Creating a Safe and Secure Living Environment in the Changing Public and Private Spheres

Designing a Sustainable Society through Intergenerational Co-creation

Implementation of Knowledge for Society through Collaboration with Society

Creating Community-based Robust and Resilient Society

Implementation-Support program [R&D results Integrated Type]

Implementation-Support program [Call for proposal Type]

2018-2019 Japan Science & Technology Agency

Human-Information Technology Ecosystem

Science of Science, Technology and Innovation Policy

2018-2019 Japan Science & Technology Agency

Research Institute of Science and Technology for Society
Modern society is facing many extremely challenging issues. The declining population arising from the low birthrate, to say nothing of the advancing age of the nation's citizens, will likely bring great change to Japanese society. In addition to this are complex and problematic challenges that are largely outside the realm of previous experience. Among them are severe national finances, an uncertain international situation, and responses to disasters.

To find ways of tackling and resolving these challenges, we must marshal the achievements of scientific research and strive to analyze issues, illuminate causes, and explore effective solutions. As we strive to resolve social issues, how much of the achievements from scientific research can be used is the main question.

Discovery and invention focused on the elements and causes that comprise these complex issues are essential to their solution. Also vital are the technologies that will make such discovery and invention practical, the capital and human resources that will commercialize them, and the legal systems and financial support mechanisms needed to make all of the above possible.

These methods and technologies leading to solutions to society are particularly important today. They can be targeted by scientific R&D and can be termed “science and technology for society.”

The Research Institute of Science and Technology for Society (RISTEX), an institution of the Japan Science and Technology Agency (JST), promotes and supports R&D in science and technology for society based on the following standpoints.

First, it is research that contributes to the resolution of specific social issues. Rather than remaining completely within the sphere of research, it can be expected to enter the areas of application, practical use, and commercialization and also lead to policy recommendations.

Second, finding solutions to social challenges will require not only research in the natural sciences but also its linkage with research in the humanities and social sciences. Thus, collaboration and joint-research among researchers in diverse fields are expected.

And third is partnership between researchers and practitioners. There must be cooperation with practitioners and policy-makers positioned to apply new research outcomes. This makes the participation of practitioners and the sharing of interest among them necessary.

No one can deny the importance of R&D in science and technology for society. However, there is no getting around the fact that recognition of the necessity of actively promoting it remains inadequate.

At RISTEX, we have endeavored to promote the development of science and technology for society that is useful in resolving social issues. As we continue doing so, we intend to broadly convey the value and necessity of such development to society based on our 13 years of experience.
The World Conference on Science (jointly sponsored by UNESCO and ICSU) was held in Budapest, Hungary, in June 1999. Scientists, government officials, journalists and other people attended the conference from around the world, and the Declaration on Science and the Use of Scientific Knowledge (the Budapest Declaration) was issued with regard to what science and technology should be in the 21st century. According to the Declaration, science and technology of the future should not only produce knowledge but broaden its attention to how to use it. The previous function of “science for knowledge” was thus augmented by three new functions of “science for peace,” “science for development,” and “science in society and science for society.”

Against this background, in April 2000, the former Science and Technology Agency established the Study Group on R&D for Science and Technology for Society chaired by the then President of the Science Council of Japan, Hiroyuki Yoshikawa. This body issued recommendations regarding three areas which should be pursued in terms of “science and technology for society”: “technologies to solve social problems,” “technologies harmonizing natural science, and the humanities and social sciences,” and “technologies with which market mechanisms do not work easily.”

The former RISTEX organization was founded in July 2001 as a specialized agency to pursue research and development in this “Science and Technology for Society.” The body was reorganized into the current RISTEX in 2005.

The issue-oriented method used at RISTEX for research and development based on specific social issues is unique and with few parallels elsewhere in the world. Through R&D activities that contribute to solving specific social issues, RISTEX seeks to create new social and public value.

**What Science and Technology for Society Means**

This means “Technology for the purpose of building new social systems that integrate the knowledge from multiple areas in the natural sciences, humanities, and social sciences.” It is technology that takes society as its direct object and seeks to resolve problems that either currently exist in society or that can be anticipated to exist in the future.

※From “Regarding the Pursuit of R&D in Science and Technology for Society” (December 2000)
Translation: RISTEX

Based on this understanding, RISTEX places value on interdisciplinary research by researchers and stakeholders working in collaboration. It also places value on R&D that constructs methodologies while also powerfully expediting actual implementation in regions and communities based on knowledge and interactive practice in the field of humanities and social sciences, as well as the natural sciences.

**R&D Emphasized by RISTEX**

- R&D aimed at solving specific social issues.
- R&D that deals with problems that cannot be satisfactorily addressed by conventional individual fields and areas using scientific knowledge extending across the humanities, social sciences, and natural sciences to build methodologies and implement actual grand-level activities. Transdisciplinary R&D, which seeks to change the way things are.
- R&D based on collaboration not just among researchers but also stakeholders with various different stances who are knowledgeable enough about on-site circumstances and problems to carry out social experiments at actual locations. Strictly following the cycle of PDCA, it seeks to create new results that will help solve problems.
- It is R&D that maintains a firm, conscious commitment to returning the specific results obtained from R&D to society, and putting it to practical application (implementation) there.

※PDCA: A management tactics that involves carrying out the sequential process of Planning, Doing, Checking, and Acting while maintaining and improving quality of activity.
Management Structure

Under the leadership of its Director General, RISTEX conducts R&D on technology for society within JST's Strategic Basic Research Programs system, and is also involved in administration related to other R&D. The chart below shows RISTEX’s organization as of December 2018.

- The RISTEX Governing Board is composed of experts who discuss matters vital to the management of RISTEX such as setting, modifying and terminating R&D Focus Areas.
- The Evaluation Committee is composed of experts who conduct interim and final evaluations on the achievement of R&D targets and project progress status.
- There are currently three R&D Focus Areas, each of which is staffed by personnel responsible for selecting and managing R&D projects under the supervision of an Program Supervisor.
- There are currently two R&D Programs, each engaged in the promotion of R&D under the supervision of a Program Supervisor. The Implementation-Support Program supports initiatives (implementation activities) for implementing and utilizing the outcomes of publicly funded R&D to resolve specific social issues.
- In fiscal 2013, RISTEX established a new Results Integrated Type program for consolidating and integrating ( packaging) multiple R&D outcomes from its R&D Focus Areas and programs so as to facilitate the implementation of these outcomes in society.
- In fiscal 2014, RISTEX made use of its transdisciplinary R&D methodology to administer the following two R&D programs: Future Earth, Enhancement of Societal Resiliency Against Natural Disasters (Strategic Innovation Promotion Program (SIP))
- Under its Director, the Department of Planning and Management manages R&D Focus Areas and carries out support, planning, research, public relations, and other administrative tasks related to R&D.

RISTEX Organization (FY2018)

The chart below shows RISTEX’s organization as of December 2018.

- The RISTEX Governing Board is composed of experts who discuss matters vital to the management of RISTEX such as setting, modifying and terminating R&D Focus Areas.
- The Evaluation Committee is composed of experts who conduct interim and final evaluations on the achievement of R&D targets and project progress status.
- There are currently three R&D Focus Areas, each of which is staffed by personnel responsible for selecting and managing R&D projects under the supervision of an Program Supervisor.
- There are currently two R&D Programs, each engaged in the promotion of R&D under the supervision of a Program Supervisor. The Implementation-Support Program supports initiatives (implementation activities) for implementing and utilizing the outcomes of publicly funded R&D to resolve specific social issues.
- In fiscal 2013, RISTEX established a new Results Integrated Type program for consolidating and integrating ( packaging) multiple R&D outcomes from its R&D Focus Areas and programs so as to facilitate the implementation of these outcomes in society.
- In fiscal 2014, RISTEX made use of its transdisciplinary R&D methodology to administer the following two R&D programs: Future Earth, Enhancement of Societal Resiliency Against Natural Disasters (Strategic Innovation Promotion Program (SIP))
- Under its Director, the Department of Planning and Management manages R&D Focus Areas and carries out support, planning, research, public relations, and other administrative tasks related to R&D.
RISTEX engages in activities like those in the figure below with the view to promoting R&D that seeks solutions to specific social issues.

1. Identifying social issues: Identify social issues or that can be expected to occur in the future and invite relevant experts and stakeholders to survey and investigate the respective issues then to narrow down specific issues.

2. Establishing R&D Focus Areas and programs: Based on the results, establish the R&D Focus Areas and programs where RISTEX activities can contribute to solution of issues based on the results.

3. Promoting R&D: Under the Program Supervisors, who manages with responsibility for R&D Focus Areas and programs, establish R&D programs that have clearly defined R&D goals, issue calls for R&D project proposals and promote adopted R&D projects. Participation of stakeholders at every stage of establishing topics, implementing R&D, and conducting evaluations so that the results of R&D will contribute to the resolution of actual social issues.

4. Presenting prototypes for return R&D results to society

5. Assisting the application of results to wider areas to be applied and to be established in society

Going through these five steps as a sequential cycle causes collaboration among science and technology and society to create prototypes (the results). The objective in seeking the diffusion and establishment of these prototypes is to make contributions to the resolution of social issues and to create new social and public value.

The following pages will give detailed explanations of activities on steps I to V.
RISTEX establishes R&D areas and programs that focus on important issues in society in order to conduct R&D on science and technology for society. New R&D Focus Areas are generally set up after about one year of preparation and investigation.

First preparatory surveys are carried out to identify a variety of different phenomena that can be taken as social issues. Then experts from a variety of fields are invited to hold a comprehensive workshop for the purpose of obtaining a comprehensive grasp of the issues. Discussion takes place on “social issues that can be expected to emerge in the near future,” “social issues that should be assigned as focus area topics,” and “approaches to the resolution of social issues.” The focus will be narrowed down to several issues considered to be of particular importance. These are the candidate focus areas.

Topical workshops are held on candidate focus areas, which are further probed for their importance and urgency, and the societal issues investigated as focus areas in the following fiscal year are decided.

**Plot diagram for overviewing social issues**

Next, people who are deeply involved with a specific problem (at RISTEX they are referred to as stakeholders) are interviewed to obtain a still deeper understanding of the latest status of the problem. For example, the topic for the R&D Focus Area “Redesigning Communities for Aged Society” launched in fiscal 2010 was “Aging Society,” for which approximately 100 stakeholders were interviewed. Individual interviews are conducted of people of various specialties and standpoints, including researchers, engineers, physicians, nurses, nursing care workers, local government officials, and members of the media, and their views are heard.

Workshops and working groups are then held with experts and stakeholders regarding the views and suggestions received from interviews and from members of the general public. Focus area frameworks, R&D approaches, and other such matters are examined and reexamined. “Public forums” concerning those general matters are held for the general public and wideranging exchanges of views take place.

