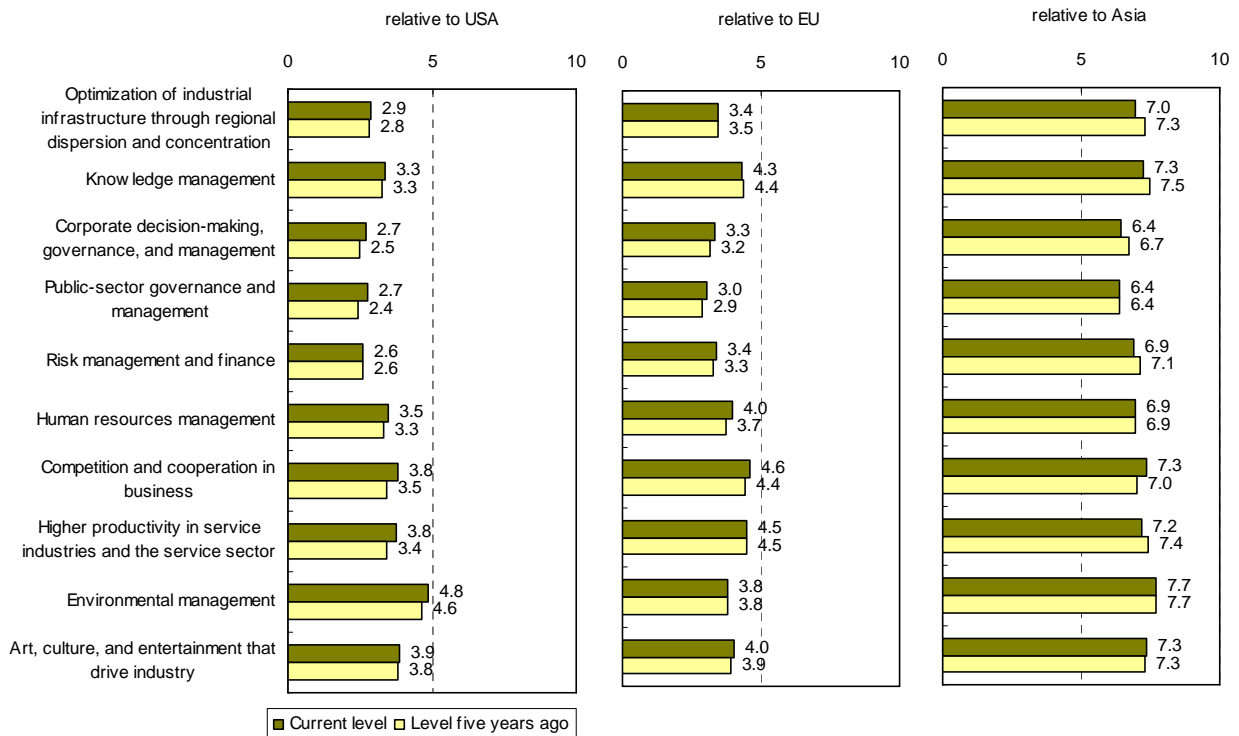


*Responses are indexed on a 10-point scale.

Social impacts



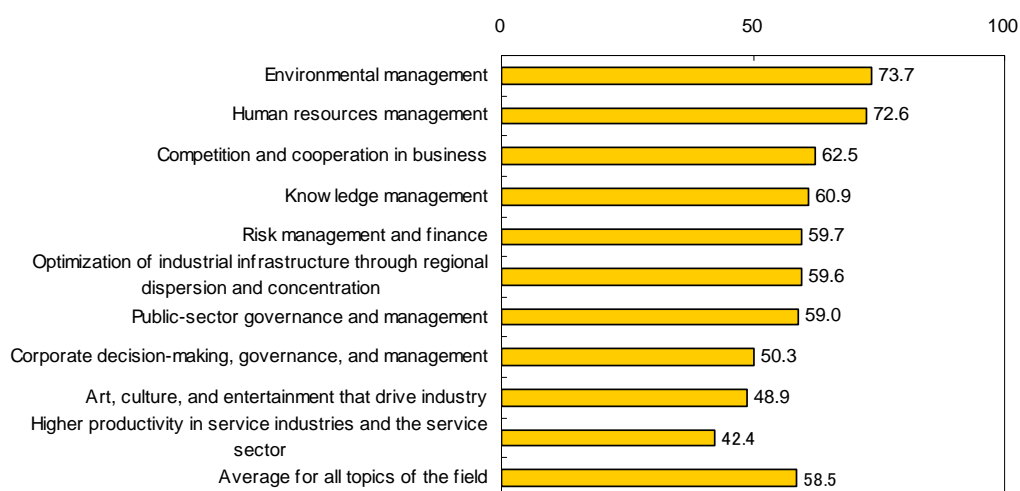
B. Japan's R&D Level



*Responses are indexed on a 10-point scale.

C. Importance to Japan

Average importance index by area



The most important 10 topics

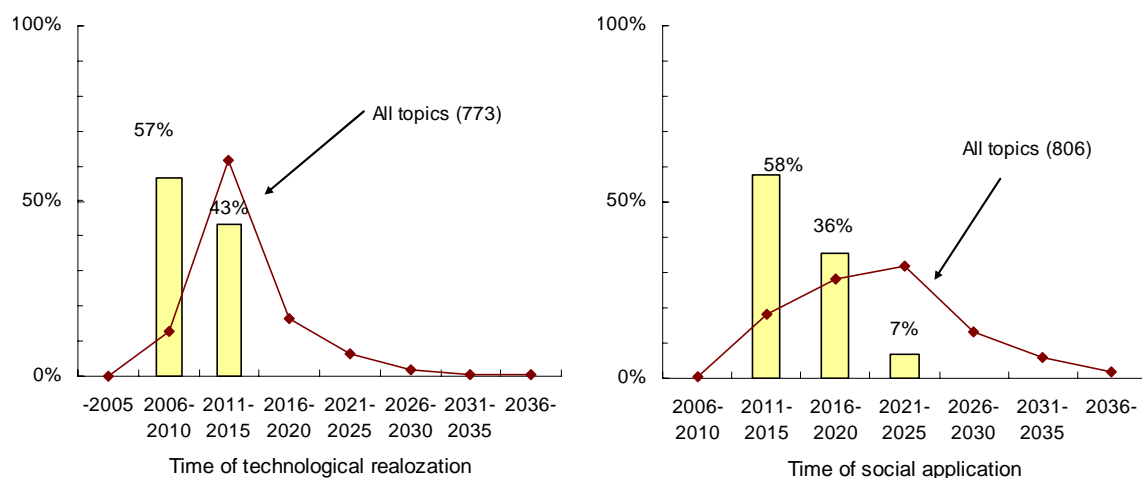
	Topic	Index	Year T*	Year S*
1	36: A social environment that encourages women to balance work and marriage, childbearing, and childrearing (e.g. 30% of listed companies set up day care centers) becomes a reality in Japan to promote the utilization of female human resources.	90	-	2014
2	39: In Japan, for easier job changes, corporate pensions become "portable" so that the pension funds deposited under the pension program of the previous employer can be transferred to the new employer's pension program when a worker changes jobs.	90	-	2013
3	51: Over half of Japan's listed companies adopt management schemes that emphasize corporate social responsibility as the fundamental business policy.	86	-	2011
4	04: Facilitation of international business operations based on international standards, as a result of international standardization of the laws governing commercial activities, transactions, taxing, competition, and intellectual property rights in the international context.	82	-	2016
5	38: Reeducation/retraining programs for "capacity building among the existing workforce," or for improving specialized skills and productivity among part-time and temporary workers, are widely implemented in Japan.	80	-	2013
6	27: Financial and other economic policies become more specific and capable of controlling inflation and deflation, contributing to a major reduction of economic fluctuations.	77	-	2021
7	34: In Japan, securities markets where relatively small, unlisted companies can raise small funds that range from a few tens to hundreds of millions of yen are formed.	76	-	2013
8	44: Consumer-oriented systems for privacy information management and protection are implemented to ensure that consumers' personal information is made accessible only to the entities authorized by the consumers and reuse by any other entities is blocked.	75	2009	2014
9	09: Methods of assessing and utilizing the database, knowledge base, and knowledge network (a social network in which people with knowledge are known and accessible) built within an organization are established and made widely available.	74	2009	2014
10	25: Japan's government sector moves toward e-government and, combined with established technologies for personal authentication and personal information protection, begins to provide online public services in areas such as tax accounting and payment, pensions, health insurance, welfare, and other formalities.	73	2008	2014

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

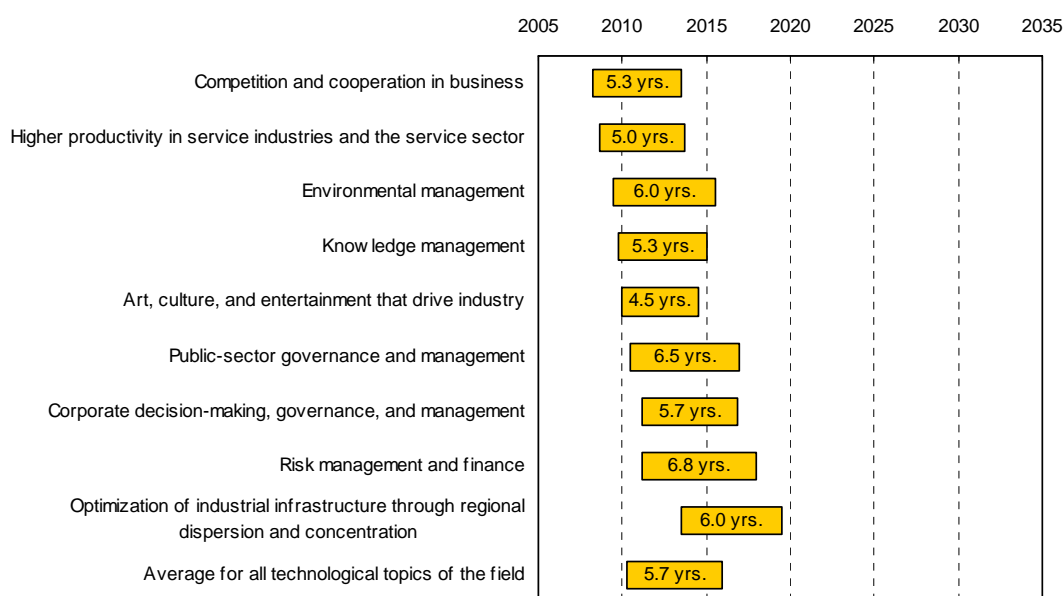
*Responses were indexed on a 100-point scale.

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
31: In Japan, advances in the behavioral scientific analysis of the strategy building process in the public and corporate sectors lead to the ability to promptly and effectively make decisions under competitive circumstances.	2012	8	Risk management and finance
18: Efficient monitoring and incentive systems applicable internally to companies are developed to allow a significant delegation of authority, resulting in a 50% increase in labor productivity from the current levels.	2013	7	Corporate decision-making, governance, and management
26: In Japan, technology for integrated risk management is developed to enhance the risk management capacity across the public sector, and this enables society to scan and identify risks, evaluate risk impacts, and rank risks by priority. As a result, assuming the desirable social state, a consistent framework within which protections against risks are proposed, adopted, and implemented is established.	2013	7	Public-sector governance and management

