

Moonshot Goal 9 call for proposals for additional PMs

PD's policy

PD : KUMAGAI Seiji (Professor, Institute for the Future of Human Society, Kyoto University)

In this open call, we are additionally recruiting Program Managers (PMs) to conduct research and development in areas that are currently lacking in our program portfolio, specifically "research on the mind in the context of social connections" and "research aimed at achieving a mentally healthy and dynamic society by increasing peace of mind and vitality from the perspective of groups and society."

1. Overview of This Research and Development Program Toward Achieving Moonshot Goals

In recent years, social issues stemming from the "mind" have become increasingly severe. From individuals to groups, comprehensively understanding each other's "minds," fostering compassionate communication, and being able to move in desired or necessary directions harmoniously are key to achieving a mentally healthy and dynamic society.

In Moonshot Goal 9, we aim to enhance "peace of mind and vitality" through science and technology. We will promote research and development aimed at creating technologies that realize "understanding the state and transitions of individual minds" as well as "mental support for communication among individuals and in groups, etc." For more details, please refer to the "PD's Supplement for the FY2021 PM application" provided at the end of this policy.

2. Portfolio and Its Ongoing Initiatives

(1) Portfolio

In this research and development program, we aim to develop technologies that support understanding and achieving the desired state of the mind for two targets: individuals and groups/society. We are pursuing highly challenging research and development based on cutting-edge "comprehensive knowledge" about the state and transitions of the mind*¹ across a broad spectrum. This includes projects in brain and neuroscience from the molecular level to individual mice and humans, as well as human

groups and societies. Furthermore, it also includes research and development that has the potential to significantly change the structure of society in the future, such as data management systems and new approaches to child-rearing, education and family systems.

Thus far, we have structured our portfolio around two types of research and development projects. "Core Research" progresses by backcasting from the envisioned society of 2050, drawing the overall scenario, while "Feasibility Study" explores bold and sharp ideas that are currently difficult to incorporate into a comprehensive framework. Each project collaborates and cooperates to advance research and development aimed at enhancing peace of mind and vitality. In fiscal year 2023, we conducted an additional open call for projects related to "suppressing negative aspects of the mind for children" and have been advancing research and development in this area.

*1: Understanding the state and transitions of the mind refers to measuring and comprehending the mind's condition through scientific methods, and altering that condition using methods grounded in scientific evidence.

(2) Current Initiatives

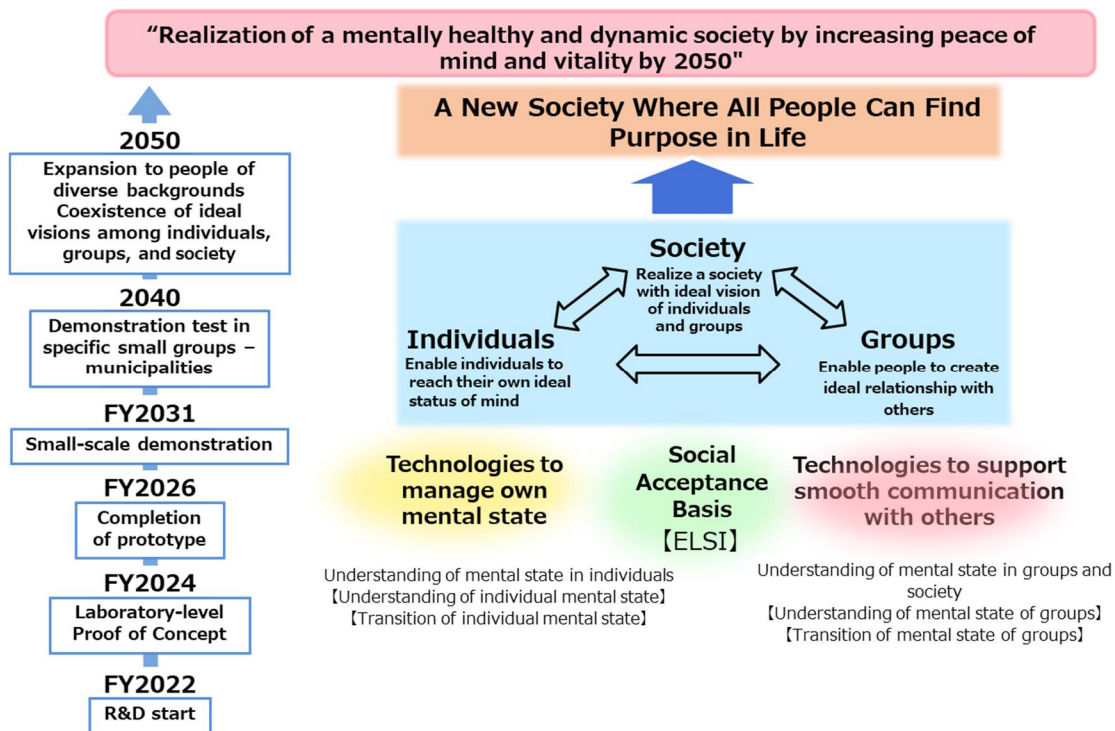
In this research and development program, 5 core research projects and 8 feasibility research projects have been promoted, each playing their respective roles as outlined in the previous section.