The concept of an R&D Focus Area built up through this series of processes is discussed by the Governing Board under policies of the national government and other authorities. On acceptance there, it then and not till then becomes a R&D Focus Area.
Promoting R&D: Overview of R&D Focus Areas and Programs

R&D Promotion System

Once an R&D Focus Area/program has been established, the R&D projects begin.

First an Program Supervisor is appointed to be responsible for operations. Several people each are also selected from industry, university, government, and private sectors to serve as Program Advisors who give the Program Supervisor expert advice.

Under the strong leadership of the Program Supervisor, the Program Advisors and area staff at RISTEX perform their specialized roles as they engage in operational management of the focus area.

Call for Proposals and Selection of R&D Projects

The various R&D Programs calls for R&D proposals in line with their objectives. The Program Supervisor, with the cooperation of the Program Advisors, chooses from among many proposals and selects multiple R&D projects (research teams).

An R&D project implements R&D as a rule for three years (a maximum of five years) on the assumption that it will produce results that accomplish the objectives of the R&D Program.

Implementation Patterns in R&D Project

<table>
<thead>
<tr>
<th>First year</th>
<th>Second year</th>
<th>Third year</th>
<th>Fourth year</th>
<th>Fifth year</th>
<th>Sixth year</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D project</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project planning survey</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D project</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project planning survey</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D project</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Project planning surveys are carried out on proposed R&D projects that are being considered the following year in order to make the concept more concrete and make the proposal more effective. They go on for a half-year.

Evaluations

Committees organized by RISTEX evaluate the activities of R&D projects operated in a focus area. Evaluations consist of interim evaluations, examining the achievements and future prospect of the project, ex-post evaluations upon completion of the project conducted after a certain period of time. External experts in each evaluation committee not only perform peer review, but also perform accountability evaluations with emphasis of social impacts from the projects and the focus area. The evaluation results are posted on RISTEX website.
Activities for Operational Management

The Program Supervisor, Advisors, and staff members get together to manage activities like those below.

■ Call for Proposals and Selection of R&D Projects
In order to promote R&D projects that come under its objectives, RISTEX issues public calls for proposals that are in line with R&D objectives. We select appropriate proposals, adopt multiple R&D projects, and provide them with grants.

The explanatory meeting to call for proposals on the R&D Focus Area inaugurated in FY2016, that is the “Human-Information Technology Ecosystem” program. Held in Tokyo in June and in Kyoto in July 2016.

■ Area Meetings
These are regular meetings where the Program Supervisor, Program Advisors, and Area staff members discuss and examine matters relating to focus area operations. The meetings are held about once every month.

A scene from the study meeting “Program Salon” held in “Science of Science, Technology and Innovation Policy”.

■ Focus-Area/Program Meetings (Lodging together)
Once a year, all the R&D projects gather to hold a focus-area/program meeting. Participants from the R&D projects are not just Principal Investigator, but also people who are active in a variety of capacities within a project. Including the Program Supervisor, the Program Advisors, and staff members, the number of participants can be as many as 100 or more.

The meetings seek to achieve the objectives set for their respective areas by reporting on the progress of the project and engaging in discussion of R&D promotion and area operations. The meetings are intended to foster a shared awareness among the people involved, and contribute to greater exchange, friendship, and lateral connections among researchers. Sometimes R&D projects may also exchange ideas with each other and develop joint research activities.

In the “Creating a Safe and Secure Living Environment in the Changing Public and Private Spheres” program, a kick-off meeting was held in FY2016. Researchers and implementers of the newly adopted projects and those adopted in FY2015, program supervisors, program advisers, and the RISTEX staff member, being 60 people in total, shared the entire program’s images and goals to deepen mutual understanding and collaboration between the projects.
R&D Project Site Visits
The R&D promoted by RISTEX places an emphasis on social experiments. Many of the projects therefore treat local regions or communities as the field in which they carry out R&D, and they form close relationships with local communities and residents while carrying on their activities. The sites of the actual implementation of R&D are visited and observed by the Program Supervisors, Program Advisors, RISTEX staff members, and members of other projects in that focus area, which allows them to ascertain the project’s progress and also provide advice to researchers as necessary. The people concerned engage actively in such site visits.

Outreach Activities and Symposia
When the activities of an R&D project in a focus area advance to a certain stage, a symposium is held to communicate and share information regarding the R&D issues and results with the public at large, and to engage in an exchange of views (Notification of symposia being held is made through the RISTEX Web site and e-mail publications).
Presenting Prototypes for the Return R&D Results to Society

The outcomes of R&D projects (tier 1 in the figure on the right) should not only be applied in the region or community where a social experiment took place, but also should be extended to be of use in many other organizations, communities, and regions.

Therefore, each R&D project is required to show prototypes in specific detail. This includes models and methodologies, regional characteristics, constraints, and other conditions of use, and the training and recruitment of responsible personnel. This will help the outcomes to be implemented more broadly via a variety of networks.

When overseeing the outcomes and shared issues of multiple projects, focus areas / programs (tier 2 in the figure on the right) aim to develop methodologies and integrated models with greater standardization and more general applicability, and lead to proposals influencing the public systems (tier 3 in the figure on the right) of national and local governments, such as legal systems and policies, in addition to improving focus area / program management methods.

Assisting the Application of Prototypes to Wider Areas

In order to ensure the prototypes presented in tier 1 are actually be applied within society, there is a need for examinations of their feasibility, the coordination of the relevant parties, and formats different to those of R&D.

Apart from the R&D Focus Areas, RISTEX also exercises an Implementation Support Program. This provides support the prototypes so that are the results of R&D can be utilized by projects conducted by the national government, local government, corporations, NPOs, or other such organizations, and so that those prototypes will in future lead to the widespread dissemination and establishment of “Science and Technology for Society.”
### The State of R&D since the Launch of RISTEX

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Human-Information Technology Ecosystem</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creating a Safe and Secure Living Environment in the Changing Public and Private Spheres</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Designing a Sustainable Society through Intergenerational Co-creation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creating Community-based Robust and Resilient Society</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Redesigning Communities for Aged Society</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community-Based Actions against Global Warming and Environmental Degradation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protecting Children from Crime</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science Technology and Humanity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Technology and Society</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brain-Science and Society</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainable Society</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Systems/Science and Technology for Society</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety and Security</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mission-Oriented Research Program I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science of Science, Technology and Innovation Policy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Science, Solutions and Foundation Integrated Research Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation-Support Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(R&D results Integrated Type)
Human-Information Technology Ecosystem
(FY2016-)

Specifying the merits and risks of information technology, we form an interaction to reflect them continually in technologies and systems.

Program Supervisor: Jiro Kokuryo
Professor, Faculty of Policy Management, Keio University

Public Needs:

Thanks to the rapid progress in information technology, e.g. artificial intelligence utilizing big data, robots and IoT, an expectation for realization of a richer and more efficient society is growing; meanwhile, however, it has begun to be pointed out that information technology could bring about various problems, e.g. “accidents or criminal cases based on malicious intent (terrorism, crime, etc.)”, “unexpected accidents or trouble (security, privacy, etc.)” and “expansion of economic disparity and/or centralization of capital”. Also, as evident in the coining of a new word “coveillance” (= mutual surveillance on the Internet), development of information technology is changing how our privacy should be itself; it is anticipated to continue changing human lifestyle in many aspects.

Beyond each specific issue, today’s information technology poses questions on the very nature of human existence, such as self and autonomy. We cannot handle such technologies simply in the framework of utilities and risks/costs.

As a consequence, we observe cases of technology deployments having proceeded with practicalization without sufficient feedback from society. In such cases, problems that emerge subsequently result in regulations that put brake on the technological development.

Groundless anxiety on technologies also persist. Today’s information technologies are often talked about in society in forms of multifarious interpretations/images/metaphors; its potential merits and negative risks are unclear. For continual, adequate use of information technology in society, therefore, evaluation by experts only is insufficient; taking in various stakeholders’ subjective opinions from the upstream stage of research and development, it becomes important to broaden problem or theme framing continually.

Reviewing information technology from a viewpoint of humanity from the upstream stage of research and development, it is becoming urgent that continual attempts should be made to design technologies and systems cooperatively under the understanding of society; in practice, however, such points as creation of opportunities or venues, establishment of methodology or functions and securement of personnel for responding to such trial have not been sufficiently dealt with. So, for coping with these problems adequately, this focus area aims at realizing a society in which information technology and human beings go hand-in-hand by promoting research and development of social technology for an interactive function that prompts coexistence of information technology and human beings/society.

In pursuing our goals, we would also like to address perspectives that are not western. Asia has tradition of viewing humans not at the center but as a part of the cosmos. Such cultural heritage may play a critical role in how humans might accept information technologies.

Goals:

To aim for a society in which information technology and human beings go hand-in-hand, we form, specifying the merits and risks of information technology, an interaction to reflect them in technologies and systems continually. In concrete terms:

① Create a responsive measure for changes by, grasping/foreseeing the changes (in positive and negative aspects) that information technology can bring about, turning them into agenda.

② Reviewing, regarding progress in information technology or various measures, value awareness or morality as well as the present system, indicate the desirable directionality or various alternatives of requests continually.

Deeming the extraction of problems, review of norms or values by various stakeholders such as ① and ② and up to the presentations and suggestions based thereon to be a cycle, we conduct research and development for its establishment. Aiming at constructing as a co-creation platform the venues or mechanisms to prompt such desirable coevolution of society and technology, also, we deem the technologies and elements required for its functioning as well to be an object of research and development.
## Projects