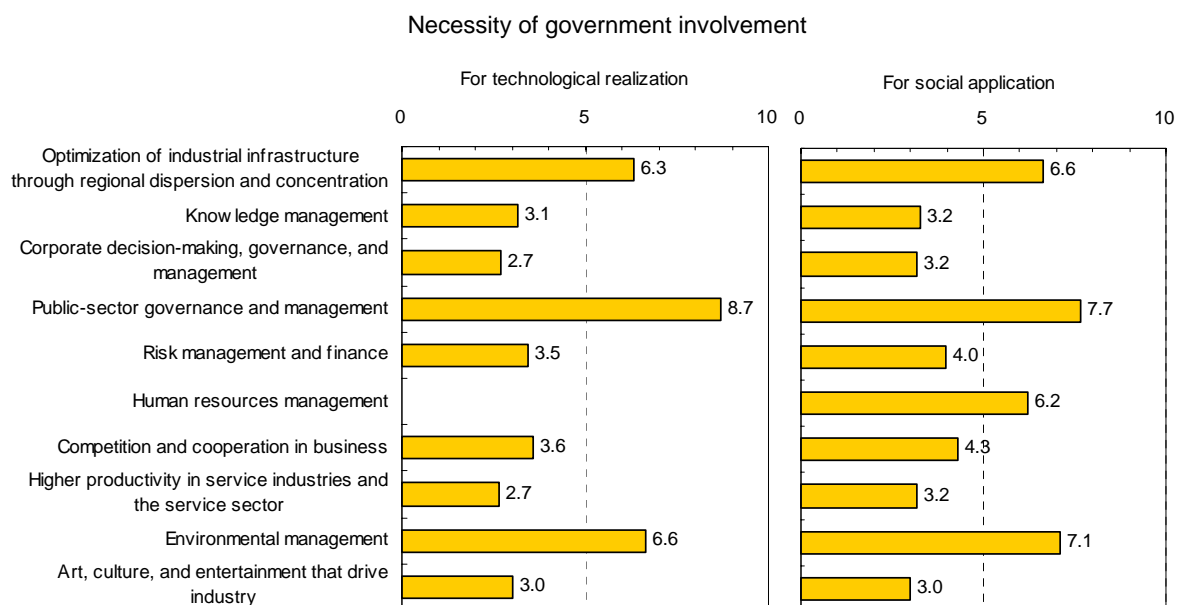
Topic	Year T*	Period*	Area
30: A rapid increase in the amount of data available to companies and advances in data analysis technology result in better prediction technologies that allow companies to evaluate diverse risks. To take advantage of these technologies, scenario planning and other tools are developed, enabling risk control that can reduce fluctuations in operating profits by half.	2011	7	Risk management and finance
32: Common, universal systems for evaluating and controlling project risks are established.	2012	7	Risk management and finance
33: As fusion between insurance and capital markets progresses, a risk control method called alternative risk transfer (ART) advances in structure. Thus, various risks of companies and individuals are diversified and transferred to investors on a large scale to achieve integrated risk management.	2012	7	Risk management and finance
54: Demand-side management programs are widely and effectively introduced to Japan's traffic, electricity, and communications infrastructures to reduce hourly and seasonal fluctuations in demand and thus to cut excessive capital investment.	2010	7	Environmental management

Topic	Year T*	Period*	Area
15: Efficient optimization of resources allocation, scheduling, etc. becomes possible, contributing to corporate cost reduction.	2009	4	Corporate decision-making, governance, and management
55: Advances in research on comfort/discomfort, likes/dislikes, and other sensibilities that people feel as a result of consuming goods and services lead to the establishment of methods by which consumer sensibilities are directly analyzed, measured, and assessed, so that the results are used for R&D, sales, and marketing of goods and services.	2012	4	Art, culture, and entertainment that drive industry
07: As with the case of open source software, diverse goods and services, regardless of price, are developed, produced, sold, and supported primarily by consumers to meet their needs.	2009	5	Knowledge management
08: For diverse goods and services, technology standardization and module-based research and development practices intensify, resulting in improved efficiency in overall R&D for any goods and services.	2009	5	Knowledge management
09: Methods of assessing and utilizing the database, knowledge base, and knowledge network (a social network in which people with knowledge are known and accessible) built within an organization are established and made widely available.	2009	5	Knowledge management
13: Widespread use of electronic money and the like allows micropayments (transactions smaller than ¥500) to be made at zero or negligible cost.	2008	5	Corporate decision-making, governance, and management
29: To reduce market risks arising from the fluctuation of currency values and international commodity (e.g. energy) prices, major Japanese companies (over 30% of those listed) measure and control risk amounts daily by identifying in advance the risk factors.	2009	5	Risk management and finance
42: Over 50% of the Japanese companies implement enterprise resource planning (ERP) systems and successfully improve demand forecasting, logistic systems, contracting forms, etc., enabling real-time order transactions and consequently, a significant reduction in inventory in the production/distribution system.	2008	5	Competition and cooperation in business
43: The establishment of flexible manufacturing technology allows over 50% of the listed manufacturers to replace conventional mass-production processes with fully individualized, made-to-order production processes.	2009	5	Competition and cooperation in business
44: Consumer-oriented systems for privacy information management and protection are implemented to ensure that consumers' personal information is made accessible only to the entities authorized by the consumers and reuse by any other entities is blocked.	2009	5	Competition and cooperation in business
46: Robots and information systems that can substitute as service personnel at checkout counters and the storefront become widely available.	2009	5	Higher productivity in service industries and the service sector

Topic	Year T*	Period*	Area
47: Ordering and other business transactions are mostly conducted over mobile phones through voice input alone.	2008	5	Higher productivity in service industries and the service sector
49: In TV and other broadcasting media, advertising material can be adapted to individual viewers.	2009	5	Higher productivity in service industries and the service sector
52: Environmental accounting (a method of evaluating a company's contribution to environmental conservation and sustainable development) or its extensions are widely adopted.	2009	5	Environmental management
58: In such fields as art, theater, cinema, music, and literature, there are artistic activities whose viability is threatened due to a very small consumer population. Such small-scale artistic activities can be made economically viable not by increasing the number of consumers, but by reducing access costs through the development of a system that allows existing consumers to enjoy, or obtain reproductions of, such activities over the Internet or other communications means at far lower cost.	2008	5	Art, culture, and entertainment that drive industry

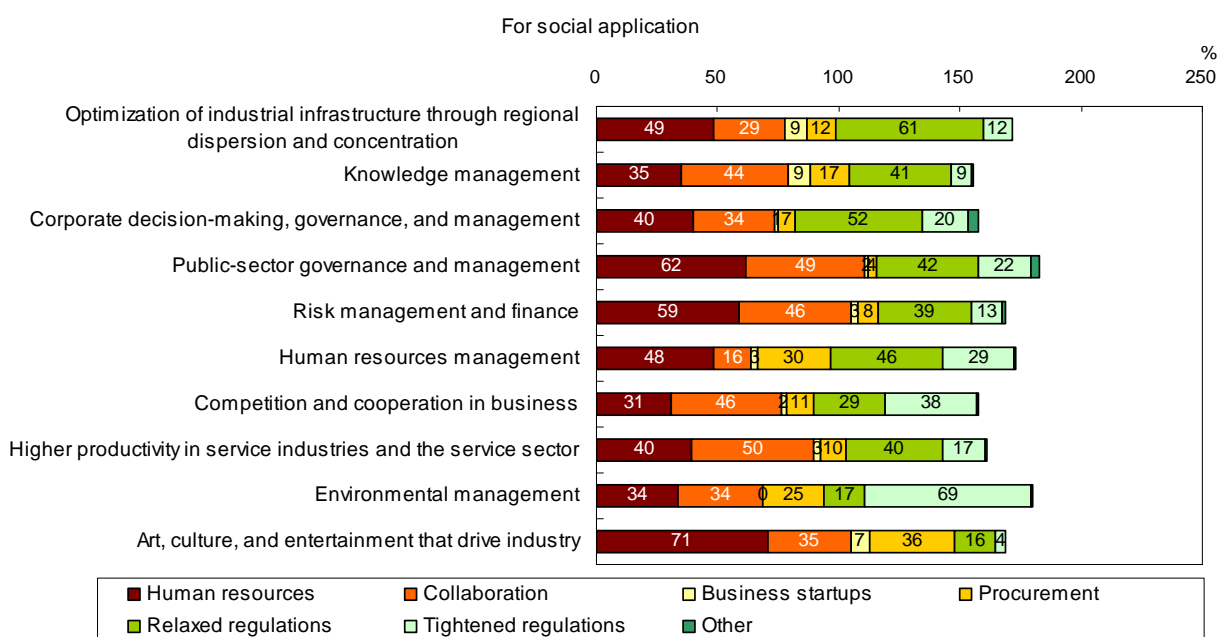
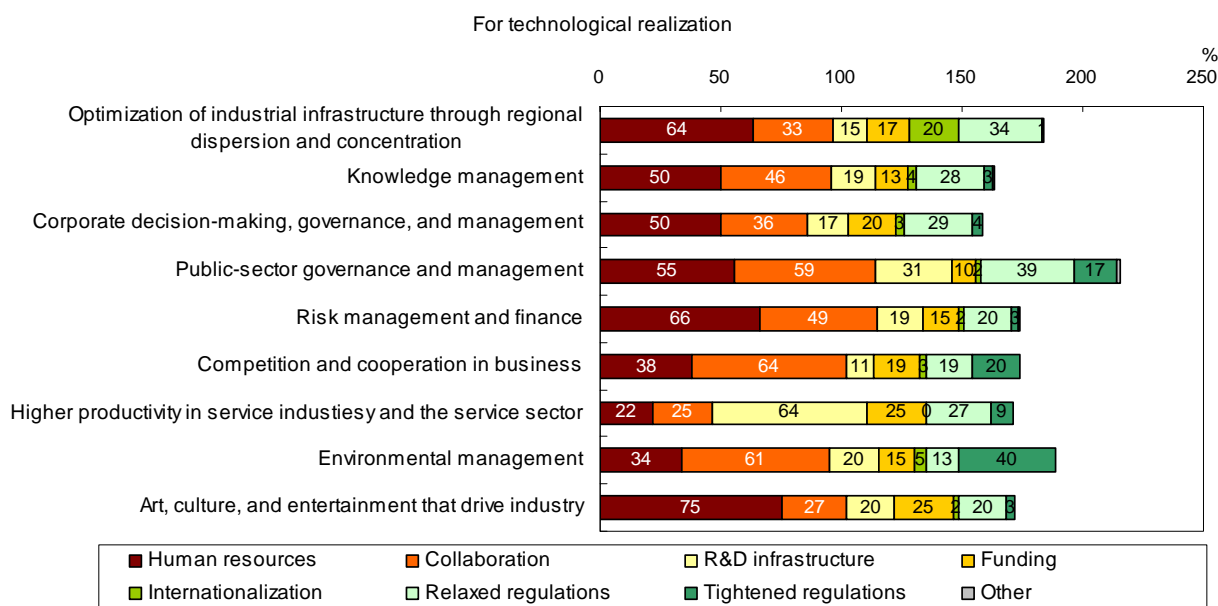
*Year T: Time of technological realization Period: Period until social application (years)

E. Effective measures that should taken by government



*Responses were indexed on a 10-point scale

Effective measures



F. Time-line of topics

Technological realization

year	topic
2007	45: Intelligent tags designed for product identification, quality control, and product tracking become widely available.
2008	13: Widespread use of electronic money and the like allows micropayments (transactions smaller than ¥500) to be made at zero or negligible cost. 25: Japan's government sector moves toward e-government and, combined with established technologies for personal authentication and personal information protection, begins to provide online public services in areas such as tax accounting and payment, pensions, health insurance, welfare, and other formalities. 42: Over 50% of the Japanese companies implement enterprise resource planning (ERP) systems and successfully improve demand forecasting, logistic systems, contracting forms, etc., enabling real-time order transactions and consequently, a significant reduction in inventory in the production/distribution system.

year	topic
2009	<p>47: Ordering and other business transactions are mostly conducted over mobile phones through voice input alone.</p> <p>58: In such fields as art, theater, cinema, music, and literature, there are artistic activities whose viability is threatened due to a very small consumer population. Such small-scale artistic activities can be made economically viable not by increasing the number of consumers, but by reducing access costs through the development of a system that allows existing consumers to enjoy, or obtain reproductions of, such activities over the Internet or other communications means at far lower cost.</p> <p>07: As with the case of open source software, diverse goods and services, regardless of price, are developed, produced, sold, and supported primarily by consumers to meet their needs.</p> <p>08: For diverse goods and services, technology standardization and module-based research and development practices intensify, resulting in improved efficiency in overall R&D for any goods and services.</p> <p>09: Methods of assessing and utilizing the database, knowledge base, and knowledge network (a social network in which people with knowledge are known and accessible) built within an organization are established and made widely available.</p> <p>15: Efficient optimization of resources allocation, scheduling, etc. becomes possible, contributing to corporate cost reduction.</p> <p>29: To reduce market risks arising from the fluctuation of currency values and international commodity (e.g. energy) prices, major Japanese companies (over 30% of those listed) measure and control risk amounts daily by identifying in advance the risk factors.</p> <p>43: The establishment of flexible manufacturing technology allows over 50% of the listed manufacturers to replace conventional mass-production processes with fully individualized, made-to-order production processes.</p> <p>44: Consumer-oriented systems for privacy information management and protection are implemented to ensure that consumers' personal information is made accessible only to the entities authorized by the consumers and reuse by any other entities is blocked.</p> <p>46: Robots and information systems that can substitute as service personnel at checkout counters and the storefront become widely available.</p> <p>49: In TV and other broadcasting media, advertising material can be adapted to individual viewers.</p> <p>52: Environmental accounting (a method of evaluating a company's contribution to environmental conservation and sustainable development) or its extensions are widely adopted.</p>
2010	<p>54: Demand-side management programs are widely and effectively introduced to Japan's traffic, electricity, and communications infrastructures to reduce hourly and seasonal fluctuations in demand and thus to cut excessive capital investment.</p>
2011	<p>30: A rapid increase in the amount of data available to companies and advances in data analysis technology result in better prediction technologies that allow companies to evaluate diverse risks. To take advantage of these technologies, scenario planning and other tools are developed, enabling risk control that can reduce fluctuations in operating profits by half.</p>
2012	<p>10: In the area of R&D project management, methods of planning, performing, controlling, and assessing research projects are established, enabling an average 50% increase in labor productivity in R&D.</p> <p>21: Competition, negotiation, and coordination are analyzed further by game theory. The results are commonly applied to real-world policy-making and corporate decision-making, causing a significant change in such practices, and to institutional design in the public sector (e.g. competition policy, industrial policy) and the corporate sector (e.g. corporate strategy).</p> <p>22: In marketing surveys, there is a general shift from the traditional analysis focusing on individuals and individual variables to an approach in which interpersonal relationships are considered as "social networks" or an approach in which each person is analyzed from the viewpoint of "individual relationships."</p> <p>31: In Japan, advances in the behavioral scientific analysis of the strategy building process in the public and corporate sectors lead to the ability to promptly and effectively make decisions under competitive circumstances.</p> <p>32: Common, universal systems for evaluating and controlling project risks are established.</p> <p>33: As fusion between insurance and capital markets progresses, a risk control method called alternative risk transfer (ART) advances in structure. Thus, various risks of companies and individuals are diversified and transferred to investors on a large scale to achieve integrated risk management.</p> <p>55: Advances in research on comfort/discomfort, likes/dislikes, and other sensibilities that people feel as a result of consuming goods and services lead to the establishment of methods by which consumer sensibilities are directly analyzed, measured, and assessed, so that the results are used for R&D, sales, and marketing of goods and services.</p>
2013	<p>03: A research and development system for developing information, medical, financial, and other technologies that meet the demands of people in developing countries, rather than developed countries.</p>