Specifically, through the development of technologies such as "techniques for managing one's own mind" and "technologies that support smooth communication with others," we are advancing the development of technologies aimed at enhancing peace of mind and vitality. On the other hand, to achieve the goals for 2050, we emphasize cross-cutting efforts on common issues among projects in addition to the PM's projects. Moreover, regarding new technologies related to the "mind" and their conditions of use, addressing ethical, legal, and social issues (ELSI) is essential. To conduct small-scale technology demonstration tests by FY2031, it is crucial not only to demonstrate the feasibility of the technology but also to carefully consider social issues, ELSI challenges, and the potential misuse of technology and social conditions. This would ensure the development of a foundation for social acceptance of new technologies. Our program is advancing with this in mind. In this goal, we have published a policy (provisional draft) on

research and development and social implementation with consideration for ELSI.

(Reference) Publication of the Provisional Draft of the ELSI Guidelines for Moonshot Goal 9

<https://www.jst.go.jp/moonshot/program/goal9/elsi/guideline.html>



(Fig.1) Scenario for achieving goal

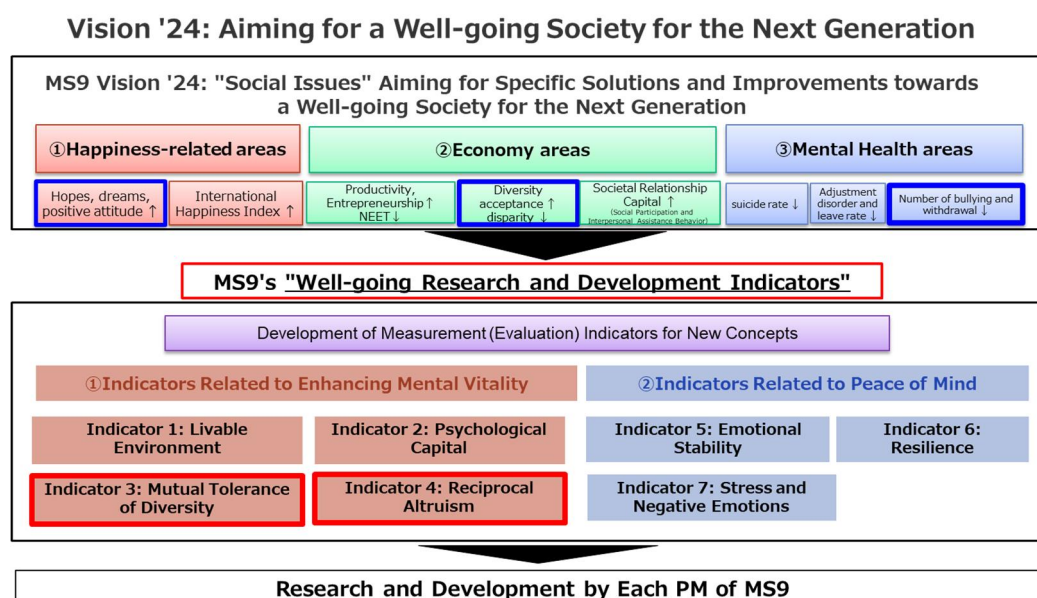
(3) Current Challenges Towards Achieving the Goal

In Moonshot Goal 9, we have been actively promoting research and development not only for adults but also for children. However, in developing technologies aimed at enhancing peace of mind and vitality, it is insufficient to focus solely on changes in the individual's mental state. We believe it is necessary to develop technologies and structures that bring about peace of mind or increased vitality through changing group and social systems. Therefore, in this open call, we aim to strengthen research and development projects related to "research on the mind in the context of social connections" and "research from the perspective of groups and society to enhance peace of mind and vitality, thereby realizing a mentally healthy and dynamic society." We endeavor to develop technologies and create systems that bring about

peace of mind or increased vitality even amidst rapid social changes.