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Length</th>
<th>Principal Investigator</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study on the platform to support wise use of personal information in the data portability era</td>
<td>3yrs.</td>
<td>Ryosuke SHIBASAKI</td>
<td>Professor, Center for Spatial Information Science, University of Tokyo</td>
</tr>
<tr>
<td>Study on Social Receptivity of Personal-Data Ecosystem</td>
<td>3yrs.</td>
<td>Koti HASHIDA</td>
<td>Professor, Social ICT Research Center, Graduate School of Information Science and Technology, The University of Tokyo</td>
</tr>
<tr>
<td>Constructing Philosophy of Artificial Intelligence 2.0 for the Coexistence of Human Being with Information Technology</td>
<td>3yrs.</td>
<td>Takayuki SUZUKI</td>
<td>Associate Professor, Graduate School of Arts and Sciences, The University of Tokyo</td>
</tr>
<tr>
<td>Updating Power of Imagination: Artificial Intelligence with Design Fiction</td>
<td>3yrs.</td>
<td>Hirotaka OSAWA</td>
<td>Assistant Professor, Faculty of Engineering, Information and Systems, University of Tsukuba</td>
</tr>
<tr>
<td>Development of platform and media for dialogues between technology and society through utilizing knowledge of humanities social science</td>
<td>3yrs.</td>
<td>Masahiko SHOJI</td>
<td>Associate Professor, Center for Global Communications, International University of Japan</td>
</tr>
<tr>
<td>Supporting co-evolution between AI based monitoring technology and nursing home based on process analysis of overestimate and underestimate</td>
<td>3yrs.</td>
<td>Koji KITAMURA</td>
<td>Senior Researcher, Artificial Intelligence Research Center, National Institute of Advanced Industrial Science and Technology</td>
</tr>
<tr>
<td>Research on the task models to cooperate with the human and new technology: Evaluating the impacts on labor market</td>
<td>3yrs.</td>
<td>Isamu YAMAMOTO</td>
<td>Professor, Faculty of Business and Commerce, Keio University</td>
</tr>
<tr>
<td>Which controls which? Sense of agency when humans and semi-automated systems co-operate</td>
<td>3yrs.</td>
<td>Takako YOSHIDA</td>
<td>Associate Professor, School of Engineering, Tokyo Institute of Technology</td>
</tr>
<tr>
<td>Consideration on the concept of ‘responsibility’ between autonomous machines and citizens</td>
<td>3yrs.</td>
<td>Kazuya MATSUIUSA</td>
<td>Associate Professor, Faculty of Letters, Toyo University</td>
</tr>
<tr>
<td>Legal being: electronic personhoods of artificial intelligence and robots in NAUMI society, based on a reconsideration of the concept of autonomy</td>
<td>3yrs.</td>
<td>Minoru ASADA</td>
<td>Professor, Graduate School of Engineering, Osaka University</td>
</tr>
<tr>
<td>Co-Creation and Communication for Real-Time Technology Assessment (CoRTTA) on Information Technology and Molecular Robotics</td>
<td>3yrs.</td>
<td>Ryuuma SHINEHA</td>
<td>Associate Professor, Seiwa University</td>
</tr>
<tr>
<td>Co-creation of Molecular Robot ELSI and Real-time Technology Assessment Research</td>
<td>3yrs.</td>
<td>Akihiko KONAGAYA</td>
<td>Professor, School of Computing, Tokyo Institute of Technology</td>
</tr>
<tr>
<td>A co-evolutionary study on society with respect to power laws: - Can AI replicate the behavior of a non-equilibrium complex system? -</td>
<td>3yrs.</td>
<td>Kumiko TANAKA-Ishii</td>
<td>Professor, Research Center for Advanced Science and Technology, University of Tokyo</td>
</tr>
<tr>
<td>Acceptable Intelligence with Responsibility - Values Awareness Support (AIR-VAS)</td>
<td>3yrs.</td>
<td>Arisa EMA</td>
<td>Project Assistant Professor, Policy Alternatives Research Institute, University of Tokyo</td>
</tr>
<tr>
<td>Development and Dissemination of Information Technology Guidelines for Promoting Japanese-style Wellbeing</td>
<td>3yrs.</td>
<td>Hideyuki ANDO</td>
<td>Associate professor, Graduate school of Information Science &amp; Technology, Osaka University</td>
</tr>
<tr>
<td>Proposals from health care on “transition of self through introspection and dialogue”</td>
<td>3yrs.</td>
<td>Seiji BITO</td>
<td>Director, Division of Clinical Epidemiology, National Hospital Organization Tokyo Medical Center, Clinical Research Center</td>
</tr>
<tr>
<td>Scenario generation of socio-technology problems in the information technology area by using the foresight method</td>
<td>3yrs.</td>
<td>Yuichi WASHIDA</td>
<td>Professor, Graduate School of Business Administration, Hitotsubashi University</td>
</tr>
<tr>
<td>Trans-disciplinary Research Project on Co-designing Social Systems (Law, Economics and Management) and AI/Robot Technologies</td>
<td>3yrs.</td>
<td>Fumio SHIMPO</td>
<td>Professor, Faculty of Policy Management, Keio University</td>
</tr>
</tbody>
</table>
Creating a Safe and Secure Living Environment in the Changing Public and Private Spheres

In recent years in Japan, the number of officially recognized crimes has declined. On the other hand, cases where victims experience ongoing violence in places such as home, workplace or school, as well as bullying and criminal events deriving from relationships in cyberspace, have come to the fore and become a new type of problems especially in terms of safety and security in the society. Also, while there is a decline in accidents which occur in public spaces such as traffic accidents, there is an increasing number of domestic accidents such as falls and drowning. In such cases, problems are manifesting themselves in private spaces and relationships which are hard to discover or intervene in from the outside.

The background for why these problems are becoming apparent involves changes in social structure—such as smaller and older households, isolation of individuals from the local community, dissemination/growth of the Internet and social media, and the transformation of private and public spheres brought on by such changes. Also the inability of existing safety functions (prevention/support functions provided by the legal system, public agencies, households and the local community) to fully cope with these changes may play a part.

The conventional approach was to leave the private sphere to self-help and self-determination, but there are rising public concern and awareness of human rights, and social support and intervention are gradually expanding at a variety of levels. A need has arisen for R&D to contribute to early discovery and solution of the primary causes of harm infliction/victimization in the private sphere, and the associated risks, by using science and technology such as sensors and robots. From the perspective of social support, the relationship between the private and public spheres is changing. On the other hand, there are also cases where institutions such as the legal system act as a barrier to providing social support.

Furthermore, there is progress in the transformation toward realization of a more desirable super-cyber society and the integration of cyberspace and real-world space, as indicated in the discussions for the 5th Science and Technology Basic Plan by the Council for Science and Technology of the Ministry of Education, Culture, Sports, Science and Technology (MEXT). This process in the policy has a strong relationship with changes in personal space, relationships and concepts of privacy. At the same time, it is expected that, from the technological side, approaches such as using big data analysis technology will facilitate the prediction and discovery of incidents and accidents, etc.

Therefore, in this R&D Focus Area, we are promoting R&D to contribute, through public/personal cooperation, to the discovery of harms and accidents in spaces/relationships which are difficult to discover or intervene in, and to the creation of mechanisms and associated activities which enable reduction and prevention of such problems by prediction, intervention and aftercare.

Specific goals in this focus area are as follows:
(1) To propose new methods to contribute to the reduction and prevention of harms and accidents by prediction, intervention and aftercare in spaces and relationships which are difficult to discover and intervene in. These new methods will be proposed based on actual problems and needs brought on by the trend toward smaller and older households, and the transformation of the private sphere due to the expansion of cyberspace.
(2) To derive and propose systems and policies for reducing harms and accidents in difficult-to-find or hard-to-intervene spaces and relationships from the R&D results. The feasibility of proposed systems will also be presented.
(3) To build a network for sharing ideas and approaches relating to adoption of these methods, aiming to ensure that the presented efforts and measures are continually implemented in order to integrate them with social systems.
As structural changes occur in society, such as the trend toward smaller and older households with fewer children, isolation of individuals from the local community, and dissemination of social media, there is an increasing number of incidents and accidents in personal spaces and relationships. “Creating a Safe and Secure Living Environment in the Changing Public and Private Spheres” is a new R&D Focus Area started in fiscal 2015 based on an awareness of the issue of these incidents and accidents.

R&D is being conducted on specific events such as Cyberbullying or abuse, and many results have been accumulated. However, there has not really been active cross-sectional R&D which might find the background of these various events, common points of remedial measures, and shared institutional problems which hinder remediation. In addition, even if measures are possible from the standpoint of the legal system, customary practices at the location, or the mindsets of people that nothing can really be done may interfere with the creation of safer living. In cases of child abuse, the reason why close collaboration between child consultation centers and the police does not adequately move forward may be because there are institutional bottlenecks in the respective organizations. Many events which occur in personal relationships and spaces are sensitive, and thus there is a need to protect personal information. On the other hand, there may be a need to share personal information between many involved parties.

Taking such issues into consideration, in this focus area we place public and personal at two ends of the spectrum, focus on the role played by the “margin” between those extremes, and attempt to create new approaches for public/personal cooperation in this “margin”. Key R&D topics are how to appropriately intervene while taking privacy into account, and what sort of function should be assigned to the “margin”. We expect to see progress in R&D on various direct and indirect approaches in the “margin” such as daily life monitoring with information and communications technology, casual verbal interaction between neighboring residents, and information sharing between involved persons, and this should contribute to the creation of safe living.

### Projects

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Length</th>
<th>Principal Investigator</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building a support system based on “people - community - society” to raise awareness of trauma</td>
<td>3yrs.</td>
<td>Yuuka OKA</td>
<td>Associate Professor, Department of psychology and social welfare, Mukogawa Women’s University</td>
</tr>
<tr>
<td>Establishing the support models for adolescents and adults with developmental disorders using application softwares</td>
<td>3yrs.</td>
<td>Masatsugu TSUI</td>
<td>Professor, Faculty of Sociology, Chukyo University</td>
</tr>
<tr>
<td>Social Development of Online-Risk Reduction Systems for Minors</td>
<td>3yrs.</td>
<td>Fujio TORIUMI</td>
<td>Associate Professor, School of Engineering, The University of Tokyo</td>
</tr>
<tr>
<td>Activation of community patrol by fostering coordinators of watching over elderly people</td>
<td>3yrs.</td>
<td>Yuzhi MURAI</td>
<td>Professor, Department of Social Welfare, DEN-EN CHOFU University</td>
</tr>
<tr>
<td>Research and Development of a Flexible Community Cooperation Model Preventing the Elderly from Becoming Involved in Fraud Cases</td>
<td>3yrs.</td>
<td>Satoshi WATANABE</td>
<td>Professor, Research and Education Center for Comprehensive Science, Akita Prefectural University</td>
</tr>
<tr>
<td>Implementation of Recovery Circle in Japanese Society for a variety of Addiction Behaviors</td>
<td>3yrs.</td>
<td>Shinichi ISHIZUKA</td>
<td>Professor, Faculty of Law, Ryukoku University</td>
</tr>
<tr>
<td>Research and Development of Public-Private Connected Caring Model Respond to Multiple Help-Longing in Urban Environment</td>
<td>3yrs.</td>
<td>Susumu SHIMAZONO</td>
<td>Director, Institute of Grief Care, Sophia University</td>
</tr>
<tr>
<td>Development of supporting system for pregnant women to prevent child abuse and domestic violence</td>
<td>3yrs.</td>
<td>Takeo FUTJWARA</td>
<td>Professor, Global Health Promotion, Tokyo Medical and Dental University (TMDU)</td>
</tr>
<tr>
<td>Research and policy of parental support systems to prevent child maltreatment</td>
<td>3yrs.</td>
<td>Kumi KURODA</td>
<td>Team Leader, Laboratory for Affiliative Social Behavior, RIKEN Center for Brain Science</td>
</tr>
<tr>
<td>Promotion of Multi - Agency Cooperation by Visualization of the Police Intervention Process in Criminal Cases in Homes and Schools</td>
<td>3yrs.</td>
<td>Masahiro TAMURA</td>
<td>Director, Institute for Criminal Justice, Kyoto Sangyo University</td>
</tr>
<tr>
<td>Development and Provision of a Training Program to Foster the Use of Forensic Interviews by Multidisciplinary Team</td>
<td>3yrs.</td>
<td>Makiko NAKA</td>
<td>Professor, College of Comprehensive Psychology, Ritsumeikan University</td>
</tr>
<tr>
<td>Developing social network for safe and autonomous economic activities of older people</td>
<td>3yrs.</td>
<td>Shoichi OGANO</td>
<td>Professor, Faculty of Law, Chuo University</td>
</tr>
<tr>
<td>Development of prevention and early-intervention system for child maltreatment using the database of nationwide survey</td>
<td>3yrs.</td>
<td>Nobuaki MORITA</td>
<td>Associate professor, Faculty of Medicine, University of Tsukuba</td>
</tr>
</tbody>
</table>
Despite dramatic advancements in science and technology, today’s society faces many issues including declining birth rate, aging of population, growing fiscal deficit, increase in environmental burden, depopulation in rural areas, and increased risk of natural disasters. These issues are all related to sustainability and common throughout the globe, with some differences per country, as indicated by the adoption of the SDGs (Sustainable Development Goals) at the United Nations Sustainable Development Summit in 2015.