year	topic
2014	<p>18: Efficient monitoring and incentive systems applicable internally to companies are developed to allow a significant delegation of authority, resulting in a 50% increase in labor productivity from the current levels.</p> <p>19: Through research in experimental economics and other fields, personal mind and consciousness are analyzed, resulting in the predictability of decision-making. This achievement is applied to designing structures such as business organizations and markets and to companies developing products and technologies.</p> <p>26: In Japan, technology for integrated risk management is developed to enhance the risk management capacity across the public sector, and this enables society to scan and identify risks, evaluate risk impacts, and rank risks by priority. As a result, assuming the desirable social state, a consistent framework within which protections against risks are proposed, adopted, and implemented is established.</p> <p>02: Social network theory and other theories on social relationships and organization are developed to create new types of methods for financing and risk management. As a result, both OECD countries and developing countries implement local policies or development policies that emphasize social assets such as local communities and mutual trust.</p>

Social application

year	topic
2011	51: Over half of Japan's listed companies adopt management schemes that emphasize corporate social responsibility as the fundamental business policy.
2013	<p>06: It becomes the standard business practice for listed companies that operations such as product development and strategy building are conducted under independent projects in which individuals or freelancers can participate without having to belong to any company.</p> <p>13: Widespread use of electronic money and the like allows micropayments (transactions smaller than ¥500) to be made at zero or negligible cost.</p> <p>14: Under a system that requires the listed companies to quantitatively assess their operational risks and publish the results periodically, efficiently reducing numerically expressed risks through the construction of an optimal business portfolio becomes a common practice among major Japanese companies.</p> <p>15: Efficient optimization of resources allocation, scheduling, etc. becomes possible, contributing to corporate cost reduction.</p> <p>20: A rise in shareholder awareness of corporate ownership in Japan results in Japanese shareholders coming to exercise their rights as extensively as U.S. shareholders.</p> <p>34: In Japan, securities markets where relatively small, unlisted companies can raise small funds that range from a few tens to hundreds of millions of yen are formed.</p> <p>38: Reeducation/retraining programs for "capacity building among the existing workforce," or for improving specialized skills and productivity among part-time and temporary workers, are widely implemented in Japan.</p> <p>39: In Japan, for easier job changes, corporate pensions become "portable" so that the pension funds deposited under the pension program of the previous employer can be transferred to the new employer's pension program when a worker changes jobs.</p> <p>42: Over 50% of the Japanese companies implement enterprise resource planning (ERP) systems and successfully improve demand forecasting, logistic systems, contracting forms, etc., enabling real-time order transactions and consequently, a significant reduction in inventory in the production/distribution system.</p> <p>45: Intelligent tags designed for product identification, quality control, and product tracking become widely available.</p> <p>47: Ordering and other business transactions are mostly conducted over mobile phones through voice input alone.</p> <p>48: In Japan, methods by which system requirements can be clearly defined for any organization in the public or corporate sector are established, resulting in efficient management of IT investment and prompt construction of the required IT environment.</p> <p>58: In such fields as art, theater, cinema, music, and literature, there are artistic activities whose viability is threatened due to a very small consumer population. Such small-scale artistic activities can be made economically viable not by increasing the number of consumers, but by reducing access costs through the development of a system that allows existing consumers to enjoy, or obtain reproductions of, such activities over the Internet or other communications means at far lower cost.</p>
2014	<p>07: As with the case of open source software, diverse goods and services, regardless of price, are developed, produced, sold, and supported primarily by consumers to meet their needs.</p> <p>08: For diverse goods and services, technology standardization and module-based research and development practices intensify, resulting in improved efficiency in overall R&D for any goods and services.</p> <p>09: Methods of assessing and utilizing the database, knowledge base, and knowledge network (a social network in which people with knowledge are known and accessible) built within an organization are established and made widely available.</p>

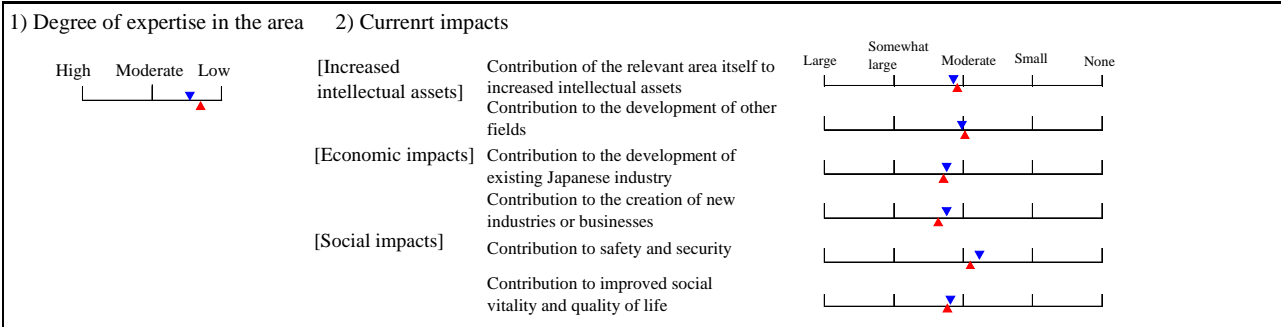
year	topic
	<p>11: A system for trading corporate databases and knowledge bases within and across corporate boundaries is built, allowing the wide and active trading of such knowledge based on economic incentives.</p> <p>12: It becomes a common approach to accelerating new discoveries and new technical developments that technical problems of companies and industries are widely publicized for a public call for solutions or for a contest in which proposed solutions are examined.</p> <p>25: Japan's government sector moves toward e-government and, combined with established technologies for personal authentication and personal information protection, begins to provide online public services in areas such as tax accounting and payment, pensions, health insurance, welfare, and other formalities.</p> <p>29: To reduce market risks arising from the fluctuation of currency values and international commodity (e.g. energy) prices, major Japanese companies (over 30% of those listed) measure and control risk amounts daily by identifying in advance the risk factors.</p> <p>36: A social environment that encourages women to balance work and marriage, childbearing, and childrearing (e.g. 30% of listed companies set up day care centers) becomes a reality in Japan to promote the utilization of female human resources.</p> <p>40: In Japan, employment contracts that clearly relate personal motivation to compensation, together with human resources evaluation methods that enable such contracts, penetrate. As a result, higher mobility in human resources and a 2% or more annual increase in labor productivity are achieved, consequently improving the quality of services provided by companies for consumers.</p> <p>43: The establishment of flexible manufacturing technology allows over 50% of the listed manufacturers to replace conventional mass-production processes with fully individualized, made-to-order production processes.</p> <p>44: Consumer-oriented systems for privacy information management and protection are implemented to ensure that consumers' personal information is made accessible only to the entities authorized by the consumers and reuse by any other entities is blocked.</p> <p>46: Robots and information systems that can substitute as service personnel at checkout counters and the storefront become widely available.</p> <p>49: In TV and other broadcasting media, advertising material can be adapted to individual viewers.</p> <p>50: Effective usage of IT is defined for the public and corporate sectors, allowing IT investment to contribute to an annual increase of 2% or more in total factor productivity. This solves "the productivity paradox," a proposition that investing in IT does not necessarily improve productivity in the entire economy.</p> <p>52: Environmental accounting (a method of evaluating a company's contribution to environmental conservation and sustainable development) or its extensions are widely adopted.</p> <p>53: In Japan, the notion of the national trust is expanded, and legislation is developed so as to promote funding from individuals and corporations for conserving and enhancing the natural environment, public property, and the living environment. As a result, diverse public values come to be protected through many different approaches.</p> <p>56: The concept of developing goods and services for not meeting specific needs, but for use in entertainment, art, and cultural activities becomes the mainstream in many industries and drives technological development.</p> <p>57: Universities, companies, and local governments establish mechanisms for promoting personal hobby activities regarding entertainment, art, and culture, and for linking them to academic or technological advances.</p>
2015	<p>01: Through political incentives and corporate decisions to promote IT, advanced traffic systems, and the decentralization of industry, the medium and long-term (5-year) growth rate of added values (GDP) produced in Japan's non-metropolitan areas exceeds the equivalent rate in its metropolitan areas.</p> <p>59: Universities become the center of the theoretical analysis of art, theater, cinema, music, literature, and other artistic and cultural activities, and play an important role in nurturing artists who initiate new artistic activities and supporting such activities.</p>
2016	<p>04: Facilitation of international business operations based on international standards, as a result of international standardization of the laws governing commercial activities, transactions, taxing, competition, and intellectual property rights in the international context.</p> <p>05: In many parts of Japan, local currencies that are, unlike the national currency, valid only within a specific geographic area become available and are used for solving environmental problems, promoting local economy, and encouraging community activities.</p> <p>16: In companies in Asia, Latin America, and Continental Europe, unique corporate governance models which are dissimilar to the shareholder-oriented one in the U.S. and the U.K. emerge and find certain acceptance.</p> <p>41: Japan-based major multinational companies of which half the sales are generated overseas introduce foreign labor to over one-third of their key managerial and specialist positions.</p> <p>55: Advances in research on comfort/discomfort, likes/dislikes, and other sensibilities that people feel as a result of consuming goods and services lead to the establishment of methods by which consumer sensibilities are directly analyzed, measured, and assessed, so that the results are used for R&D, sales, and marketing of goods and services.</p>