Furthermore, we believe such research and development can be a challenging endeavor that develops in a mutually complementary manner when conducted in collaboration with already ongoing research and development projects.

To provide a more specific indication of the content of the research and development projects being recruited in this additional open call, we will explain the overall vision for Goal 9 (hereinafter referred to as "Vision '24") (Figure 2).



(Figure 2) Overview of Vision '24 and the Social Issues Aimed to Be Addressed by This Goal, as well as the Well-Going Research and Development Indicators

In Vision '24, we have clarified the social issues that this goal aims to address and established the "Well-going Research and Development Indicators" as a guideline for research and development aimed at solving these issues. In these "Well-going Research and Development Indicators," Indicators 1 through 4 are set as "Indicators for Enhancing Vitality of the Mind," and Indicators 5 through 7 are set as "Indicators for Peace of Mind." We are promoting research and development projects aimed at solving 8 issues within 3 social issue areas. In MS Goal 9, through the resolution of specific social issues, we aim to elucidate

the mechanisms of the mind and realize the envisioned society that MS Goal 9 aims to achieve.

This time, we particularly focus on social issues aimed at “improving hope, dreams, and positive attitudes,” “enhancing diversity acceptance and reducing disparities,” and “decreasing the number of bullying and social withdrawal cases” within the context of interaction with groups and society, among the 3 areas and 8 issues.

"Improving hope, dreams, and positive attitudes" is particularly sought after among the youth. According to the 62nd survey on the consciousness of 18-year-olds conducted by the Nippon Foundation (Minato-ku, Tokyo; Chairman, Yohei Sasakawa) in February 2024^{*2}, only 15% of Japanese youth responded that the future of their country would "get better," and only 60% had "dreams for their own future," both being the lowest among the six countries surveyed (Japan, the U.S., the U.K., China, South Korea, and India; 1,000 youths aged 17-19 from each country). As for "enhancing diversity acceptance and reducing disparities," the 2024 Inclusiveness Index survey^{*3} conducted by the Othering and Belonging Institute placed Japan between 50th and 100th out of 152 countries in terms of difficulties caused by race, gender, and disabilities. Regarding "decreasing the number of bullying and social withdrawal cases," reported bullying incidents have been increasing since 2014, reaching a peak of 615,000 cases in 2021, indicating a significant issue. Meanwhile, social withdrawal cases were estimated at 1,460,000 in 2021, showing an upward trend. The increase is particularly notable among those aged 40-64, making consultation support and creating places for a wide range of generations from youth to middle-aged and older adults an urgent priority.

*2: <https://www.nippon-foundation.or.jp/who/news/pr/2024/20240403-100595.html>

*3: <https://belonging.berkeley.edu/inclusiveness-index/index-results>

3. Research and Development Themes and Requirements for the Additional Open Call

(1) Research and Development Themes

Under the aforementioned circumstances, we aim to address the insufficiency of the program in research and development focused on changes in the state of mind of individuals within groups and society and research on

mutual tolerance and reciprocal altruism, which significantly affect individuals' connections and motivation within groups and society. We aim to develop related social systems and the core technologies that underpin them.

For this additional open call, we seek research and development aimed at enhancing peace of mind and vitality by solving social issues in the areas outlined in Vision '24 such as "improving hope, dreams, and positive attitudes," "enhancing diversity acceptance and reducing disparities," and "decreasing the number of bullying and social withdrawal cases" from the perspective of groups and society. In this process, we consider "Indicator 3: Mutual Tolerance of Diversity" and "Indicator 4: Reciprocal Altruism" to be important metrics related to solving these issues. Therefore, it is expected that research and development projects will include these indicators as guidelines.

However, proponents are expected to set the specific social issues they aim to address within the aforementioned areas.

* Examples of research and development themes (These are merely examples and are not exhaustive.)