While various efforts have been made to tackle these issues, it is clear that a segmented approach treating them separately has limited impact. Instead, we should take a holistic approach towards the real problems in respective regions, taking into account the varied local resources available. We believe that intergenerational co-creation is an important methodology in this regard. This is because an intergenerational approach makes people active, affects their mindset, enables gathering of diverse knowledge, facilitates consensus formation, and enhances sustainability of activities.

This is not to say all problems can be solved by this methodology, or that there is no room for improvement. Hence, we would like to further develop methods of intergenerational co-creation as a social technology, so that people in many regions can take advantage of it. This will, we believe, help lead to the realization of sustainable society.

Goals:

Our aim can be summarized in the following three points:

1) We will clarify how intergenerational co-creation is effective in achieving sustainability in cities and regions.
2) In the areas where intergenerational co-creation is expected to be effective, we propose mechanisms to promote, put into practice and improve it.
3) We will make efforts to implement these mechanisms in our society while building a network for exchanging experiences and know-how.

Almost all the projects in this research area have regional fields, owing to the above point of view, providing a venue for first verifying their research hypotheses. In addition, each aims for activities to continue in some way so that they become ingrained into society beyond the RISTEX research period.

By “co-creation,” we mean a cooperative activity to create something together, rather than simply allowing one generation to take care of the other. What we expect to be created are not necessarily physical products, but could well include values such as improvement in health or well-being, and reduction in fiscal deficit or environmental burden.
## Projects

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Length</th>
<th>Principal Investigator</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FY2018</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restoring a Beautiful and Rich Inner Bay through “Fish Local, Eat Local”</td>
<td>3yrs.</td>
<td>Koji OTSUKA</td>
<td>Professor, Graduate School of Humanities and Sustainable System Sciences, Osaka Prefecture University</td>
</tr>
<tr>
<td>Restructuring Local Livelihoods and Fostering Diverse Lifescapes through Cooperative Ateliers in Rural Communities</td>
<td>3yrs.</td>
<td>Masahiro ONUMA</td>
<td>Professor, Graduate School of Life Design, Tohoku Institute of Technology</td>
</tr>
<tr>
<td>Revitalizing Streetscapes by Utilization of Vacant Houses and Neighborhood Medical Care</td>
<td>3yrs.</td>
<td>Haruhiko GOTO</td>
<td>Professor, Graduate School of Creative Science and Engineering, Waseda University</td>
</tr>
<tr>
<td>Building a Support System to Public Facility Management for a Sustainable Region</td>
<td>3yrs.</td>
<td>Tsukiki TSUTSUMI</td>
<td>Associate Professor, Faculty of Engineering, Maebashi Institute of Technology</td>
</tr>
<tr>
<td>Development of an Intergenerationally Co-creative Community Model of Work-Life Integration</td>
<td>3yrs.</td>
<td>Shigeru YANAKA</td>
<td>Professor, Faculty of Regional Sciences, Tottori University</td>
</tr>
<tr>
<td>Proposals on Intergenerationally Co-creative Models through Donation*</td>
<td>1yr.</td>
<td>Sachiko KISHIMOTO</td>
<td>Executive Director, Public Resources Foundation</td>
</tr>
<tr>
<td>Regional Revitalization Education by Intergenerational Philosophical Dialogue and Project Learning*</td>
<td>1yr.</td>
<td>Tetsuya KONO</td>
<td>Professor, College of Arts, Rikkyo University</td>
</tr>
<tr>
<td>An Investigation regarding the Mechanism of Intergenerational Inheritance of Social Capital*</td>
<td>1yr.</td>
<td>Masato YODD</td>
<td>Associate Professor, Research Center for Advanced Policy Studies, Institute of Economic Research, Kyoto University</td>
</tr>
<tr>
<td>Practical Feedback for the Measurement of Various Aspects of Happiness in Local Areas and the Sustainability of Intergenerational Societies</td>
<td>3yrs.</td>
<td>Yukiko UCHIDA</td>
<td>Associate Professor, Kokoro Research Center, Kyoto University</td>
</tr>
<tr>
<td>Creating an Intergenerational Platform for Utilizing Regional Resources through Sheep Farming</td>
<td>3yrs.</td>
<td>Katsuya KANETOU</td>
<td>Representative Director, Satoumi Farm</td>
</tr>
<tr>
<td>Distributed Rainwater Management for a Sustainable Well-being Society</td>
<td>3yrs.</td>
<td>Yukihiro SHIMATANI</td>
<td>Professor, Faculty of Engineering, Kyushu University</td>
</tr>
<tr>
<td>Developing a Multi-layered and Intergenerational System of Cooperation in Community</td>
<td>3yrs.</td>
<td>Yoshinori FUJIWARA</td>
<td>Team Leader, Research Team for Social Participation and Community Health, Tokyo Metropolitan Institute of Gerontology</td>
</tr>
<tr>
<td>Creating a Fountain of Future Lifestyle Ideas</td>
<td>3yrs.</td>
<td>Ryuzo FURUKAWA</td>
<td>Professor, Faculty of Environmental Studies, Tokyo City University</td>
</tr>
<tr>
<td>Ensuring Sustainability at Local Government Level through Promoting Implementation of Multigenerational Participatory Stock Management Methods</td>
<td>3yrs.</td>
<td>Hidemun KURASAKA</td>
<td>Professor, Graduate School of Social Sciences, Chiba University</td>
</tr>
<tr>
<td>Development of Mobility Assist System for the People with Visual Impairment by Collaborative Creation of Multiple Generations</td>
<td>3yrs.</td>
<td>Yoshikazu SEKI</td>
<td>Chief Senior Researcher, Department of Information Technology and Human Factors, National Institute of Advanced Industrial Science and Technology (AIST)</td>
</tr>
<tr>
<td>Evaluation of Effectiveness of Intergenerational Co-creative Community on ME-BYO</td>
<td>3yrs.</td>
<td>Kenji WATANABE</td>
<td>Professor, Faculty of Environment and Information Studies/ School of Medicine, Keio University</td>
</tr>
</tbody>
</table>

* Comprehensive and horizontal type: To obtain results as a whole area, study the effectiveness of intergenerational co-creation and systems to realize social implementation of research outcomes, with a broad perspective, instead of being limited to a specific geographical area.
Faced with wide-ranging, complex issues, such as global warming, energy management, pandemics, and an aging society, advanced research and development are expected to contribute more to the resolution of social issues. They are also expected to bring about social innovation—that is, change in the social system through the creation of economic and public value. In order to promote research efficiently aimed at resolving issues, science and technology policy has been merged with innovation policy (together abbreviated to "ST&I" policy). This should also be strategically integrated with other important policies, such as industrial, economic, and educational policies, and with diplomacy.

Japan's fourth Science and Technology Basic Plan, covering the five-year period beginning in fiscal 2011, also provides for the integrated development of ST&I policy, under which policies concerning science and technology, as well as science and technology-based innovation, are carried out comprehensively. In furthering the relationship of science and technology to society, it is necessary to carry out ST&I policy as an integral part of policies for society and the public good with broad participation by citizens, gaining their understanding and trust. To this end, the benefits of ST&I to society and its impact on society must be made visible, as part of an effort to plan and carry out policy based on objective evidence and achieve a more rational policy-forming process, while exercising greater accountability to the public.

However, sometimes R&D investment has been made without adequate objective evidence. Although great insights have been gained through basic research, the research outcomes have not been applied in an effective fashion so that they lead to innovations or the creation of systems to resolve challenges and advance society. Outstanding policy ideas have been conceived, but they have not been implemented due to insufficient communication with the public. The root cause of this was the absence of clear, evidence-based methods to create ST&I policy.

Aware of these issues, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) launched the “Science for RE-designing Science, Technology and Innovation Policy” program in fiscal 2011, aimed at achieving objective evidence-based policy formation so that effective policies can be proposed to deal with issues, drawing on a multifaceted analysis and grasp of economic, societal, and other factors. As a part of the program, RISTEX has been conducting a research funding program to promote R&D on the “Science of ST&I Policy” since June 2011. This funding program aims for middle- to long-term contributions to the policy-making process.

RISTEX will support R&D projects aimed at:

- Developing methodologies in measurement and analysis that can be utilized in actual policy-making processes
- Expanding community networks by team science in broad, interdisciplinary fields and stakeholders, and by their outreach activities
Projects

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Length</th>
<th>Principal Investigator</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research on Constructing Open Data for Policies to Reduce Child Poverty</td>
<td>3.5yrs</td>
<td>Aya ABE</td>
<td>Professor, School of Humanities &amp; Social Sciences, Tokyo Metropolitan University</td>
</tr>
<tr>
<td>Healthcare Innovation driven by Effective Hospital-bed Reductions and Urban Planning</td>
<td>3.5yrs</td>
<td>Yukiko ITO</td>
<td>Professor, College of Policy Studies, Tsuda University</td>
</tr>
<tr>
<td>The construction of a commons utilizing ICT to generate evidence for medical policy</td>
<td>3.5yrs</td>
<td>Kazuto KATO</td>
<td>Professor, Graduate School of Medicine, Osaka University</td>
</tr>
<tr>
<td>Biology-informed, family-friendly policies against declining birth rate in Japan</td>
<td>3.5yrs</td>
<td>Kumi KURODA</td>
<td>Principal Investigator, Laboratory for Affiliative Social Behavior, RIKEN Center for Brain Science</td>
</tr>
<tr>
<td>System design to introduce energy-saving equipment for reinforcement of resilience</td>
<td>3.5yrs</td>
<td>Akane UEMICHI</td>
<td>Assistant Professor, Graduate School of Engineering, The University of Tokyo</td>
</tr>
<tr>
<td>A Metasystem Approach to Regulatory Rule Making on Advanced Medicine</td>
<td>3.5yrs</td>
<td>Shingo KAND</td>
<td>Associate Professor, Graduate School of Frontier Sciences, The University of Tokyo</td>
</tr>
<tr>
<td>Star Scientists and Innovation in Japan</td>
<td>3.5yrs</td>
<td>Kanetaka MAKI</td>
<td>Associate Professor, Waseda Business School</td>
</tr>
<tr>
<td>An analysis of the factors that influence women and girls to pursue physics and mathematics</td>
<td>3.5yrs</td>
<td>Hiromi M. YOKOYAMA</td>
<td>Professor, Kavli IPMU, The University of Tokyo</td>
</tr>
<tr>
<td>Research on description and interpretation of evidence in policy process</td>
<td>3yrs</td>
<td>Yuya KAJIKAWA</td>
<td>Professor, School of Environment and Society, Tokyo Institute of Technology</td>
</tr>
<tr>
<td>Proactionary approach for ELSI in emerging biomedical research</td>
<td>3yrs</td>
<td>Jusaku MINARI</td>
<td>Project Associate Professor, Uehiro Research Division for IPS Cell Ethics, Center of IPS Cell Research and Application, Kyoto University</td>
</tr>
<tr>
<td>Assessing Regenerative Medicine in Japan: an interdisciplinary approach</td>
<td>3yrs</td>
<td>Yoshimi YASHIRO</td>
<td>Professor, Kanagawa University of Human Services</td>
</tr>
</tbody>
</table>