year	topic
2017	<p>17: A new form of corporation in which non-shareholder stakeholders (employees, consumers, etc.) assume shareholder-like corporate ownership and are granted the right to claim residual profits becomes widespread.</p> <p>54: Demand-side management programs are widely and effectively introduced to Japan's traffic, electricity, and communications infrastructures to reduce hourly and seasonal fluctuations in demand and thus to cut excessive capital investment.</p>
2018	<p>10: In the area of R&D project management, methods of planning, performing, controlling, and assessing research projects are established, enabling an average 50% increase in labor productivity in R&D.</p> <p>21: Competition, negotiation, and coordination are analyzed further by game theory. The results are commonly applied to real-world policy-making and corporate decision-making, causing a significant change in such practices, and to institutional design in the public sector (e.g. competition policy, industrial policy) and the corporate sector (e.g. corporate strategy).</p> <p>22: In marketing surveys, there is a general shift from the traditional analysis focusing on individuals and individual variables to an approach in which interpersonal relationships are considered as "social networks" or an approach in which each person is analyzed from the viewpoint of "individual relationships."</p> <p>30: A rapid increase in the amount of data available to companies and advances in data analysis technology result in better prediction technologies that allow companies to evaluate diverse risks. To take advantage of these technologies, scenario planning and other tools are developed, enabling risk control that can reduce fluctuations in operating profits by half.</p>
2019	<p>03: A research and development system for developing information, medical, financial, and other technologies that meet the demands of people in developing countries, rather than developed countries.</p> <p>19: Through research in experimental economics and other fields, personal mind and consciousness are analyzed, resulting in the predictability of decision-making. This achievement is applied to designing structures such as business organizations and markets and to companies developing products and technologies.</p> <p>32: Common, universal systems for evaluating and controlling project risks are established.</p> <p>33: As fusion between insurance and capital markets progresses, a risk control method called alternative risk transfer (ART) advances in structure. Thus, various risks of companies and individuals are diversified and transferred to investors on a large scale to achieve integrated risk management.</p> <p>35: Because of a major increase in the volume of highly specialized knowledge required for senior management and a higher demand for highly specialized professionals, MBA holders come to account for 25% of the top executives of Japan's listed companies.</p> <p>37: In Japan's listed companies, women account for 20% of senior-level managers.</p>
2020	<p>02: Social network theory and other theories on social relationships and organization are developed to create new types of methods for financing and risk management. As a result, both OECD countries and developing countries implement local policies or development policies that emphasize social assets such as local communities and mutual trust.</p> <p>18: Efficient monitoring and incentive systems applicable internally to companies are developed to allow a significant delegation of authority, resulting in a 50% increase in labor productivity from the current levels.</p> <p>26: In Japan, technology for integrated risk management is developed to enhance the risk management capacity across the public sector, and this enables society to scan and identify risks, evaluate risk impacts, and rank risks by priority. As a result, assuming the desirable social state, a consistent framework within which protections against risks are proposed, adopted, and implemented is established.</p> <p>31: In Japan, advances in the behavioral scientific analysis of the strategy building process in the public and corporate sectors lead to the ability to promptly and effectively make decisions under competitive circumstances.</p>
2021	<p>24: Non-monetary accounting methods, which use physical units as well as monetary units, are established, and multidimensional performance evaluation systems based on them come into wide use for evaluation of the public sector, the environment, and social capital such as human relationships.</p> <p>27: Financial and other economic policies become more specific and capable of controlling inflation and deflation, contributing to a major reduction of economic fluctuations.</p>
2022	<p>23: Global governance is established as a result of the construction of organizations and schemes for "monitoring," "controlling," and "coordinating" activities of companies, consumers, and individuals within a common framework for governance across national boundaries.</p>
2023	<p>28: In Japan, methods of evaluating personal contribution to a local society or non-profit organization (NPO) are developed, so that the evaluation results are used by government or NPOs in designing the personal roles.</p>

Appendix: Results of R1 and R2

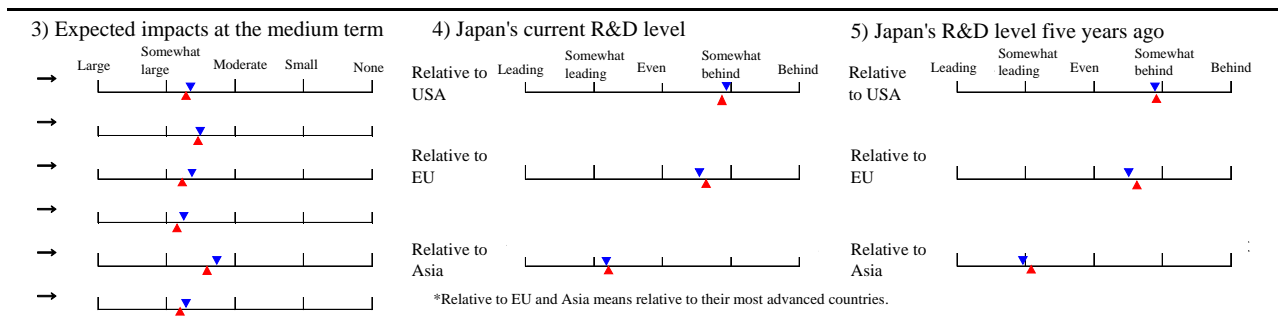
I. Optimization of industrial infrastructure through regional dispersion and concentration

1. Questions regarding the relevant area



2. Questions regarding topics

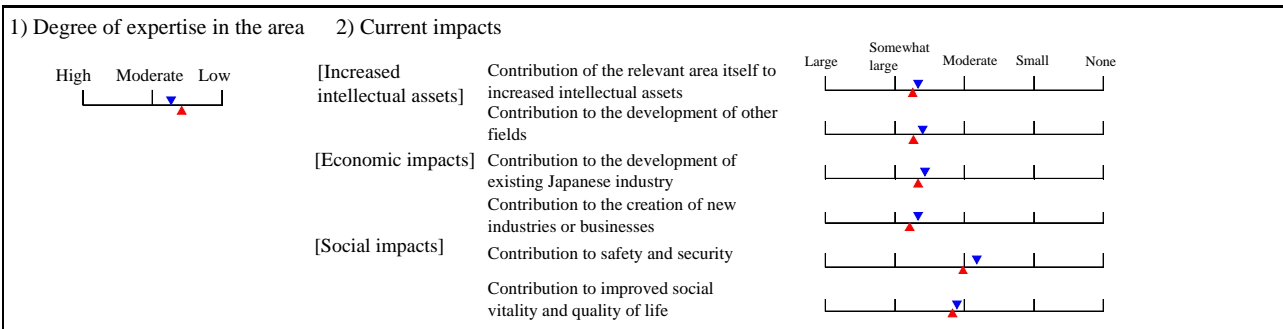
No	Topic	Questionnaire	Respondents (persons)	Degree of expertise				Importance to Japan				Time of technological realization								
				High	Moderate	Low	None	Index	High	Moderate	Low	None	Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know
				(%)				(%)				(%)								
1	Through political incentives and corporate decisions to promote IT, advanced traffic systems, and the decentralization of industry, the medium and long-term (5-year) growth rate of added values (GDP) produced in Japan's non-metropolitan areas exceeds the equivalent rate in its metropolitan areas.	1	73	12	30	58	-	67	43	42	15	0								
		2	64	2	17	81	-	63	29	65	6	0								
		E	1	100	0	0	-	50	0	100	0	0								
2	Social network theory and other theories on social relationships and organization are developed to create new types of methods for financing and risk management. As a result, both OECD countries and developing countries implement local policies or development policies that emphasize social assets such as local communities and mutual trust.	1	72	18	31	51	-	64	38	44	18	0							8	17
		2	61	8	28	64	-	58	23	64	13	0							8	7
		E	5	100	0	0	-	70	40	60	0	0							0	0
3	A research and development system for developing information, medical, financial, and other technologies that meet the demands of people in developing countries, rather than developed countries.	1	71	11	31	58	-	57	26	49	25	0							4	18
		2	60	3	20	77	-	57	19	69	12	0							5	9
		E	2	100	0	0	-	75	50	50	0	0							0	50
4	Facilitation of international business operations based on international standards, as a result of international standardization of the laws governing commercial activities, transactions, taxing, competition, and intellectual property rights in the international context.	1	80	18	33	49	-	78	58	37	5	0								
		2	65	11	28	61	-	82	66	29	5	0								
		E	7	100	0	0	-	86	71	29	0	0								
5	In many parts of Japan, local currencies that are, unlike the national currency, valid only within a specific geographic area become available and are used for solving environmental problems, promoting local economy, and encouraging community activities.	1	75	12	23	65	-	45	16	35	45	4								
		2	61	3	16	81	-	39	7	35	58	0								
		E	2	100	0	0	-	25	0	0	100	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			
(%)						(%)				(%)						(%)					(%)																
																							23	20	39	41	17	3	38	33	30	33	48	10	2		
																								18	16	26	54	18	2	33	30	28	21	72	5	0	
																								0	0	0	100	0	0	0	100	0	100	100	100	0	0
3	41	54	1	1	30	38	24	8	42	34	22	18	18	37	3	2							8	14	25	48	21	6	43	32	13	25	49	6	4		
2	28	70	0	0	12	68	17	3	61	38	14	5	13	46	2	0							8	15	12	70	13	5	58	33	5	11	67	4	0		
0	25	75	0	0	25	75	0	0	75	50	50	25	50	50	25	0							0	0	20	60	20	0	60	60	0	20	60	40	0		
6	63	24	4	3	33	33	27	7	48	33	22	25	36	25	2	0							3	21	27	42	27	4	58	34	13	21	28	9	3		
4	74	18	0	4	16	65	14	5	67	28	15	30	28	22	0	0							2	17	9	72	16	3	75	36	4	16	34	0	0		
0	50	50	0	0	0	50	50	0	100	100	100	100	100	50	0	0							0	50	0	100	0	0	100	100	0	100	100	0	0		
																								3	8	64	26	9	1	44	34	10	12	45	34	5	
																								2	13	76	19	5	0	53	39	3	5	61	27	0	
																								0	0	86	14	0	0	43	43	0	0	71	29	0	
																								18	19	25	25	31	19	34	12	12	12	63	24	5	
																								10	13	15	28	44	13	25	9	6	6	72	25	0	
																								100	0	0	0	50	50	0	0	0	0	100	0	0	