- Proposals to Promote Hope, Dreams, and Positive Attitudes Among the Younger Generation
- Proposals to Solve Issues of Excessive Conformity, Defamation, and Intense Emotional Conflicts Among Users on Social Media
- Proposals to Prevent Bullying and Harassment in Schools, Workplaces, etc.
- Proposals Related to Support for Social Reintegration of Individuals Facing Social Withdrawal, Maladjustment in Schools or Workplaces
- Proposals Related to Intergenerational Exchange that Enhances Happiness for Both the Elderly and Children

(2) Overall Application Policy

Against the backdrop of a real society where various problems exist, please clarify how the proposed research and development project will transform the present situation to improve "hope, dreams, and positive attitudes," enhance "diversity acceptance and reduce disparities," or decrease "the number of bullying and social withdrawal cases." Also, elucidate the specific vision of the society that will be realized through these changes. On that basis, propose a scenario that demonstrates how it connects to Moonshot Goal 9, "Realization of a mentally healthy and dynamic society by increasing peace of mind and

vitality by 2050." When proposing the scenario, consider both the "backcasting" approach, which means working backwards from the society of 2050 to determine what needs to be done now, and the "forecasting" approach, which means predicting the future based on the current society and technology. The scenario and research and development plan should cover the period up to March 2027 from the PM adoption point, and, if the continuation of the program is approved, up to March 2032 (the 10th year of the R&D program for Goal 9).

The proposal must clearly explain how it ties to the achievement of the 2050 goals (the social vision the proponent aims for), the bottleneck challenges to be addressed from diverse and comprehensive perspectives, and the scientific bottleneck challenges to be tackled in this proposal and the approach to these bottlenecks should be challenging and innovative, and the scenario (considering ELSI, the current analysis, hypotheses, and evidence about how these social challenges will be resolved, and how the solutions will be implemented and adapted in society).

(3) Application Requirements

[1] Research and Development Content

We are seeking research and development projects related to one of the following: "Improvement of Hope, Dreams, and Positive Attitudes," "Enhancement of Diversity Acceptance and Reduction of Disparity," or "Reduction in the Number of Bullying and Social Withdrawal Cases." The research should include the following three elements in the project plan: (a) Understanding the State of Mind, (b) Transition of the State of Mind, and (c) Social Implementation.

Additionally, for the application, we seek proposals that correspond to the following points a to e.

- a. In light of Vision '24, we expect proposals that aim to solve social challenges through scientific considerations or approaches related to "tolerance" or "altruism," which human societies have historically built upon primarily as ethical or religious values.
- b. In research aimed at solving social challenges targeted by MS Goal 9, it

is essential to provide scientific evidence underpinning the "mind" as scientifically defined by the proponent, including definitions from social sciences. This is not limited to advanced scientific technologies such as brain and neuroscience, but also includes social sciences based on scientific evidence.

- c. During this research period, the aim is to formulate a Proof of Concept (PoC) plan for social implementation by FY2031. Proposals should include verification frameworks and cooperation relationships within specific groups and communities, such as local governments,
- d. As a Moonshot Research and Development Program, the proposed research must be challenging and based on bold ideas that are not merely extensions of past efforts, while also possessing feasibility backed by scientific hypotheses for solving the aforementioned social challenges.
- e. Proposals are limited to research focused on the human mind but do not preclude the inclusion of animal experiments. Moreover, research exclusively related to medical treatments for mental illnesses, etc., is not considered.

In terms of structure, in addition to a PM (Project Manager), please assign or anticipate personnel responsible for the implementation items related to (a) Understanding the State of Mind, (b) Transition of the State of Mind, and (c) Social Implementation, as well as those responsible for ELSI (Ethical, Legal, and Social Issues) responses. The personnel responsible for ELSI responses should be involved not only in addressing ELSI issues within the research and development project but also in participating in forums discussing and examining cross-goal ELSI issues. To create "integrated knowledge," it is strongly recommended to establish a research structure involving collaboration between researchers in the humanities and social sciences and researchers in the natural sciences (including engineering). If necessary, appoint sub-PMs or group leaders to create a functional project structure.

Regarding the entire goal, efforts are being made to develop a "scientific common indicator" that can be used across projects to measure increases in

peace of mind and vitality, and to reflect this in the direction of research and development. Although this common indicator is currently not disclosed, selected projects will participate in this activity.

During the process of advancing research and development, we expect the creation of outcomes that may contribute to various industries as a ripple effect. (However, the social implementation of this goal is not limited to industrial applications; it is also well anticipated that collaborations with organizations such as NPOs and local governments could occur.) Therefore, the project is also required to engage in proactive activities to gain the support of cooperating entities such as private companies and local governments.

[2] Research and Development Period

The period will be up to March 31, 2027, at the latest.