Affiliations and positions are those that applied at the completion of the project.
The key to success is consecutive work of research, development, demonstration, and diffusion
While science and technology have made a remarkable progress in recent years and yielded the multitudinous outcome, most of those outcomes, however, have remained dormant in a repository of knowledge without being applied to our society. The reason is that the intellectual activities usually discontinue at the stage of the research and do not proceed to a consecutive work through development, demonstration and further to diffusion. Under such circumstances, it is almost impossible to utilize intellectual assets in a repository.

Unsuccessfulness results in the discontinuity between R&D and demonstration
R&D for society is largely conducted by universities or by research and development institutions. So long as the validity of their outcome is not demonstrated in a visible form, the public, who are potential beneficiaries, will hesitate to invest their money in enjoying benefit of R&D. As a result, research and development work is interrupted by the shortage of budget before going to the demonstration, and RDDD cycle remains incomplete.

A transit across the valley of death by the help of implementation support program
Researchers want outcome of their own research to be actually utilized, and the public at large also wants to make use of research and development results. In order to fulfill the wants of both parties, it is essential to traverse the valley of death between R&D and demonstration, to visualize the R&D outcome, and to develop a mechanism whereby the potential beneficiaries can easily make the decision to provide funding without hesitating over it. The implementation-support program is just such a mechanism. Please note that in the absence of implementation support program, R&D will be slowed down and, depending on the circumstances, may end up being stalled.

Implementation activities as teamwork with the public
The major premise of the implementation-support program is that R&D have ended and produced results. Since implementation activities are conducted as teamwork with the public, it is necessary to make clear who the potential beneficiaries is, what the purpose is, what methods are to be used to achieve the purpose, and what kind of effects are to be expected until when.

Flexibility to accept coagent
In the course of implementation in society, it is necessary to have the flexibility in the organization in getting cooperation, as circumstances require, with researchers in deferent discipline, engineers, people with local on-site experience, beneficiaries, and others. Without coagent, it will not be possible to traverse the valley of death.

Building a bridgehead to diffusion
The scope of this program does not cover as far as the stage of diffusion. When it becomes established and runs autonomously in society, however, then one expects that the implementation will be taken up as a successful case and diffused throughout the country.

Institutions that can receive implementation support
Institutions that can receive implementation support include private enterprises, societies of all kinds, non-profit organizations (NPO), universities, research institutes, and so on, regardless of the constituting entity. Projects are given support for one year or more, up to three years. By this support, it is expected to expedite the application of R&D outcome in society, to strengthen the researchers’ social role, to improve the foundation of the R&D organization, and to positively realize the diffusion and firm establishment of R&D outcome in society.
### Projects

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Length</th>
<th>Principal Investigator</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>An implementation of a universal prevention program for mental health in elementary school</td>
<td>3 yrs.</td>
<td>Shin-ichi ISHIKAWA</td>
<td>Professor, Faculty of Psychology, Doshisha University</td>
</tr>
<tr>
<td>Implementation of disaster animal management assistance system</td>
<td>3 yrs.</td>
<td>Shin-ich HAYAMA</td>
<td>Professor, School of Veterinary Medicine, Nippon Veterinary and Life Science University</td>
</tr>
<tr>
<td>Implementation of a disaster medical assistant drill program with citizens</td>
<td>2.5 yrs.</td>
<td>Ikushi YODA</td>
<td>Senior Research Scientist, Human Informatics Research Institute, National Institute of Advanced Industrial Science and Technology (AIST)</td>
</tr>
<tr>
<td>Implementation of the early intervention model based on evidence for children with developmental disabilities tackled with parents</td>
<td>3 yrs.</td>
<td>Hitomi KUMA</td>
<td>Joint representative, Human Resource Development Division, ADDS</td>
</tr>
<tr>
<td>Implementation of integrated care system of Behavior analysis data of the elderly and information obtained from doctors, public health nurses, and life support counselors for Elderly people living in temporary housing in the affected areas of the Kumamoto earthquake</td>
<td>2 yrs.</td>
<td>Mako SHIROUZU</td>
<td>Associate Professor, Faculty of Administration, Prefectural of University of Kumamoto</td>
</tr>
<tr>
<td>The implementation of the Kidkey system to assist high-quality nursing care services</td>
<td>3 yrs.</td>
<td>Atsushi SHINJO</td>
<td>Professor, Faculty of Environment and Information Studies, Keio University</td>
</tr>
<tr>
<td>Implementation of wide-area cooperated information utilization support mechanism for recovery from Kumamoto earthquake</td>
<td>2 yrs.</td>
<td>Shingo SUZUKI</td>
<td>Deputy Manager Research Fellow, Disaster Resilience Research Division, National Research Institute for Earth Science and Disaster Resilience</td>
</tr>
<tr>
<td>Implementing systems for promoting the introduction and the utilization of low energy-consuming products and people’s energy conservation behaviors</td>
<td>3 yrs.</td>
<td>Yoshikuni YOSHIDA</td>
<td>Professor, Graduate School of Frontier Sciences, The University of Tokyo</td>
</tr>
<tr>
<td>Implementation of Irrigation Information Service Systems for Large-scale Rice Farmers</td>
<td>2.5 yrs.</td>
<td>Toshiaki IIDA</td>
<td>Associate Professor, Laboratory of Water Environment Engineering, Graduate School of Agricultural and Life Sciences, The University of Tokyo</td>
</tr>
<tr>
<td>Advanced Medical Image Diagnosis Support System Implementation</td>
<td>3 yrs.</td>
<td>Taichi KIN</td>
<td>Assistant Professor, Department of Neurosurgery, The University of Tokyo</td>
</tr>
<tr>
<td>Implementation of a Disaster Warning System for Landslide and Avalanche using Thinned Wood</td>
<td>3 yrs.</td>
<td>Nobuhiro SHIMOI</td>
<td>Professor, Department of Machine Intelligence and Systems Engineering, Akita Prefectural University</td>
</tr>
<tr>
<td>Implementation of ADHD Children Support System using functional NIRS</td>
<td>3 yrs.</td>
<td>Ipeita DAN</td>
<td>Professor, Faculty of Science and Engineering, Chuo University</td>
</tr>
</tbody>
</table>

*FY 2017*
Program Outline

The Research Institute of Science and Technology for Society (RISTEX) supports a range of R&D projects with the aim of yielding outcomes that will help resolve social problems that we and our society in the 21st century face, including issues involving the environment and energy, aging society, safety and security, and sustainability. With the aim of implementing R&D outcomes in society, programs in the R&D Focus Area have strategically solicited and adopted projects, accumulating R&D outcomes aimed at resolving social issues, and creating comprehensive outcomes within the focus area through area management that encourages coordination among projects at the R&D stage.

The Implementation-Support Program (R&D Results Integrated Type)—which started in fiscal year 2013 to handle consolidation of outcomes—integrates and consolidates multiple R&D outcomes produced by R&D Focus Area programs promoted by RISTEX, and supports initiatives that implement these outcomes in society. (support period of 3 years.) By consolidating, or packaging, multiple outcomes, instead of limiting itself to the implementation of individual outcomes, it is hoped that each solution's effectiveness, and the quality and speed of its deployment in society, can be improved.

Before the outcomes of R&D can reach society and the market, it must be gone through the stages of research, development, demonstration, and diffusion. Knowledge and technology are applied / demonstrated in society, and, if they are not ready to move on to the next stage, the process returns to development. This cyclic process is the key to implementing R&D outcomes in society. It is essential that politicians, industry, academia, government agencies and local residents carry on a dialog and collaborate in the actual environment and society in which they are active, with diverse people, schemes, and systems interacting, and with the aim that outcomes will be produced that help resolve issues confronting society and that the utilization of those outcomes in society will be sustained.

This program prioritizes implementation activities performed on the basis of cooperation and collaboration with stakeholders in order to promote the transfer and application, and the deployment in society of outcomes that continue to expand beyond the original regions and organizations after implementation support has ended. Furthermore, it actively consolidates and integrates outcomes that transcend the framework of the RISTEX R&D Focus Area.
## Projects

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Length</th>
<th>Principal Investigator</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-creating Communities for Aged Society</td>
<td>3yrs.</td>
<td>Tetsuo TSUJI</td>
<td>Professor, Institute of Gerontology, The University of Tokyo</td>
</tr>
<tr>
<td>Local Co-Innovation approach for against Climate Change</td>
<td>3yrs.</td>
<td>Takayuki TAKARADA</td>
<td>Professor, the Graduate School of Science and Technology, Gunma University</td>
</tr>
</tbody>
</table>

## Project Activities

### Co-creating Communities for Aged Society

Principal Investigator: Tetsuo TSUJI  
Professor, Institute of Gerontology, The University of Tokyo

This is an integrated implementation activity which consolidates the R&D outcomes of the “Redesigning Communities for Aged Society” R&D Focus Area (FY2010-2015). In response to the aged society issue, which becomes obvious in the place of living, implementation activities are being done to support creation of a community in which people can continue living “vivaciously”, “vigorously” and “with peace of mind” no matter how old one gets. So it is attempted to implement supportive activities from various viewpoints, e.g. fostering human resources that can lead the solution of areal issues, construction of an information-sharing platform to promote networking by vividly communicating how the issue is being dealt with in each locality, systematization of the cooperative town-making technology beyond sectors and an actual practice of a living laboratory with a view to ordinary people. At the same time, prioritizing an actual practice for creating a model community of a vigorous and charming aged society, town-making of a resident participation type is being proceeded with in Kashiwa City, Chiba Prefecture.