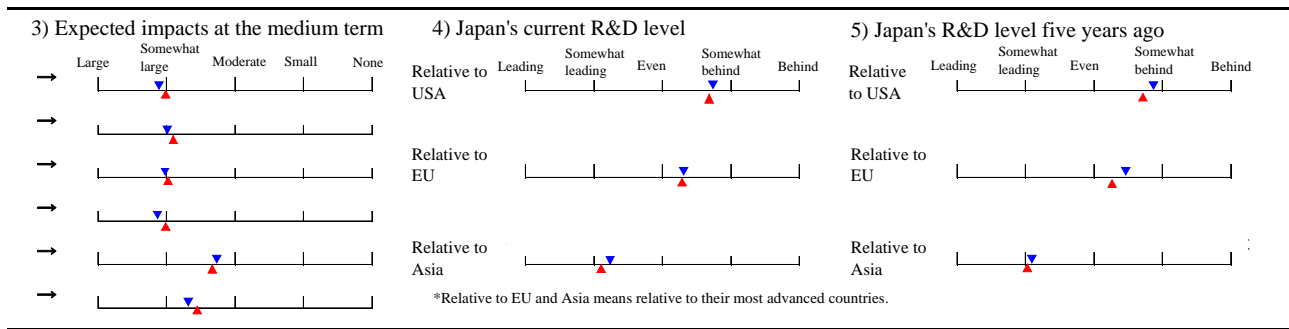
II. Knowledge management

1. Questions regarding the relevant area



2. Questions regarding topics

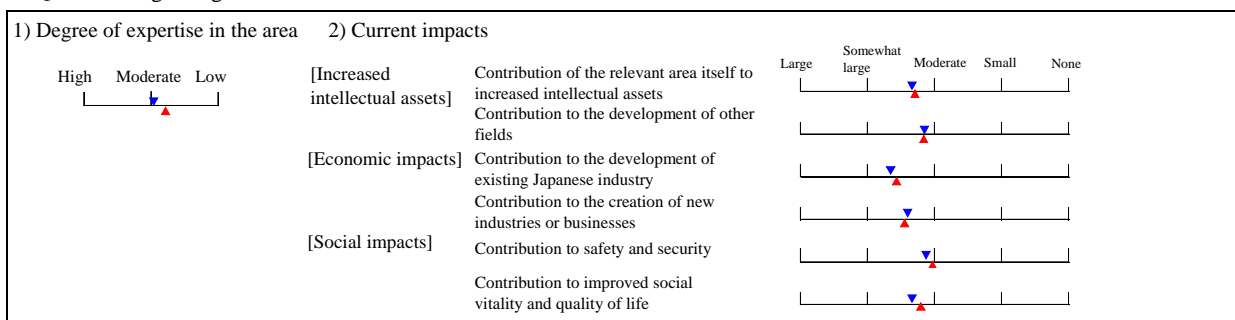
No	Topic	Questionnaire	Respondents (persons)	Degree of expertise				Importance to Japan				Time of technological realization									
				High	Moderate	Low	None	Index	High	Moderate	Low	None	Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know	
				(%)				(%)				(%)									
6	It becomes the standard business practice for listed companies that operations such as product development and strategy building are conducted under independent projects in which individuals or freelancers can participate without having to belong to any company.	1	87	25	45	30	-	58	29	46	23	2									
		2	68	9	43	48	-	52	16	60	24	0									
		E	6	100	0	0	-	71	50	33	17	0									
7	As with the case of open source software, diverse goods and services, regardless of price, are developed, produced, sold, and supported primarily by consumers to meet their needs.	1	88	15	41	44	-	57	26	48	26	0								5	10
		2	67	3	31	66	-	47	11	57	30	2								5	8
		E	2	100	0	0	-	38	0	50	50	0								0	50
8	For diverse goods and services, technology standardization and module-based research and development practices intensify, resulting in improved efficiency in overall R&D for any goods and services.	1	82	16	40	44	-	69	46	41	11	2								4	10
		2	67	9	30	61	-	71	47	42	11	0								0	8
		E	6	100	0	0	-	88	83	0	17	0								0	33
9	Methods of assessing and utilizing the database, knowledge base, and knowledge network (a social network in which people with knowledge are known and accessible) built within an organization are established and made widely available.	1	86	22	38	40	-	71	50	35	15	0								1	13
		2	66	8	33	59	-	74	53	36	11	0								0	8
		E	5	100	0	0	-	85	80	0	20	0								0	40
10	In the area of R&D project management, methods of planning, performing, controlling, and assessing research projects are established, enabling an average 50% increase in labor productivity in R&D.	1	78	13	49	38	-	68	42	49	6	3								4	13
		2	67	4	40	56	-	72	47	48	3	2								2	14
		E	3	100	0	0	-	67	67	0	0	33								0	67
11	A system for trading corporate databases and knowledge bases within and across corporate boundaries is built, allowing the wide and active trading of such knowledge based on economic incentives.	1	83	17	47	36	-	63	39	40	17	4									
		2	67	9	42	49	-	61	29	57	12	2									
		E	6	100	0	0	-	79	66	17	17	0									
12	It becomes a common approach to accelerating new discoveries and new technical developments that technical problems of companies and industries are widely publicized for a public call for solutions or for a contest in which proposed solutions are examined.	1	73	10	36	54	-	60	33	43	23	1									
		2	64	3	23	74	-	49	10	69	19	2									
		E	2	100	0	0	-	63	50	0	50	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	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		
(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)		
																							17	17	8	19	30	43	28	17	26	36	55	17	2	
																							9	12	2	15	36	47	37	23	9	23	66	3	6	
																							0	33	0	17	33	50	0	33	33	67	67	0	0	
5	68	23	0	4	12	18	37	33	35	28	28	28	12	51	11	0							6	14	7	25	37	31	36	25	29	32	53	12	0	
0	92	6	2	0	2	11	58	29	57	26	15	13	0	61	4	0							4	10	0	17	62	21	39	22	18	18	65	6	0	
0	100	0	0	0	0	0	50	50	0	0	0	0	0	100	0	0							0	50	0	50	0	50	0	0	0	0	0	100	0	0
13	75	8	0	4	16	24	30	30	29	41	30	25	20	27	0	4							3	16	10	28	34	28	21	42	30	28	33	5	2	
6	89	3	2	0	2	24	44	30	33	57	22	20	9	22	4	0							0	13	2	18	62	18	21	64	9	15	34	6	0	
0	100	0	0	0	0	17	17	66	50	0	0	100	0	50	0	0							0	33	0	34	33	33	25	75	0	25	50	0	0	
10	82	7	0	1	12	24	33	31	37	41	31	31	10	24	2	3							0	16	11	31	34	24	33	43	25	33	29	10	5	
2	95	3	0	0	6	18	50	26	48	58	17	6	2	15	2	4							0	11	5	17	58	20	31	63	12	13	23	8	0	
0	100	0	0	0	0	20	0	80	100	0	0	0	0	0	0	0							0	40	0	0	20	80	100	0	0	0	0	0	0	0
10	81	9	0	0	14	18	38	30	49	38	32	32	11	21	2	2							3	17	10	25	34	31	55	35	22	24	24	2	2	
2	96	2	0	0	2	14	58	26	63	42	21	15	4	15	2	0							2	15	5	20	52	23	64	48	2	8	20	4	0	
0	100	0	0	0	0	0	33	67	0	0	0	100	0	0	0	0							0	67	0	0	33	67	0	100	0	0	0	0	0	0
																							10	13	11	24	41	24	26	33	16	22	40	29	3	
																							3	13	3	14	63	20	22	31	4	8	55	25	0	
																							0	33	17	0	33	50	0	0	0	0	33	67	0	
																							7	15	17	25	32	26	37	50	25	46	33	17	4	
																							8	14	3	19	53	25	30	57	11	32	28	9	2	
																							0	100	0	0	0	100	0	0	0	0	0	0	0	0

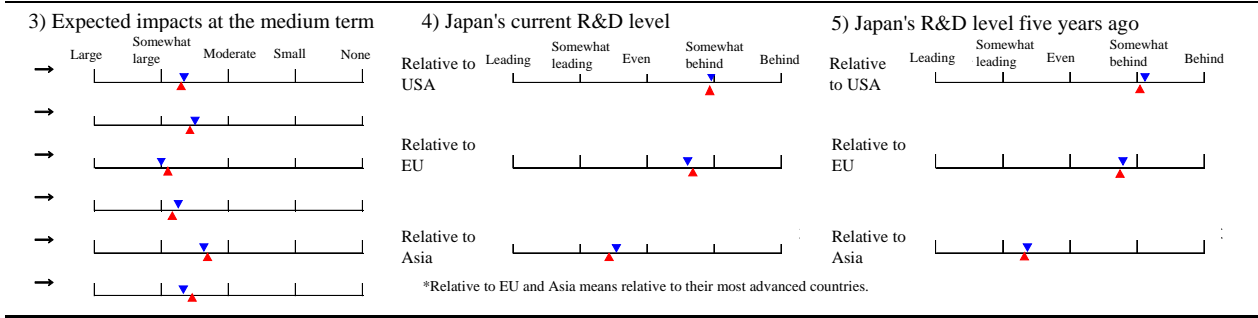
III. Corporate decision-making, governance, and management

1. Questions regarding the relevant area





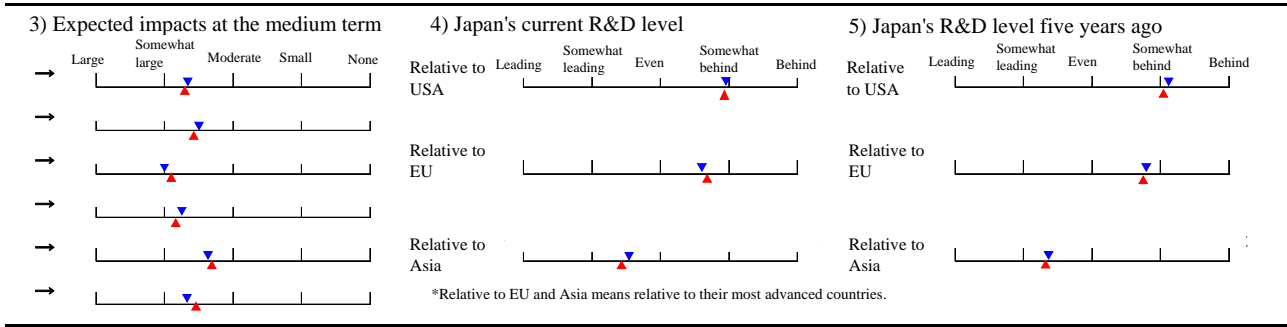
2. Questions regarding topics

No	Topic	Questionnaire	Degree of expertise				Importance to Japan				Time of technological realization										
			Respondents (persons)				Index	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														(%)	(%)
13	Widespread use of electronic money and the like allows micropayments (transactions smaller than ¥500) to be made at zero or negligible cost.	1	87	10	31	59	-	45	11	47	40	2							2	6	
		2	70	4	20	76	-	41	6	45	49	0								0	3
		E	3	100	0	0	-	42	0	67	33	0									0
14	Under a system that requires the listed companies to quantitatively assess their operational risks and publish the results periodically, efficiently reducing numerically expressed risks through the construction of an optimal business portfolio becomes a common practice among major Japanese companies.	1	95	28	36	36	-	60	31	49	20	0									
		2	76	24	30	46	-	58	22	67	11	0									
		E	18	100	0	0	-	67	39	50	11	0									
15	Efficient optimization of resources allocation, scheduling, etc. becomes possible, contributing to corporate cost reduction.	1	87	24	33	43	-	55	26	42	31	1							5	15	
		2	71	13	34	53	-	51	13	66	20	1								0	10
		E	9	100	0	0	-	75	56	33	11	0									0
16	In companies in Asia, Latin America, and Continental Europe, unique corporate governance models which are dissimilar to the shareholder-oriented one in the U.S. and the U.K. emerge and find certain acceptance.	1	90	27	32	41	-	58	33	40	18	9									
		2	71	20	28	52	-	57	26	54	17	3									
		E	14	100	0	0	-	68	50	29	14	7									
17	A new form of corporation in which non-shareholder stakeholders (employees, consumers, etc.) assume shareholder-like corporate ownership and are granted the right to claim residual profits becomes widespread.	1	89	30	28	42	-	51	28	33	28	11									
		2	71	20	28	52	-	51	19	52	26	3									
		E	14	100	0	0	-	59	36	36	21	7									
18	Efficient monitoring and incentive systems applicable internally to companies are developed to allow a significant delegation of authority, resulting in a 50% increase in labor productivity from the current levels.	1	91	25	40	35	-	64	38	42	20	0							12	19	
		2	72	15	38	47	-	58	20	73	6	1								7	14
		E	11	100	0	0	-	70	40	60	0	0									9
19	Through research in experimental economics and other fields, personal mind and consciousness are analyzed, resulting in the predictability of decision-making. This achievement is applied to designing structures such as business organizations and markets and to companies developing products and technologies.	1	84	21	30	49	-	52	25	38	33	4							19	15	
		2	72	13	33	54	-	44	7	58	34	1								13	10
		E	9	100	0	0	-	64	33	56	11	0									0
20	A rise in shareholder awareness of corporate ownership in Japan results in Japanese shareholders coming to exercise their rights as extensively as U.S. shareholders.	1	95	31	32	37	-	56	27	48	22	3									
		2	74	19	40	41	-	52	13	73	13	1									
		E	14	100	0	0	-	70	43	50	7	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							
(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)							
19	50	25	5	1	15	28	35	22	18	23	23	12	14	55	26	0	4	6	23	28	33	16	15	21	15	18	64	36	1
13	78	9	0	0	9	36	46	9	15	32	20	3	3	72	15	0	1	3	12	43	39	6	13	25	5	10	84	20	0
0	67	33	0	0	34	33	33	0	33	33	0	0	33	67	0	0	0	0	50	50	0	0	0	0	0	50	50	0	0
																	8	11	17	26	33	24	32	31	11	16	34	45	5
																	5	8	11	30	43	16	38	27	2	2	33	48	2
																	11	0	22	34	33	11	44	25	0	0	13	56	0
11	83	5	0	1	5	13	39	43	45	28	21	36	6	26	0	2	3	18	4	15	34	47	37	34	17	29	32	5	2
4	96	0	0	0	0	13	41	46	65	27	16	27	3	14	3	0	0	14	3	13	41	43	50	45	0	13	37	5	3
0	100	0	0	0	0	11	56	33	67	50	50	33	0	0	0	0	0	11	11	11	56	22	33	67	0	33	33	17	17
																	19	24	16	15	29	40	31	22	6	8	49	27	14
																	11	14	3	26	33	38	38	31	0	5	71	19	5
																	21	0	7	21	29	43	13	38	0	0	75	75	0
																	30	24	17	25	22	36	22	14	2	16	65	41	6
																	23	16	6	25	35	34	21	14	0	9	72	49	2
																	43	14	14	21	21	44	25	25	0	13	63	75	0
6	76	10	2	6	6	19	34	41	38	25	15	19	15	44	13	8	12	24	8	15	29	48	33	21	7	19	65	14	7
1	96	1	1	1	0	13	43	44	61	22	8	3	0	47	3	0	4	24	3	13	36	48	46	26	0	9	71	14	6
0	91	0	9	0	0	9	36	55	20	20	20	0	0	60	0	0	0	20	0	9	18	73	0	50	0	50	50	0	50
5	91	3	0	1	9	16	38	37	38	34	32	46	6	16	2	0	14	19	6	13	34	47	46	51	12	29	24	10	0
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0	100	0	0	0	25	0	25	50	25	25	25	75	0	0	25	0	0	11	22	0	22	56	25	25	0	50	0	25	0
																	13	9	14	23	31	32	18	11	8	2	62	38	8
																	8	5	7	21	39	33	17	8	0	2	77	29	2
																	7	0	29	14	43	14	17	0	0	0	83	50	8