[3] Research and Development Costs (including indirect costs)

The total research and development costs, including indirect costs, will be capped at 200 million yen. Proposals with significantly lower amounts are also acceptable. During the project refinement phase of post-selection, substantial revisions to the research plan, including budget planning, may be requested at the discretion of the PD.

(4) Milestones in Research and Development

As MS Goal 9, we place an emphasis on linking R&D to technical demonstrations in real-world environments. Therefore, in addition to the milestones independently set by the proposed research and development projects, it is essential to contribute to achieving the FY2026 MS Goal9 overall milestones as indicated below.

- The verification of elemental technologies that enhance peace of mind and vitality will commence in limited real-world environments.

(Reference)

- Moonshot Goal 9 Website

<https://www.jst.go.jp/moonshot/program/goal9/index.html>

- Moonshot Goal 9 Vision '24 (from the Public Symposium in January 2024)

https://www.youtube.com/watch?v=8Rk-s-_Z59I

(Reference) FY 2021
[Moonshot Goal 9] PD's Supplements

PD: Seiji Kumagai (Associate Professor, Kokoro Research Center, Kyoto University)

1. Policy for Selection and Proposal content.

(1) Policy for Selection

Please choose and apply for one of the following two research categories. Your approach can be deductive or inductive, objective or subjective, qualitative or quantitative— we are looking for brave proposals that aim to break new ground, integrating different research fields and elements. Please select and apply under one of the following two research categories:

i. Core research

Under *core research*, we are seeking applications for comprehensive R&D that builds on an overall scenario of the world of 2050 using backcasting. If you are selected in this research category, please propose a scenario with a specific vision of society under which a mentally healthy and dynamic society is realized by increasing peace of mind and vitality by 2050.

Please propose both “forecasting” thought, which predicts the future from the present society and technology, and “backcasting” thought, which works backwards, using society in 2050 as the starting point, and thinks about what we should do now. Please propose a scenario for 2050 and scenarios/R&D for the third year, fifth year, and tenth year after your adoption as a PM. The content of your proposed scenarios should contain the path to achieving the 2050 goal (the kind of society you envision). State the bottlenecks to be resolved from a diverse and comprehensive point of view. Make your proposed action pioneering and revolutionary, and consider ethical, legal and social issues (ELSI), and include your current analysis and evidence for how your scenario fits or adapts society.

ii. Feasibility studies

We are also seeking applications for feasibility studies that are highly original yet difficult to pursue as comprehensive core research R&D at this stage. Reasons might include that the feasibility of the proposed technology itself will only be able to be judged in the course of the R&D, that the scope of R&D is to some extent refined, or that the team participating in the research is limited from the start of the project.

If you are applying under this category, please make an R&D proposal that sets clear objectives for three years only, based on the originality of the R&D and the extent of advances expected over existing or previous research (or is there nothing comparable?). Please explain the project objectives by stating the key components for achieving the Moonshot Goal as well as the key challenges and bottlenecks to the overall objectives.

(2) Proposal content

i. Thinking about the targets

Two targets are set for this Goal (1. Understanding of individual mental status and transitions and 2. Support for mental status in terms of interpersonal and intergroup communication). Both are likely to require interdisciplinary R&D projects that include the three elements of (a) understanding mechanisms of the mind, (b) mental status transitions and (c) application in society.

Element (a) understanding mechanisms of the mind, applies to either or both “To know the mental status of your groups/society” and “To know your own mental status”, while (b) mental status transitions applies to “To Know about mental status transitions and how to improve them”. For (c) application in society, it is unlikely that researching (a) and (b) alone will link to a vision of society in 2050. As such, backcasting from that vision of society, it is assumed that demonstration projects in the community will be undertaken alongside research of (a) and (b) and outcomes.

Furthermore, the intention is to actively pursue the creation of “comprehensive knowledge” from interdisciplinary efforts between the social sciences and natural sciences in the form of new value-discovery perspectives and theories, including knowledge of the elements that influence the mind (tradition, culture, art, etc.) and their relationship to the mind (“To know what if deeply connected to the mental status”), which should be a strength for Japan.

Add to which - and this also relates to (c) application in society - relevance and interaction with society are particularly important to emerging science and technology. This means that ELSI, collaboration in R&D not just with researchers but with stakeholders and RRI (Responsible Research and Innovation) are key elements to be included right from the conceptual stage of R&D projects.