![A stakeholder workshop for implementation in Kashiwa City, Chiba Prefecture.](image)

### Local Co-Innovation approach for against Climate Change

Principal Investigator: Takayuki TAKARADA  
Professor, the Graduate School of Science and Technology, Gunma University

Launched in 2014, this project aims to integrate and implement the multiple outcomes of research conducted under the R&D Program: Community-Based Actions against Global Warming and Environmental Degradation (FY 2008 – 2013). The project will provide support for initiatives being implemented by local governments and others to create self-reliant, sustainable communities combating global warming, tapping renewable energy sources and other strategies. Focusing on cooperation between local communities aimed at boosting the effectiveness of emergent community development based on exploitation of local energy resources and collaboration with local residents, and on integrated initiatives for combating global warming and revitalizing local communities through collaboration between consumers, producers and retailers, this project aims to provide packages of research outcomes for supporting the creation of low carbon communities that have been tailored to local issues and perceptions. The project team will also promote the adoption of its solutions by building an information platform and network linking local governments nationwide with the aim of supporting their implementation by an increasing number of local governments and communities. Project team members are currently working with Kiryu City in Gunma Prefecture, Emergent Community Development and Cooperation Promotion Center and many others.

![Symposium "De-carbonization to activate regional life" in Kiryu City](image)
Creating Community-based Robust and Resilient Society

(FY2012-2017)

Resilience is the Quality that will Determine the Society for Anticipated Large-scale Disaster

Program Supervisor: Haruo HAYASHI
President, National Research Institute for Earth Science and Disaster Prevention

Public Needs:
The Great East Japan Earthquake in 2011 caused extensive damage across many regions, but it also highlighted a number of issues relating to complex, widespread disasters, including earthquake and tsunami response, crisis management, information and communications, logistics, and emergency medical treatment.
RISTEX scientifically examines such issues and lessons gleaned from disasters with a view to implementing responses that will make our society more resilient to future large-scale disasters.

Goals:
1. To scientifically collate and analyze existing R&D relating to disaster mitigation and preparedness as well as information on front-line measures, initiatives, and systems; to take a unified and systematic approach to examining various crises and disasters that could complicate with each other; and to develop new knowledge and methodologies required to respond effectively in emergencies.

2. To provide realistic policy advice and demonstrate workable measures aimed at building safe and secure cities and regions and reassuring citizens by identifying and analyzing current circumstances and issues in crisis and disaster response at the city and regional level, and effectively interlinking knowledge and skills related to safety and security, social systems, and the efforts of all stakeholders (governments, residents, schools, industries, NPOs, NGOs, etc.)

3. To build stakeholder networks in order to share information, exchange views, and facilitate partnership and cooperation so that R&D efforts and outcomes are utilized beyond the bounds of the originally studied region or research field, spreading and becoming established over a much broader area.

R&D Projects Elements:
1. R&D that utilizes community characteristics to enhance disaster resilience
2. R&D that encourages effective networks and redesign of self-help, mutual aid, and public assistance schemes
3. R&D that builds mechanisms linking individual skills and knowledge to resolve issues relating to safety and security
4. R&D that promotes implementation of social mechanisms linking communities (Analysis of legislation, regulations, and systems, and creation of mechanisms for new initiatives)
<table>
<thead>
<tr>
<th>Category</th>
<th>Project Name</th>
<th>Length</th>
<th>Principal Investigator</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Producing Explicit Knowledge of Community Resilience for Disaster Management in Remote Islands</td>
<td>3yrs.</td>
<td>Jun OKAMURA</td>
<td>Professor, Faculty of Nursing, Japanese Red Cross Kyushu International College of Nursing</td>
</tr>
<tr>
<td>I</td>
<td>Development of LODE Method for Improving Self Protection and Resilience against Large-scale Disasters in Modern Communities</td>
<td>3yrs.</td>
<td>Munetaka KURAHARA</td>
<td>Professor, Department of Policy Studies, Iwate Prefectural University</td>
</tr>
<tr>
<td>I</td>
<td>Creating a Community to Secure the Coexistence of Human and Animal by Improving Disaster Animal Resilience</td>
<td>3yrs.</td>
<td>Shin-ichi HAYAMA</td>
<td>Professor, School of Veterinary Medicine, Nippon Veterinary and Life Science University</td>
</tr>
<tr>
<td>I</td>
<td>Construction of Peer Support Communities for Disaster Workers</td>
<td>3yrs.</td>
<td>Yutaka MATSUI</td>
<td>Professor, Faculty of Human Sciences, University of Tsukuba</td>
</tr>
<tr>
<td>I</td>
<td>Development of a Healthcare Area Disaster Resilience Management System Model</td>
<td>3yrs.</td>
<td>Masahiko MUNECHIKA</td>
<td>Professor, Faculty of Science &amp; Engineering, Waseda University</td>
</tr>
<tr>
<td>II</td>
<td>Intergenerational and Interregional Risk Communication through Disaster Evacuation Map</td>
<td>3yrs.</td>
<td>Isami KINOSHITA</td>
<td>Professor, Graduate School of Horticulture, Chiba University</td>
</tr>
<tr>
<td>I</td>
<td>A Proposal of Planning Methods for Creating Resilient Metropolitan Areas</td>
<td>3yrs.</td>
<td>U HIRAI</td>
<td>Associate Professor, School of Engineering The University of Tokyo</td>
</tr>
<tr>
<td>I</td>
<td>Planning Process of Land Use Models for Sustainable Tsunami Resilience and &quot;Regional Inheritance&quot;</td>
<td>3yrs.</td>
<td>Hideo YAMANAKA</td>
<td>Professor, Institute of Technology and Science, The University of Tokushima</td>
</tr>
<tr>
<td>II</td>
<td>Disaster Medical Outreach for Urban Communities: An Integrated Approach</td>
<td>3yrs.</td>
<td>Shoichi OHTA</td>
<td>Affiliate Professor, Department of Emergency and Critical Care Medicine, Tokyo Medical University</td>
</tr>
<tr>
<td>II</td>
<td>Optimal Life Recovery Assistance for Publicly Rented Temporary Housing Dwellers in Wide Dispersed Areas</td>
<td>3yrs.</td>
<td>Shigeo TATSUKI</td>
<td>Professor, Department of Sociology, Doshisha University</td>
</tr>
<tr>
<td>II</td>
<td>Creating Community-Based Disaster Reduction System in the Catastrophic Disaster Area by Protecting the Member of Local Voluntary Organizations</td>
<td>3yrs.</td>
<td>Ichiro MATSUO</td>
<td>Deputy Director, Research Institute for Disaster Mitigation and Environmental Studies</td>
</tr>
<tr>
<td>I</td>
<td>Development of Support Model for Agriculture and Forestry Land Conservation and Resilience after Flooding Disaster in Hilly and Mountainous Areas</td>
<td>3yrs.</td>
<td>Kazuo ASAHIRO</td>
<td>Associate Professor, Environment and Heritage Design, Faculty of Design, Kyushu University</td>
</tr>
<tr>
<td>I</td>
<td>Redevelopment of Tsunami Impacted Coastal Region to Save Life and to Implement Disaster Resilient Community</td>
<td>3yrs.</td>
<td>Mikiko ISHIKAWA</td>
<td>Professor, Faculty of Science and Engineering, Chuo University</td>
</tr>
<tr>
<td>II</td>
<td>Development of a Disaster Management Support System Based on Computer-assisted Structuring of Disaster Information</td>
<td>3yrs.</td>
<td>Kentaro INUI</td>
<td>Professor, Research Organization of Electrical Communication, Tohoku University</td>
</tr>
<tr>
<td>II</td>
<td>Development of Comprehensive Disaster Mitigation Project of &quot;Preservation Districts for Groups of Traditional Buildings&quot;</td>
<td>3yrs.</td>
<td>Hajime YOKOUCHI</td>
<td>Associate Professor, Department of Architecture, Owama National College of Technology</td>
</tr>
</tbody>
</table>

Category I: Projects whose goal is to provide options for resolving social problems (the approach to R&D, organization of indicators, etc. for scientific evaluation)
Category II: Projects whose goal is to go all the way to experimental proof of specific technologies, methods etc. to help resolve social problems.
We developed (improve quality/efficiency and augment new values) problem-solving technology/methodology, etc. with an interdisciplinary (natural science and cultural/social science, etc.) approach by grasping society’s specific or latent needs and utilizing real data or case examples as well as, furthermore, promoting research and development for establishing a research foundation for “service science”. (Activities ended as of March 2017.)

In this program, we have been addressing, since its inauguration in 2010, establishment of a research and development foundation for service science and creation of methodology/technology for solving various programs relating to service. As a result, service supply utilizing the research outcomes was achieved or systematic theoretical research outcomes, etc. were created. We also presented the “Service Value Co-Creation Framework (named the Smile Chart)”, which is a common framework for understanding the positioning of service science research. Additionally, participants in this program have also been stakeholders in founding the Academic Society of Services.

While promoting these activities, the social situation relating to services changed largely; it has come to be expected that, in the future, a “Super Smart Society” will emerge, in which creation of services to supply new values utilizing ICT is accelerated. Under such circumstances, to review what kind of addressing research and development is necessary for creating new services, the “Service Science’s Future Review Meeting”, which consists of young service researchers and designers, etc., was set up under this program; after over 1 year of investigations and discussions, the review results were summarized in a report “Aiming at a Service Science to Co-Create the Future” (October 2015).

In FY2016, based on the report above, an open call for proposals for possibility surveys on research and development program schemes to address creation of new services and establishment of service design methodology was launched and 8 projects were adopted.

In March 2017, a workshop to report the results of these possibility surveys as well was held to brush up the proposals for deployment of the schemes.

A book that summarizes mainly the research outcomes of this program “Invitation to Serviceology—Service Innovation by Value Co-Creation” was published in June 2017. The projects promoted under this program, from the background to/how and why of the birth of “serviceology” to aim at realizing innovations by a comprehensive and scientific approach to services to social implementation and up to future prospects, are introduced, intertwining the newest case examples of research. The content will attract not only beginners in, or researchers of, services, but also corporate directors and planners as well as business managers.

Edited and authorized by: Teruyasu MURAKAMI / Tamio ARAI / JST Research Institute of Science and Technology for Society
University of Tokyo Press  Price (book 3900 yen + tax) Published on June 21, 2017
It is estimated that, in our country, in 2025, the population of people aged 65 or older will exceed 30% of the total population, which is an increase of over 7 million people nationwide from in 2010. The population increase in urban areas in particular is significant, creating large regional disparities. For solving hardly predictable and complex regional problems due to the advent of an aged society unprecedented in the world, we have been promoting research and development based on trans-disciplinary and multi-stakeholder collaboration (program activities ended as of March 2016).