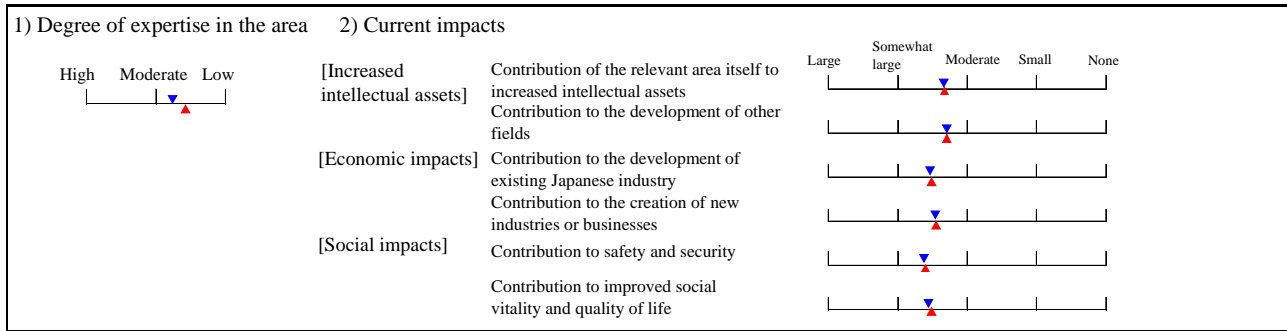
No	Topic	Questionnaire	Respondents (persons)	Degree of expertise				Importance to Japan				Time of technological realization										
				High	Moderate	Low	None	Index	High	Moderate	Low	None	Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know		
				(%)				(%)				(%)										
21	Competition, negotiation, and coordination are analyzed further by game theory. The results are commonly applied to real-world policy-making and corporate decision-making, causing a significant change in such practices, and to institutional design in the public sector (e.g. competition policy, industrial policy) and the corporate sector (e.g. corporate strategy).	1	90	17	42	41	-	51	22	40	36	2								12	15	
		2	70	9	45	46	-	46	9	61	26	4									6	13
		E	6	100	0	0	-	58	34	33	33	0									0	17
22	In marketing surveys, there is a general shift from the traditional analysis focusing on individuals and individual variables to an approach in which interpersonal relationships are considered as "social networks" or an approach in which each person is analyzed from the viewpoint of "individual relationships."	1	82	24	27	49	-	47	19	38	38	5								3	21	
		2	66	18	15	67	-	45	6	61	31	2									3	15
		E	12	100	0	0	-	56	25	50	25	0									0	17



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
(%)					(%)					(%)					(%)					(%)									
2	91	6	0	1	6	26	31	37	40	40	35	33	6	17	2	8	16	20	6	23	29	42	50	54	11	13	30	7	7
0	100	0	0	0	1	15	44	40	54	56	29	17	2	15	0	0	7	19	0	18	41	41	63	55	5	3	23	3	8
0	100	0	0	0	0	50	50	0	67	83	33	17	0	0	0	0	33	33	0	50	50	0	83	50	17	0	0	0	17
6	83	8	0	3	6	14	31	49	38	43	23	35	10	23	0	3	5	18	4	14	31	51	45	50	8	13	26	3	3
3	94	3	0	0	0	6	38	56	64	50	4	21	7	14	0	0	2	17	2	8	38	52	63	63	0	3	23	3	3
9	82	9	0	0	0	17	17	66	75	75	0	25	0	0	0	0	0	17	0	17	25	58	60	80	0	0	0	20	0

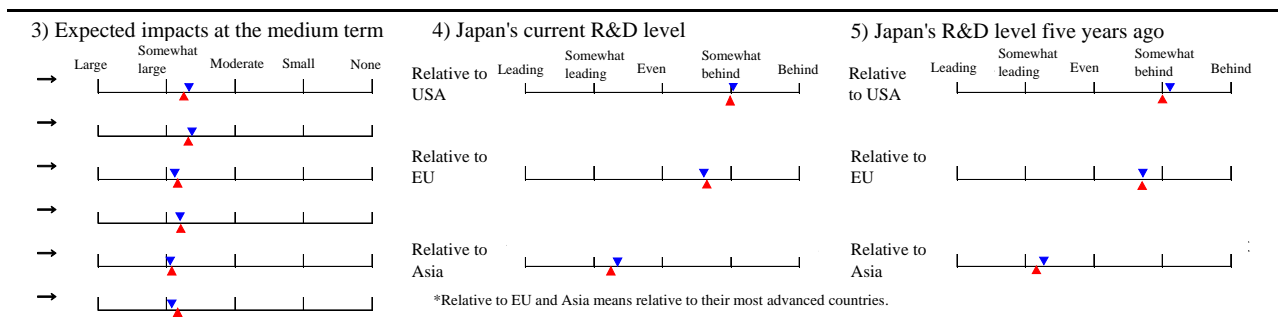
V. Risk management and finance

1. Questions regarding the relevant area



2. Questions regarding topics

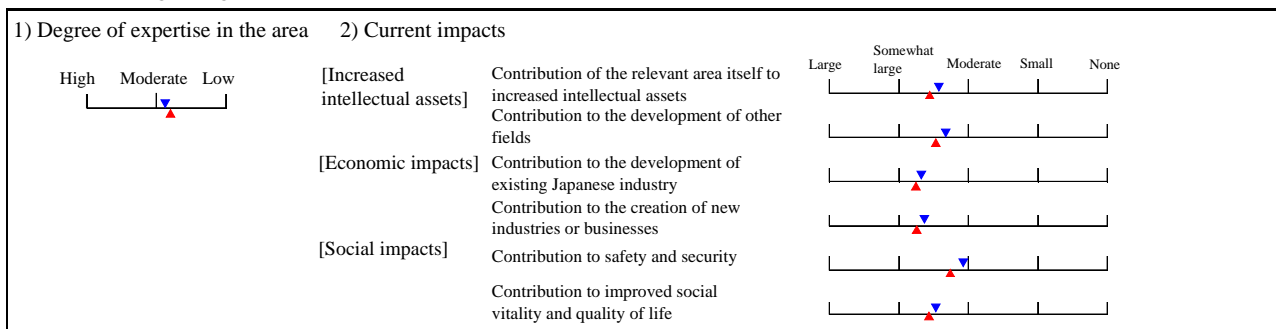
No	Topic	Questionnaire	Respondents (persons)	Degree of expertise				Importance to Japan				Time of technological realization											
				High	Moderate	Low	None	Index	High	Moderate	Low	None	Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know			
				(%)				(%)				(%)											
29	To reduce market risks arising from the fluctuation of currency values and international commodity (e.g. energy) prices, major Japanese companies (over 30% of those listed) measure and control risk amounts daily by identifying in advance the risk factors.	1	78	33	26	41	-	64	35	53	9	3								4	10		
		2	70	19	24	57	-	64	30	67	3	0									3	6	
		E	13	100	0	0	-	83	69	23	8	0										8	0
30	A rapid increase in the amount of data available to companies and advances in data analysis technology result in better prediction technologies that allow companies to evaluate diverse risks. To take advantage of these technologies, scenario planning and other tools are developed, enabling risk control that can reduce fluctuations in operating profits by half.	1	84	26	30	44	-	57	29	45	24	2											
		2	74	14	32	54	-	55	15	75	10	0											
		E	10	100	0	0	-	60	30	50	20	0											
31	In Japan, advances in the behavioral scientific analysis of the strategy building process in the public and corporate sectors lead to the ability to promptly and effectively make decisions under competitive circumstances.	1	77	23	43	34	-	63	34	52	13	1											
		2	68	9	40	51	-	56	15	81	4	0											
		E	6	100	0	0	-	75	50	50	0	0											
32	Common, universal systems for evaluating and controlling project risks are established.	1	76	24	28	48	-	60	32	47	20	1											
		2	69	7	29	64	-	53	13	71	16	0											
		E	5	100	0	0	-	55	20	60	20	0											
33	As fusion between insurance and capital markets progresses, a risk control method called alternative risk transfer (ART) advances in structure. Thus, various risks of companies and individuals are diversified and transferred to investors on a large scale to achieve integrated risk management.	1	63	27	32	41	-	63	37	45	16	2											
		2	65	15	26	59	-	54	14	75	11	0											
		E	10	100	0	0	-	68	40	50	10	0											
34	In Japan, securities markets where relatively small, unlisted companies can raise small funds that range from a few tens to hundreds of millions of yen are formed.	1	75	29	31	40	-	72	50	38	12	0											
		2	67	12	36	52	-	76	56	37	7	0											
		E	8	100	0	0	-	75	62	13	25	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	
(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)					
1	92	7	0	0	19	21	38	22	44	41	32	27	22	31	8	2					3	12	17	24	35	24	45	50	7	21	30	16	4
0	99	1	0	0	7	10	61	22	63	52	17	12	6	23	2	2					4	9	3	29	45	23	63	59	2	6	31	11	2
0	100	0	0	0	17	33	33	17	70	40	30	10	20	30	0	0					8	0	8	46	23	23	70	50	0	0	40	40	0
1	91	4	0	4	10	19	46	25	46	39	36	33	16	21	5	0					20	16	10	21	42	27	54	47	7	22	22	10	3
0	100	0	0	0	4	10	61	25	68	51	25	21	2	17	0	0					14	10	1	14	61	24	67	55	2	13	22	5	2
0	100	0	0	0	10	20	40	30	71	57	29	0	14	14	0	0					10	10	0	30	50	20	63	38	0	25	25	13	0
0	91	6	0	3	21	20	35	24	55	40	38	33	10	17	5	5					8	18	16	26	33	25	66	47	7	16	24	5	9
0	100	0	0	0	8	20	50	22	73	51	16	18	0	14	2	0					7	6	4	25	47	24	77	54	0	4	19	0	2
0	100	0	0	0	0	17	66	17	100	80	20	0	0	0	0	0					17	0	0	17	50	33	100	75	0	0	0	0	0
1	94	4	0	1	16	22	33	29	50	37	35	21	19	25	6	4					11	11	9	27	27	37	51	49	11	21	30	11	9
0	93	5	2	0	3	20	51	26	67	43	16	16	0	14	6	0					7	7	3	16	50	31	70	54	2	9	24	4	2
0	100	0	0	0	0	20	60	20	75	50	0	0	0	25	50	0					0	20	0	20	60	20	75	50	0	0	50	0	0
0	89	9	2	0	18	26	37	19	57	39	33	27	12	37	16	0					3	13	23	13	41	23	54	38	8	23	44	23	10
0	97	3	0	0	7	15	60	18	58	48	20	10	2	32	4	0					5	8	2	28	53	17	53	42	0	4	57	17	0
0	89	11	0	0	11	11	67	11	63	38	25	0	13	50	13	0					0	0	0	50	40	10	44	33	0	0	56	22	0
																					3	21	33	38	19	10	29	17	29	32	65	41	3
																					1	6	27	48	16	9	25	13	11	13	79	38	0
																					13	13	0	50	25	25	17	0	17	0	67	50	0

VI. Human resources management (relationship among education, competition, and cooperation)

1. Questions regarding the relevant area

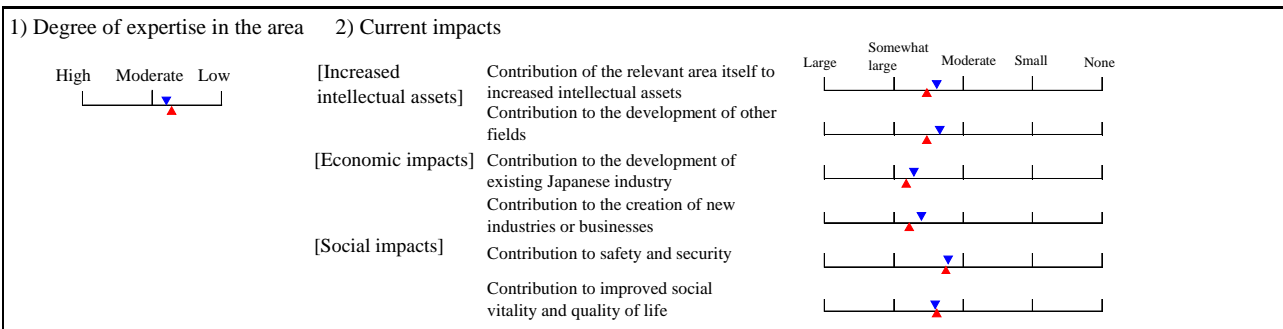


2. Questions regarding topics

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
				(%)				(%)				(%)								
35	Because of a major increase in the volume of highly specialized knowledge required for senior management and a higher demand for highly specialized professionals, MBA holders come to account for 25% of the top executives of Japan's listed companies.	1	93	39	27	34	-	55	31	35	26	8								
		2	78	24	40	36	-	52	20	51	28	1								
		E	19	100	0	0	-	72	50	39	11	0								
36	A social environment that encourages women to balance work and marriage, childbearing, and childrearing (e.g. 30% of listed companies set up day care centers) becomes a reality in Japan to promote the utilization of female human resources.	1	87	25	34	41	-	82	66	32	2	0								
		2	74	15	35	50	-	90	81	18	1	0								
		E	11	100	0	0	-	95	91	9	0	0								
37	In Japan's listed companies, women account for 20% of senior-level managers.	1	87	26	32	42	-	60	30	52	18	0								
		2	72	19	32	49	-	65	34	59	7	0								
		E	14	100	0	0	-	70	43	50	7	0								
38	Reeducation/retraining programs for "capacity building among the existing workforce," or for improving specialized skills and productivity among part-time and temporary workers, are widely implemented in Japan.	1	85	29	32	39	-	71	49	38	9	4								
		2	72	18	36	46	-	80	62	34	4	0								
		E	13	100	0	0	-	88	77	23	0	0								
39	In Japan, for easier job changes, corporate pensions become "portable" so that the pension funds deposited under the pension program of the previous employer can be transferred to the new employer's pension program when a worker changes jobs.	1	86	31	34	35	-	80	64	29	7	0								
		2	74	19	42	39	-	90	82	14	4	0								
		E	14	100	0	0	-	88	79	14	7	0								
40	In Japan, employment contracts that clearly relate personal motivation to compensation, together with human resources evaluation methods that enable such contracts, penetrate. As a result, higher mobility in human resources and a 2% or more annual increase in labor productivity are achieved, consequently improving the quality of services provided by companies for consumers.	1	90	29	38	33	-	67	41	45	14	0								
		2	73	22	45	33	-	69	42	51	6	1								
		E	16	100	0	0	-	78	63	31	0	6								
41	Japan-based major multinational companies of which half the sales are generated overseas introduce foreign labor to over one-third of their key managerial and specialist positions.	1	84	23	36	41	-	64	37	48	14	1								
		2	71	18	38	44	-	62	29	62	9	0								
		E	13	100	0	0	-	71	46	46	8	0								

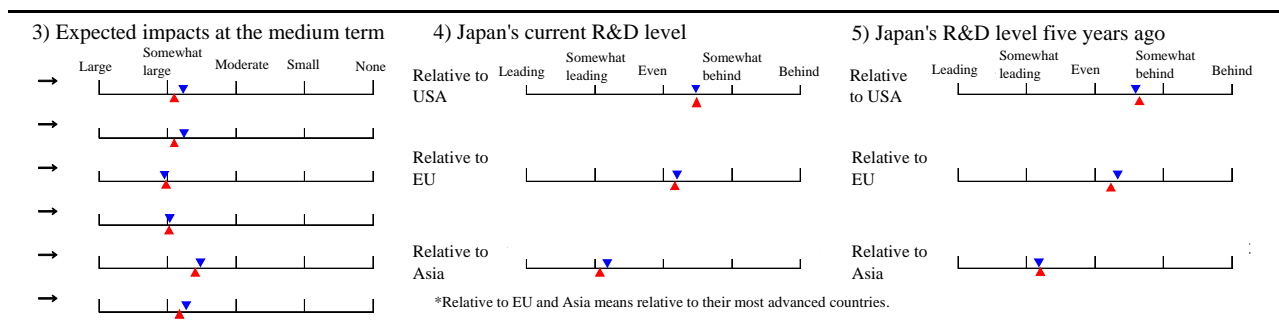
VII. Competition and cooperation in business

1. Questions regarding the relevant area



2. Questions regarding topics

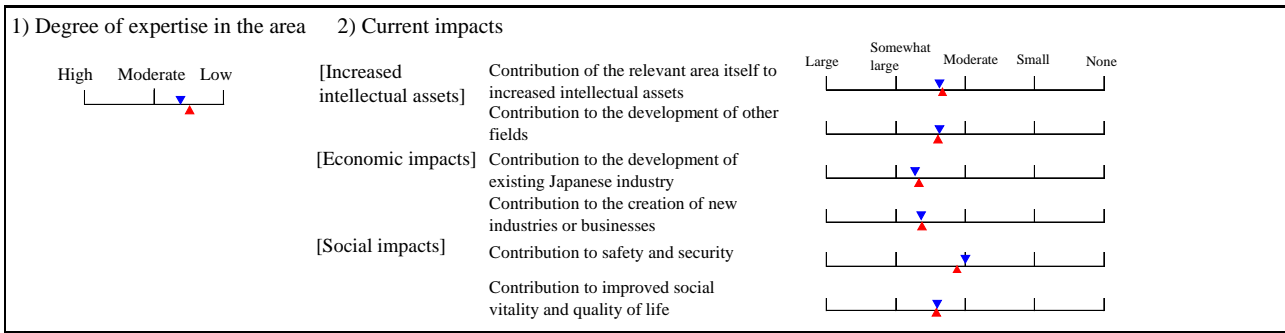
No	Topic	Questionnaire	Degree of expertise				Importance to Japan				Time of technological realization										
			Respondents (persons)				Index				Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized		Do not know		
			High	Moderate	Low	None	High	Moderate	Low	None							(%)	(%)			
42	Over 50% of the Japanese companies implement enterprise resource planning (ERP) systems and successfully improve demand forecasting, logistic systems, contracting forms, etc., enabling real-time order transactions and consequently, a significant reduction in inventory in the production/distribution system.	1	83	24	35	41	-	63	34	52	13	1								5	5
		2	67	10	43	47	-	59	22	69	9	0								3	3
		E	7	100	0	0	-	61	29	57	14	0								14	0
43	The establishment of flexible manufacturing technology allows over 50% of the listed manufacturers to replace conventional mass-production processes with fully individualized, made-to-order production processes.	1	78	24	36	40	-	59	32	42	25	1								5	8
		2	65	14	40	46	-	53	15	67	18	0								5	3
		E	9	100	0	0	-	61	33	45	22	0								11	0
44	Consumer-oriented systems for privacy information management and protection are implemented to ensure that consumers' personal information is made accessible only to the entities authorized by the consumers and reuse by any other entities is blocked.	1	86	17	30	53	-	71	49	37	14	0								4	8
		2	69	6	32	62	-	75	51	44	5	0								3	4
		E	4	100	0	0	-	88	75	25	0	0								25	0
45	Intelligent tags designed for product identification, quality control, and product tracking become widely available.	1	77	19	35	46	-	68	40	51	9	0								0	6
		2	67	12	31	57	-	64	31	63	6	0								0	3
		E	8	100	0	0	-	88	75	25	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														
(%)	(%)	(%)									(%)					(%)					(%)															
26	69	5	0	0	9	13	41	37	48	60	19	25	8	35	6	0								5	9	9	18	39	34	36	42	17	32	43	19	0
11	89	0	0	0	0	9	48	43	46	86	5	5	0	30	3	0								3	4	0	14	45	41	31	56	3	13	54	8	0
0	100	0	0	0	0	14	57	29	80	80	0	0	0	40	20	0								14	0	0	14	43	43	75	75	0	25	75	25	0
49	43	8	0	0	9	9	42	40	47	44	27	42	11	16	0	2								11	12	7	12	40	41	43	43	16	20	25	9	2
73	25	2	0	0	0	6	42	52	55	58	6	26	6	10	0	0								6	9	2	6	43	49	66	56	0	9	16	0	0
78	22	0	0	0	0	11	33	56	100	75	25	0	0	0	0	0								11	0	0	11	33	56	100	75	0	25	0	0	0
6	75	18	0	1	35	25	30	10	31	41	28	33	12	27	44	0								4	12	40	27	27	6	27	31	15	23	27	65	1
2	90	8	0	0	40	24	27	9	28	45	14	21	3	14	60	0								1	7	56	27	12	5	14	21	2	6	16	87	2
0	50	50	0	0	25	25	50	0	50	50	25	0	0	0	25	0								25	0	75	25	0	0	25	25	0	0	25	75	25
42	53	4	0	1	17	26	43	14	25	44	25	34	16	34	20	3								3	8	23	27	38	12	28	41	16	33	41	45	3
51	49	0	0	0	3	30	47	20	23	67	19	25	2	21	15	0								2	5	12	34	45	9	14	49	3	17	31	56	2
62	38	0	0	0	0	50	50	0	13	75	50	38	0	25	13	0								13	0	25	37	38	0	13	75	0	25	38	63	13

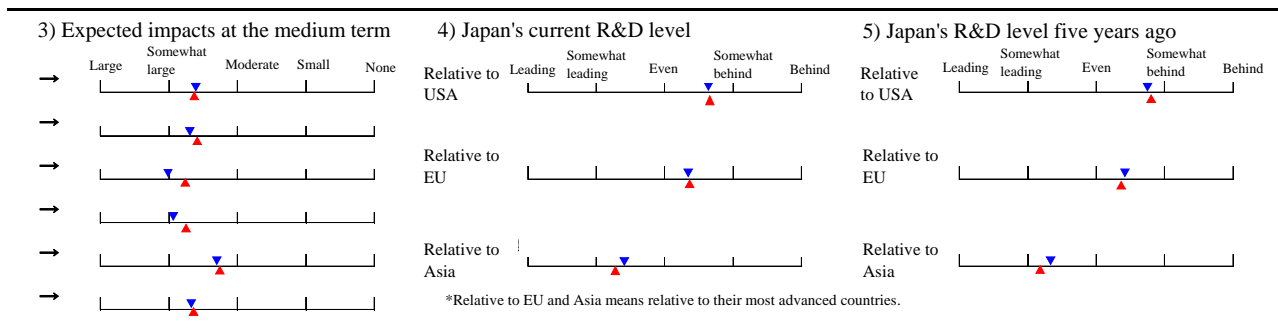
VIII. Higher productivity in service industries and the service sector

1. Questions regarding the relevant area



2. Questions regarding topics

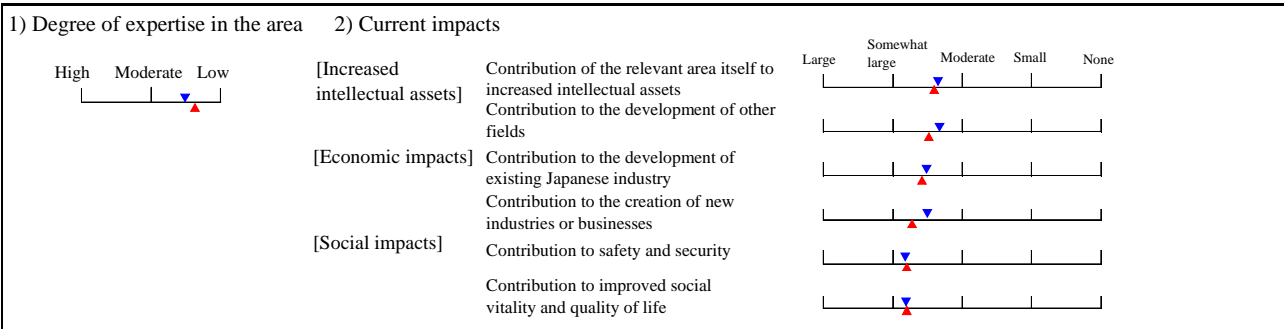
No	Topic	Questionnaire	Respondents (persons)	Degree of expertise				Importance to Japan					Time of technological realization								
				High	Moderate	Low	None	Index	High	Moderate	Low	None	Already realized	2006-2010	2011-2015	2016-2025	2026-2035	2036-	Will not be realized	Do not know	
				(%)				(%)					(%)								
46	Robots and information systems that can substitute as service personnel at checkout counters and the storefront become widely available.	1	68	12	29	59	-	46	16	37	44	3								9	6
		2	61	5	13	82	-	38	5	36	59	0								2	5
		E	3	100	0	0	-	75	67	0	33	0									0
47	Ordering and other business transactions are mostly conducted over mobile phones through voice input alone.	1	70	11	31	58	-	44	12	43	40	5								2	8
		2	60	5	12	83	-	39	3	46	49	2								3	5
		E	3	100	0	0	-	33	0	33	67	0									0
48	In Japan, methods by which system requirements can be clearly defined for any organization in the public or corporate sector are established, resulting in efficient management of IT investment and prompt construction of the required IT environment.	1	71	21	28	51	-	59	30	46	23	1									
		2	60	7	20	73	-	50	8	77	15	0									
		E	4	100	0	0	-	69	50	25	25	0									
49	In TV and other broadcasting media, advertising material can be adapted to individual viewers.	1	63	16	24	60	-	39	8	39	45	8								6	10
		2	61	10	16	74	-	32	2	27	68	3								0	12
		E	6	100	0	0	-	42	17	17	66	0									0
50	Effective usage of IT is defined for the public and corporate sectors, allowing IT investment to contribute to an annual increase of 2% or more in total factor productivity. This solves "the productivity paradox," a proposition that investing in IT does not necessarily improve productivity in the entire economy.	1	68	15	37	48	-	61	31	51	18	0									
		2	59	5	25	70	-	53	14	74	10	2									
		E	3	100	0	0	-	75	67	0	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	
(%)						(%)				(%)						(%)					(%)														
57	37	6	0	0	16	13	41	30	30	32	59	43	2	27	11	0							15	12	15	17	43	25	37	35	20	39	31	16	4
83	15	2	0	0	2	8	53	37	22	30	68	24	0	30	8	0							3	8	5	7	59	29	31	40	2	33	40	12	2
67	33	0	0	0	0	0	100	0	50	50	50	0	0	100	50	0							0	0	33	0	67	0	33	33	0	33	100	33	0
53	40	3	2	2	12	15	47	26	35	33	50	33	6	31	19	0							5	11	11	17	52	20	30	32	16	22	34	40	0
84	12	2	0	2	2	5	67	26	26	26	60	24	0	21	7	0							5	10	5	9	65	21	24	36	4	4	42	38	0
100	0	0	0	0	0	0	100	0	67	33	33	0	0	67	33	0							0	0	33	0	67	0	33	0	0	0	33	67	0
																							4	13	18	25	38	19	44	44	17	31	31	15	2
																							2	15	5	12	62	21	63	63	2	11	30	2	0
																							0	0	25	25	50	0	75	50	0	25	75	25	0
20	75	2	0	3	10	20	40	30	29	31	38	31	2	31	21	0							10	8	16	20	46	18	22	38	14	10	38	38	6
15	83	0	0	2	0	12	59	29	17	20	63	27	0	29	12	0							3	8	7	5	66	22	13	49	4	0	56	36	0
33	67	0	0	0	0	20	60	20	50	50	50	50	0	25	50	0							17	0	40	0	60	0	40	0	0	0	100	60	0
																							6	15	15	29	33	23	53	55	18	25	37	10	6
																							3	15	3	17	51	29	66	63	0	2	32	0	2
																							0	0	0	33	67	0	67	67	0	0	0	0	0