Visions Based on the R&D Focus Area Outcomes

The issue of aging becomes evident in the “community”, which is a place of living. In this program, 15 projects yielded various outcomes concerning specific problems associated with aging in diverse communities with different characteristics of culture/climate/resource, etc. The created various methods, actions and images of community are, while being connected with each other, arranged as follows together with the image of aged society to be aimed at.

At present, we are deploying activities in the “Implementation-Support Program【R&D results Integrated Type】” for further dissemination and establishment of these outcomes in society:

1. A society in which you can play active roles
   ...Draw a picture of being active for lifetime through activities from work to social contribution.

2. A society in which you can stay healthy as long as possible
   ...Develop know-how of health promotion rooted in the community.

3. A society in which you can live with peace of mind even when you get weak
   ...Realize an area in which you can live “with peace of mind” and “in your own manner” for ever.

Dissemination of the Program/Project Outcomes

The outcomes of this R&D Focus Area’s projects and records of the program activities are disclosed on the program website (https://www.jst.go.jp/ristex/korei/en/) (photo at left). In the program, also, community action research was promoted/discussed, and the results were summarized in the book “Aged Society Action Research” (photo at right).
Global environmental issues essentially raise a fundamental skepticism to the present “modern” condition that was brought about by the rapid and mineral fuel-dependent economic development of the 20th century. To address global warming, this R&D Focus Area has set a scenario of reducing greenhouse gas emissions by 60-80% by the year 2050, and aimed to create new pathways to drastically reform the “modern,” working from local communities and business fields. This R&D Focus Area has developed realistic reforming scenarios and local implementation models. The idea of ‘de-carbonization that activates regional life’ was also disseminated widely as an R&D area activity.

**Guideline 1**
- Developing foundations for achieving a society of local resource utilization that rewards the local community
  1-1 Developing rules to utilize local resources in the local area
  1-2 Developing foundations to support implementations of fair and locally effective appropriate technologies
  1-3 Developing inter-local networks and human resources which underpin the achievement of a society of renewable energy and energy saving

**Guideline 2**
- Aiming for creation of new values and systems in the era of de-carbonization and utilization of renewable energy
  2-1 Pursuing a paradigm shift that promotes population re-migration as well as temporal exchange between urban areas and rural areas by utilizing renewable energy and creating multiple jobs as a local survival strategy
  2-2 Re-constructing a relationship among consumer, distributor, and producer for achieving low carbon

**R&D Focus Area and project achievement**
The following priority social issues were set to be tackled by the R&D Focus Area: (a) rural regeneration, (b) middle-sized city revitalization, (c) low carbon value chain innovation, and (d) human resource development.
As is evident from social problems such as suicides caused by abuse and bullying, protecting children from crime is an urgent issue in today’s Japan. It is not an issue only for guardians and the police any more. We believe the following are important to protect children from crime: a) children should be protected and nurtured by all of society; b) various initiatives should be linked to prevent children becoming the victims of crime; and c) the problem should be considered from the standpoint of human, material, and social systems. This R&D area was finished in March 2013.

Summary of R&D Focus Area - Outcomes and recommendations

In order to recognize and disseminate crime prevention initiatives in Japan based on scientific evidence, to reduce the risk of crime against children, and to take proactive measures so that children would not become crime victims, we promoted thirteen projects over a period of six years, establishing the following three objectives: to develop scientific knowledge and methods; to produce specific results that would match the local circumstances; and, to that end, to build networks of people and researchers dealing with practical issues in regions, schools, and government authorities. We held a number of symposiums to raise and clarify problems extending beyond the initiatives and results of individual projects. Finally, we summarized what cannot be solved through the efforts of individual researchers and a single funding agency in the form of “Seven Recommendations”. We are confident that they will serve as guidelines when proposing and designing new initiatives and policies.

Seven recommendations for protecting children from crime are:

1. Protect and nurture children through the collaboration of all stakeholders,
2. Aim for sustained initiatives based on actual circumstances and evidence,
3. Capture the voices of children, turn them into data, and use for prevention,
4. Share data and create frameworks to be used by individual initiatives,
5. Understand criminal phenomena and foster capabilities that help in crime prevention,
6. Promote R&D and implementation that contributes to crime prevention, and
7. Understand local needs and communicate research outcomes with society.

The outcomes are disclosed on the website.

Program activities ended at the end of FY2012, but not all problems have been resolved. It is no exaggeration to say that it has just begun to return the project outcomes to society and to deploy them further. Also, new problems will surely show up now and in the future. To let you know our initiatives and outcomes so far, therefore, we renewed the “Children’s Safety from Crime” website. The program’s outcomes, e.g. the entire text of the “7 Suggestions on Protecting Children from Crime”, and the outcomes of 13 projects, are summarized in an easy-to-understand manner. In addition to the specific outcomes of each project, voices of the co-workers who kindly actually utilized the outcomes and the idea of crime prevention, etc., as well, are introduced. Also, there is a link to the project’s own website for your perusal.
Over an eight-year period, from FY2005 to FY2012, we were engaged in two R&D programs in the R&D Focus Area Science Technology and Humanity that relate to issues involving science, technology and society, namely "Science and Technology, Literacy in the 21st Century" (FY2005 to FY2009) and "Interactions between Science, Technology, and Society" (FY2007 to FY2012). This focus area was finished in March 2013.

Summary of R&D Focus Area outcomes and recommendations

The achievements of science and technology now have a large influence daily life, being widely utilized throughout society. ‘Trans-science’ defines fields where scientific questions can be raised, but science cannot provide a full answer on its own. In order to resolve trans-scientific issues, they must be considered by the various relevant parties affected by the issues, not just researchers.

All 12 projects in this program address a variety of trans-scientific issues including nanotechnology, ICT, medicine, food safety, and global environment. Based upon the results of those 12 projects, we can summarize this program’s outcome and recommendations as follows.

1. Making the connection between Science and Technology and Everyday Life
   Given the rising complexity and uncertainty in science, technology and society, it is important to involve more concerned people, and link expert knowledge on science and technology with "common sense = knowledge in life" in local environments, to ensure our decisions are more effective and open.

2. Encouraging Experts to take a step forward
   There is a need for experts who are able to collaborate with a variety of people by finding solutions to complex and uncertain issues, not staying in their area of expertise but rather taking a small step forward while duly keeping the limitation of their discipline in mind.

3. Learning from Pilot Projects on Social Challenges
   It is necessary to carry out various pilot projects to address social challenges, in particular, we should constantly provide spaces for collaboration between these new experts who have taken a step forward and diverse stakeholders, as well as anyone concerned with practical issues in our society. We need to embark on social challenges, with a long-term perspective so that we can keep learning from our experiences, including possible failures.

4. Building up Trust through Continuous Response
   Especially following the 2011 Great East Japan Earthquake (earthquake, tsunami, and nuclear accident.), success of social challenges largely depends on how trust is created. Trust is never obtained solely from expert knowledge. Taking into account the complexity and uncertainty associated with social issues, continuous dialogue among a wide range of stakeholders and those people concerned is essential.
The Research Institute of Science and Technology for Society (RISTEX) started in 2001 as the “Social Technology System” and has been conducting research and development for over 15 years. Its homepage introduces, a number of R&D outcomes of projects, including the 9 projects introduced herein.※ Affiliations and positions are those that applied at the completion of the R&D project.

Past Major R&D results funded by RISTEX

The “Moving Hazard Map” and disaster prevention education resulted in “Miracle of Kamaishi.”

Principal Investigator: Toshitaka Katada, Professor, the Graduate School of Engineering, Gunma University
Director, Research Center for Disaster Prevention in the Extended Tokyo Metropolitan Area

We developed the “Moving Hazard Map”, which enables the checking on the map of the predicted damage range and degree of the tsunami in time sequence from its occurrence. For disaster prevention enlightenment activities, we addressed disaster prevention education activities in collaboration with municipalities. One of those municipalities was Kamaishi City. The Great East Japan Earthquake in 2011 inflicted great damage on Kamaishi City too; in the city’s 14 elementary and middle schools, where disaster drills had been held for 8 years, however, of about 3,000 people, 99.8% of the children survived. This is the event called “Miracle of Kamaishi”.

The “Disaster Victim’s Life Recovery Support System” aims at support without omissions of disaster victims of earthquake or flood/fire.

Principal Investigator: Haruo HAYASHI, Professor, Research Center for Disaster Reduction Systems, Disaster Prevention Research Institute, Kyoto University

This system, part of the development and implementation of which was borne by RISTEX, has a mechanism to enable the issuance of disaster victim certificates fairly and smoothly by correctly certifying the degree of building damage. Moreover, it aims at speedy support without omissions by, digitalizing the ledger, the city approaching the disaster victims to apply for life support. This system has already been introduced in 12 Tokyo Metropolitan special wards and elsewhere; in FY2016, it was utilized in 15 municipalities in Kumamoto Prefecture as well as after the Great Fire of Itoigawa.

Regarding the implementation activities, Ms. Keiko TAMURA (Professor, Crisis Management Room, Niigata University) replaced the former supervisor in April 2012.

The community resilience theory was corroborated through the support of collective relocation from the disaster-stricken area.

Principal Investigator: Mikiko ISHIKAWA
Professor, Human General Science and Engineering Section, Faculty of Science and Engineering, Chuo University

The Sendan Alluvial Plain including the Tamaura District of Iwanuma City, Miyagi Prefecture sustained great damage from the Great East Japan Earthquake. We corroborated to develop a method concerning the path of reconstruction or formulation of urban/local plans while supporting the collective relocation therefrom. Our addressing of the revitalization of the “Coastal Region to Protect Life” that proceeded, while carefully gathering each of the resident’s opinions, was broadcast in several instalments of the NHK Special program and produced a great sensation. Also, our “Suggestions” submitted to the Science Council of Japan went through profound discussion and were disclosed to greatly affect how the reconstruction should be.

Imbalance (center of gravity) is detected and warning provided to prevent trailer and big car rollover.

Principal Investigator: Yutaka WATANABE, Professor, Faculty of Marine Technology, Tokyo University of Marine Science and Technology

Trailer trucks transporting freight containers sometimes have rollover accidents at curves, even if they may be running at legal speeds, due to the center of gravity being high or to the load becoming one-sided. In this research, therefore, the mechanism of rollover was clarified by actually trying to make the trailer roll over. Applying (making an inverse function) the method of calculating a ship’s center of gravity, we completed a system to enable calculation of the rollover danger speed by just making a trailer run straight for only 30 seconds. Thereafter a voice alarm function was added to merge with the drive recorder and the GPS as well. The system is expected to become widely popular in society, both in Japan and overseas, as one which is indispensable for automatic driving of big cars.
**An early identification system for children who require development support was developed and was incorporated into the Maternal and Child Health Handbook.**

Principal Investigator: Yoko KAMIO, Director of Department of Child and Adolescent Mental Health, National Institute of Mental Health, National Center of Neurology and Psychiatry

In this research and development, we conducted a cohort study over a 5-year period in collaboration with a local government’s medical checkup of infants; we developed a system (M-CHAT) to identify/support at an early stage for children who require development support, and successfully put it on a business basis. Furthermore, we developed a learning tool for the health nurses and pediatricians in the area closest to the children who need support, and tried to disseminate it. In 2012, 1 item of M-CHAT was adopted in the 1-year-old child column of the Maternal and Child Health Handbook and, in 2014-2015, in the health guidance text for medical checkups of infants as well. Additionally, M-CHAT is utilized in a priority issue of the Secondary Plan (FY2015-2024) of “Healthy Parent and Child 21”, as well as an index of establishment of understanding of early development of sociability.

**A joystick system to enable even people with disabled limbs to drive a car**

Principal Investigator: Masayoshi WADA Associate Professor, Institute of Engineering, Graduate School, Tokyo University of Agriculture and Technology

We, together with the Nissan Motor Company, Ltd. (the present Mikuni Life & Auto), which has over 40 years of experience in the development and manufacture of automobile driving gear for people with disabilities, developed a joystick-type automobile driving system to enable even people with severe disabilities, who can hardly move their limbs forcefully, to drive a car. Our research and development won the FY2015 Culture, Sports, Science and Technology Minister-Commended Scientific Technology Prize. For the driver to acquire a driver’s license with the modified car, incidentally, we realized a support system model with the cooperation of driving schools and rehabilitation centers. We will continue our dissemination activities so that many people can utilize this system now and in the future.

**Construction of an “easy” and “pleasant” agricultural management style to suit each locality**

Principal Investigator: Shingo TERAOKA Professor, Cultural and Social Science School, Faculty of Letters, Nara Women’s University

We addressed research and development in Shimoichi-Chou, Nara Prefecture, where persimmon agriculture is thriving, for heightening the sustainability of mountainous regions by reviewing how agriculture should be to allow the elderly people to continue working “easily and pleasantly”. We gained outcomes from various viewpoints such as the “village inspection method” to sociologically clarify the problems in the locality, agricultural method for persimmon not to burden the body, development of electric farm equipment easy for the elderly people to use, body exercises to eliminate the physical problems peculiar to persimmon agriculture, etc. These activities won the 2014 2nd Platinum Award Excellence Award. Also, we were invited to Turkey, an agricultural power, and so on; thus our outcomes are gathering attention widely in Japan and overseas.

**For “ease of use”, elderly people/companies/researchers collaborate in the “Everybody Lab”.**

Principal Investigator: Etsuko HARADA Professor, Human-Related Psychological Area, University of Tsukuba

Under the theme “elderly people’s ‘ease of use’”, we started up the “Everybody’s Ease of Use Lab” as a place of dialogue between elderly people, companies, and researchers. Here elderly people participate in tests and discuss the things or services that companies have brought in through the coordinator. For the elderly people, it is a place of activities where they can make social contributions to thing-making or local networking while, for the companies and researchers, it is a place for deepening their discernment of “ease of use” through dialogue with the elderly people. The Everybody Lab activities are gathering attention abroad as well, e.g. winning the Gold Prize in the IAUD’s (International Association for Universal Design) 2014 Award, Social Design Sector.

**A system to watch over elderly people by “telephone” was developed and disseminated; to be featured in elementary school textbooks as well.**

Principal Investigator: Akiko OGAWA, Professor, Department of Social Welfare, Iwate Prefectural University

We developed and disseminated a system to enable an old person living alone to communicate when in trouble, etc. lightheartedly to the supporter by household telephone, as well as making a community which utilizes the system. The supporter can provide life support in shopping areas, etc. by gently watching over the elderly people in the area in collaboration with the social welfare council or the people in the area, and rush to an old person as alerted in an emergency. The system was introduced to (the then) Takizawa Village, Iwate Prefecture or otherwise utilized in temporary housing after the Great East Japan Earthquake as well. Scenes from these activities have been introduced in textbooks on society for the 5th grade of elementary school since FY2015.
Realize a Globally Sustainable Society through R&D in Tackling Global Environmental Changes (FY2014-)

The existing global environmental problems are universal issues today, and collaboration among nations is essential for their solution. New efforts will also be required, through collaborative engagements with various stakeholders such as those in the fields of science, industry, administration, and civil society.

The "Future Earth" initiative was proposed based on this recognition, at the RIO+20 conference in 2012, led by the International Council for Science (ICSU), and became fully operational in 2015. Having the same concept as the two existing activities: the integrated Global Environmental Change Programs (GEC) and the researches on Sustainable Development Goals (SDGs), Future Earth is a 10-year schemed, international global environment research program to counter the various risks arising from global environmental changes, aiming to build a sustainable society around the globe.

Future Earth clearly states the importance of a strong partnership between the natural sciences, and the humanities and social sciences; as well as the importance of Knowledge Co-Creation, or "Transdisciplinary researches", achieved through Co-Design, Co-Production, and Co-Delivery of researches that are based on collaborative engagements by direct or indirect stakeholders (e.g. international organizations, central and local governments of various countries, organizations dealing with research grant programs, international cooperation and development aid organizations, industries, civil society, and media etc.) for the research results.

The government shall promote initiatives for a societal implementation of research and development in environmental science and technology, by co-designing with the stakeholders. The government shall also move toward constructing the basis for scientific knowledge, technologies, human resources, systems and other required matters.

As part of the Future Earth initiative promotion activities, the Research Institute of Science and Technology for Society (RISTEX), a division in the Japan Science and Technology Agency (JST), has been carrying out the "Research and study on selection of globally prioritized themes for Japan to be engaged in and on R&D designs for such themes" and the "Transdisciplinary researches for problem solutions", since FY2014.

- Research and study on selection of globally prioritized themes for Japan to be engaged in and on R&D designs for such themes
  The project was working on developing methodologies which benefit the design of Transdisciplinary research for a sustainable global society. As one of the outcomes of the studies, this project made the brochure titled “Japan Strategic Research Agenda (JSRA) 2016” (above photo). It contains a series of globally prioritized topics and themes in which Japan may be able to take initiatives within Asia and the world, utilizing the strengths of Japan.
  Makoto TANIGUCHI [Deputy Director-Generals, Research Institute for Humanity and Nature (RIHN)] (FY2014-FY2016)

- Transdisciplinary researches for problem solutions
  Through FY2014 and FY2015, we have carried out Feasibility Studies (FS) for research and development to be promoted as Transdisciplinary researches (hereinafter, TD researches) in two stages, phase 1: designing the research agenda, and phase 2: trying out research plans. A full scale "Transdisciplinary Researches for problem solutions" has been in effect since FY2016.

SI-CAT (FY2015-2019)

SI-CAT develops reliable technologies for near-term climate change projections that apply to reviewing and formulating climate change countermeasures by local governments and assessing the effectiveness of the countermeasures against climate change impacts in Japan. It conducts the project to realize reliable social implementation through development, which unites seeds of technologies with the needs of local governments. It also supports to adopt municipal adaptation measures appropriate for regional characteristics, which are taken against extreme weather phenomena (extreme heat or torrential rains) that are on the increase due to climate change.

FY2016 - (photo at left)
A transdisciplinary research by networking solution-oriented interdisciplinary sciences of environment, disaster, health, governance and human cooperation
Tetsukazu YAHARA [Director, the Institute of Decision Science for a Sustainable Society, Kyushu University]

FY2017 - (photo at right)
Transdisciplinary Study of Natural Resource Management under Poverty Conditions Collaborating with Vulnerable Sectors
Tetsu SATO [Professor, Faculty of Collaborative Regional Innovation, Ehime University]
Cross-ministerial Strategic Innovation Promotion Program (SIP) is a national project for science, technology and innovation, spearheaded by the Council for Science, Technology and Innovation as it exercises its headquarters function to accomplish its role in leading science, technology and innovation beyond the framework of government ministries and traditional disciplines. SIP has identified 11 themes that will address the most important social problems facing Japan, as well as contribute to the resurgence of the Japanese economy. Each project is led by an experienced and talented program director who is responsible for end-to-end focused research and development, facilitating coordination among government, industry, and academic entities. These directors have been charged with guiding their project from basic research to practical application and commercialization, and ultimately to a clear exit strategy. SIP focuses on science, technology, and innovation, which drive our nation’s economic growth and vitality and which will dramatically change society.

RISTEX will be responsible for the program "Enhancement of Societal Resiliency against Natural Disasters". This program aims to develop technologies for real-time sharing of damage estimates and on-the-ground damage information, creating a comprehensive Cabinet Office disaster prevention system and seamless integration with other related systems for better communications between and among federal and local governments, businesses, and groups. This seamless communication platform should allow for better decision-making during times of disaster.

This program will also develop technologies for instantly sharing information with individuals and groups, supporting the ability for these to make their own informed decisions during disasters. In this way, this project hopes to strengthen resilience in the face of major events on both the individual and social levels.
Broad Addressing for Resolving Social Issues

We are conducting survey analysis of social issues and are creating a foundation for collaboration/cooperation for their solution.

The World Social Science Forum 2018 (WSSF) was held for the first time in the Asian region at the Fukuoka International Congress Center in Hakata Ward, Fukuoka City, Fukuoka Prefecture from September 25th to 28th, 2018. Under the theme of “Security and Equality for Sustainable Futures,” the forum was organized by International Science Council (ISC), Science Council of Japan, and Kyushu University, and co-organized by Japan Science and Technology Agency (JST).

On the first day, the opening ceremony was held in the presence of their Imperial Highnesses the Crown Prince and Crown Princess, and was attended by the Director-General of the Research Institute of Science and Technology for Society (RISTEX), Akira Morita. On the second day, there was a lively discussion in the plenary session by JST, titled “Securing Co-evolution of Human and Artificial Intelligence: Role of Social Science and Humanities for SDGs,” chaired by Professor Jiro Kokuryo (Research Director of RISTEX’s “Human-Information Technology Ecosystem” R&D Focus Area) from the Faculty of Policy Management at Keio University.

In parallel sessions, there were reports and discussions on the projects which JST implements and co-plans, such as RISTEX's “Designing a Sustainable Society through Intergenerational Co-creation” R&D Focus Area, the Belmont Forum, and the Future Earth Initiative.
Research Institute of Science and Technology for Society (RISTEX)

JST Tokyo Headquarters (Science Plaza)
5-3, Yonbancho, Chiyoda-ku, Tokyo 102-8666, Japan
Phone +81-3-5214-0130 (main switchboard)
Fax +81-3-5214-0140
URL: https://www.jst.go.jp/ristex/en/

Access
● Subway Ichigaya Station No.3 Exit: 10 minutes
● JR Ichigaya Station: 10 minutes
● Subway Kojimachi Station No.6 Exit: 5 minutes
● Subway Hanzomon Station No.5 Exit: 10 minutes

Contact us
● Research Institute of Science and Technology for Society: https://form.jst.go.jp/enquetes/ristex_contact

The latest information, such as holding of events, issuance of books, etc., is disclosed on the homepage.