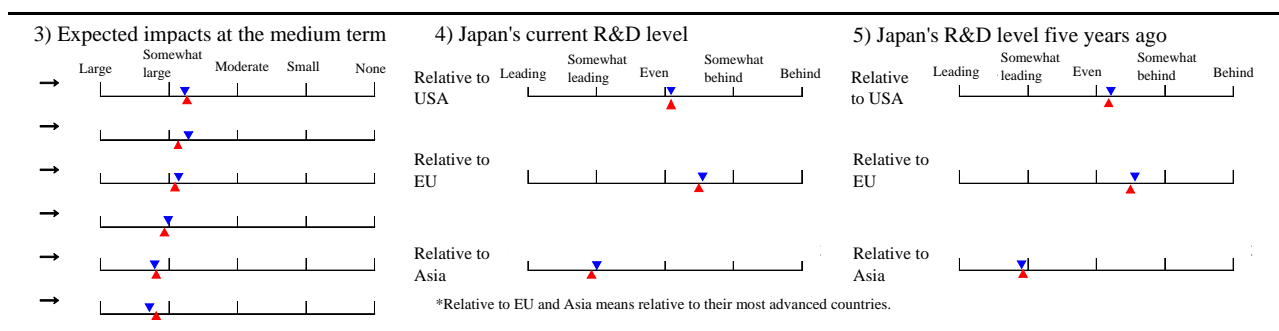
IX. Environmental management

1. Questions regarding the relevant area



2. Questions regarding topics

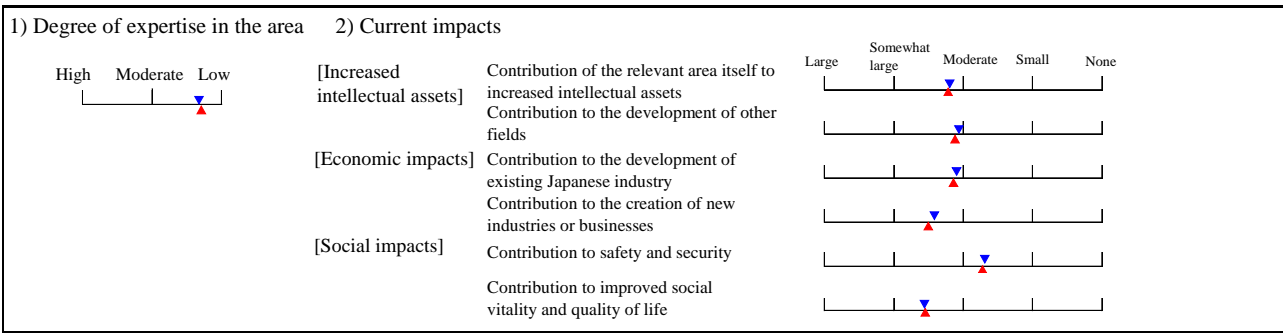
No	Topic	Questionnaire	Degree of expertise				Importance to Japan				Time of technological realization																	
			Respondents (persons)				Index	High			Moderate	Low	None	Already realized	2006-2010		2011-2015		2016-2025		2026-2035		2036-		Will not be realized		Do not know	
			High	Moderate	Low	None		High	Moderate	Low	None	(%)	(%)		(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)					
51	Over half of Japan's listed companies adopt management schemes that emphasize corporate social responsibility as the fundamental business policy.	1	92	25	40	35	-	77	58	32	10	0																
		2	69	17	44	39	-	86	75	18	7	0																
		E	12	100	0	0	-	96	92	8	0	0																
52	Environmental accounting (a method of evaluating a company's contribution to environmental conservation and sustainable development) or its extensions are widely adopted.	1	82	17	37	46	-	67	39	51	10	0													4	4		
		2	69	10	36	54	-	66	34	60	6	0												0	3			
		E	7	100	0	0	-	86	71	29	0	0												0	0			
53	In Japan, the notion of the national trust is expanded, and legislation is developed so as to promote funding from individuals and corporations for conserving and enhancing the natural environment, public property, and the living environment. As a result, diverse public values come to be protected through many different approaches.	1	66	14	24	62	-	70	46	40	14	0																
		2	63	3	16	81	-	71	47	43	10	0																
		E	2	100	0	0	-	100	100	0	0	0																
54	Demand-side management programs are widely and effectively introduced to Japan's traffic, electricity, and communications infrastructures to reduce hourly and seasonal fluctuations in demand and thus to cut excessive capital investment.	1	72	19	17	64	-	68	42	44	14	0													4	7		
		2	62	11	13	76	-	72	47	48	5	0													3	5		
		E	7	100	0	0	-	68	43	43	14	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	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	
(%)					(%)					(%)										(%)		(%)		(%)											
																							2	4	33	26	25	16	37	32	7	23	18	66	3
																							0	0	37	22	26	15	36	41	0	12	10	72	0
																							0	0	33	25	17	25	44	78	0	22	0	67	0
9	26	65	0	0	33	38	21	8	39	42	27	28	28	21	46	1							5	8	36	33	22	9	44	37	11	30	29	63	1
3	3	94	0	0	35	50	12	3	35	59	11	8	10	8	60	0							0	0	43	42	12	3	43	37	0	17	10	79	0
0	0	100	0	0	43	57	0	0	43	71	0	0	0	0	57	0							0	0	57	43	0	0	29	43	0	14	14	100	0
																							3	21	53	32	13	2	34	29	8	34	29	68	3
																							0	6	61	32	5	2	33	16	0	26	18	75	2
																							0	0	100	0	0	0	100	0	0	50	0	100	0
30	35	32	0	3	29	34	20	17	33	38	34	31	10	19	28	2							8	13	31	38	18	13	33	33	9	40	34	45	5
34	44	20	0	2	22	48	20	10	33	63	30	22	0	19	20	0							3	7	19	60	14	7	24	44	0	45	29	47	2
57	43	0	0	0	29	14	43	14	33	67	17	0	0	17	17	0							14	0	14	58	14	14	50	0	0	33	33	33	0

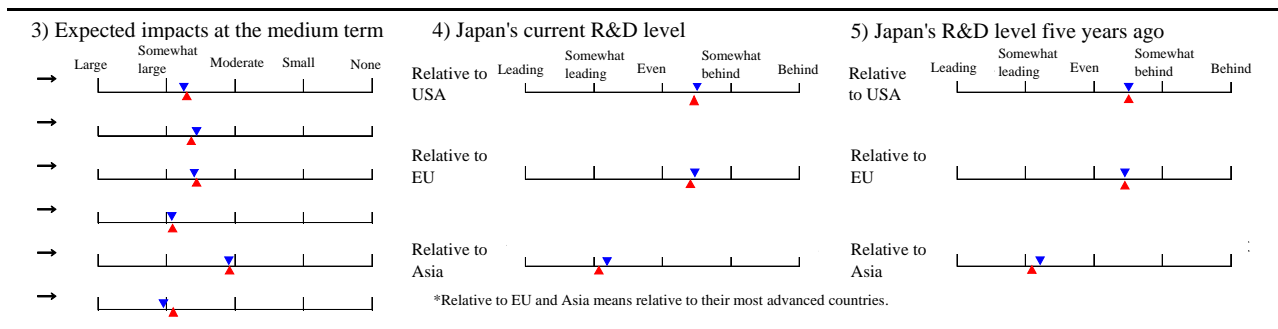
X. Art, culture, and entertainment that drive industry

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		
				(%)				(%)				(%)										
55	Advances in research on comfort/discomfort, likes/dislikes, and other sensibilities that people feel as a result of consuming goods and services lead to the establishment of methods by which consumer sensibilities are directly analyzed, measured, and assessed, so that the results are used for R&D, sales, and marketing of goods and services.	1	68	22	21	57	-	55	25	46	29	0									6	12
		2	62	16	19	65	-	49	12	60	28	0		5	8							
		E	10	100	0	0	-	53	20	50	30	0		10	0							
56	The concept of developing goods and services for not meeting specific needs, but for use in entertainment, art, and cultural activities becomes the mainstream in many industries and drives technological development.	1	71	17	18	65	-	55	21	55	24	0										
		2	63	8	17	75	-	50	12	66	22	0										
		E	5	100	0	0	-	75	60	20	20	0										
57	Universities, companies, and local governments establish mechanisms for promoting personal hobby activities regarding entertainment, art, and culture, and for linking them to academic or technological advances.	1	70	13	21	66	-	51	19	50	31	0										
		2	65	6	12	82	-	54	15	70	15	0										
		E	4	100	0	0	-	69	50	25	25	0										
58	In such fields as art, theater, cinema, music, and literature, there are artistic activities whose viability is threatened due to a very small consumer population. Such small-scale artistic activities can be made economically viable not by increasing the number of consumers, but by reducing access costs through the development of a system that allows existing consumers to enjoy, or obtain reproductions of, such activities over the Internet or other communications means at far lower cost.	1	68	13	25	62	-	51	19	47	34	0									1	9
		2	63	5	10	85	-	46	8	59	33	0		5	6							
		E	3	100	0	0	-	42	0	67	33	0		0	0							
59	Universities become the center of the theoretical analysis of art, theater, cinema, music, literature, and other artistic and cultural activities, and play an important role in nurturing artists who initiate new artistic activities and supporting such activities.	1	63	8	22	70	-	46	13	47	40	0										
		2	64	3	9	88	-	45	8	57	35	0										
		E	2	100	0	0	-	38	0	50	50	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
(%)						(%)				(%)						(%)					(%)													
11	80	3	0	6	6	14	53	27	42	40	38	47	4	9	2	0						8	15	6	14	46	34	42	37	28	28	14	7	0
9	85	4	0	2	2	9	56	33	69	44	31	44	0	5	0	0						6	6	2	3	53	42	74	56	6	21	9	6	0
22	78	0	0	0	11	0	78	11	88	25	38	38	0	0	0	0						10	10	11	0	56	33	83	50	17	50	0	0	0
																						1	16	6	19	43	32	47	30	32	32	32	11	0
																						2	11	2	10	46	42	86	31	17	17	14	0	0
																						0	20	20	0	40	40	100	33	33	67	0	0	0
																						3	12	6	25	49	20	53	45	18	33	24	10	2
																						2	10	2	16	52	30	66	52	2	27	16	5	0
																						0	0	0	50	50	0	50	25	0	25	25	25	0
9	63	20	3	5	18	22	42	18	49	23	23	23	17	28	13	2						6	13	15	24	42	19	39	22	26	48	37	22	0
4	81	11	2	2	5	12	63	20	81	11	9	6	4	34	6	0						5	8	5	15	64	16	53	14	8	69	29	10	0
0	67	33	0	0	0	0	67	33	100	0	0	0	0	0	0	0						0	33	33	0	67	0	50	0	0	50	0	0	0
																						12	13	14	31	41	14	65	29	8	37	18	8	4
																						5	16	7	20	58	15	75	19	4	44	13	0	0
																						0	0	0	50	50	0	100	0	0	0	0	0	0