As per the above, achieving the Goal and its targets will require a variety of R&D elements and related actions. Therefore we need collaboration between diverse personnel and research fields, exchange of personnel between projects and the positive engagement of external people and organizations.

ii. Proposal requirements

a. Common requirements of core research and feasibility studies

For your proposed R&D project, please state in the proposal how you view the mind as a multidimensional structure and are taking this into account, the elements you have chosen for your approach, and how you will expand your R&D area. Factors for consideration include depression, stress, anxiety, isolation or even suicide; violence, domestic violence and bullying; conflict, war and intolerance of diversity. Regarding the goal of *realizing a mentally healthy and dynamic society by increasing peace of mind and vitality*, please set the scene for your scenario by describing the specific kind of society (specifically what will change and how) that will be realized through your proposed R&D project.

In addition, please describe how you would deal with aspects such as collaborating with diverse colleagues and interdisciplinary research, including any solutions or principles you might apply.

Note that proposals for R&D related to treatment of mental illness or exclusively related to medicine are not the subject of this goal.

b. Core research

R&D projects toward this Goal are required to be core research with plans that include the elements of (a) understanding mechanisms of the mind, (b) mental status transitions and (c) application in society. Assuming a period of 5 years, there would be a R&D budget ceiling of around 700 million yen total in direct costs (approximately 300 million yen total for the first three years, then around 400 million yen in total for years four and five). However, it is not a problem if your proposal envisages a smaller spend. Note that proposals for core research may also be selected as a feasibility study at the discretion of the PD.

In terms of your team, in addition to the PM, tentatively propose staff for each implementation category for (a), (b), (c) and ELSI. Assume that the team member responsible for ELSI will not only have to consider challenges relating to ELSI on your R&D project but also participation in meetings to deliberate and discuss ELSI issues with other teams engaged in the Goal. However, this person does not need to be an expert in ethics, law or sociology. In addition, it is strongly recommended that you include in the team researchers from the social sciences or other disciplines outside of the natural sciences, in order to generate “comprehensive knowledge”. As

required, create a functional project structure by assigning sub-PM, group leader, etc.

As stated in the R&D concept, no objective indicators exist specifically for peace of mind or vitality yet and there is no way of expressing these in quantitative terms. Therefore, under the overall Goal, we hope that an exploration of the qualitative values for peace of mind and vitality will allow the establishment of common quantitative indicators for their use across the entire project, which can then be reflected in the direction of R&D in future. Please offer your thoughts on this concept.

c. Feasibility studies

R&D projects with potential to contribute to achieving the Goal are required to include one of the three elements of (a) understanding mechanisms of the mind, (b) mental status transitions and (c) application in society in their plans (although (c) cannot stand alone as the only element you include). Assuming a period of up to 3 years, there would be a ceiling of around 10-100 million yen total R&D spend in direct costs.

During the 3-year period, verification and evaluation will be conducted as to whether the objectives set initially will be met, whether there is the possibility for research outcomes to be integrated as elements of core research, and whether the team is capable of addressing elements (a), (b) and (c). Regarding feasibility studies that can be developed or accelerated into core research, they could lead to R&D in their fourth and fifth year once they have been designated for either integration into an existing core research R&D project or as new core research.

2. Policy for promoting R&D

(1) Review of the structure of the project for the overall Goal at the end of the third year

Even in the case of 5-year core research, please bear in mind that after year 3, the structure of the R&D projects may be overhauled dramatically in view of the optimal team for the overall Goal. Should your proposal be adopted, please understand that year 4 and 5 implementation plans may not necessarily reflect the content of your proposal. Note that the plan you submit in your application does not need to consider the possibility of future review.

Regarding this review of the structure, it is envisaged that it will reflect the progress on achieving the objectives set by each R&D project, the state of progress with mutual collaboration among projects (including feasibility studies) and the state of the

external environment among other factors toward optimizing the outcomes of the overall Goal. We expect that the PD will do this by assessing and conferring on these for each individual R&D project.

We are aware that securing the people to make breakthroughs is a key challenge, so when it comes to compensation of researchers employed on the project, our intention is to make provision for salaries in core research to the maximum extent possible, even in the event of project restructuring.

(2) Portfolio building

Building the portfolio for the overall Goal will require cooperation and competition among PMs, with consideration given to the relationships among multiple R&D projects. In order to achieve this, during the period of elaboration after the recruitment of PMs, consultations will be held with the PD based on the scenarios proposed for each project to clarify milestones toward objectives and make logical revisions to programs and budget plans, for example. Furthermore, in consultation with the PD, it will be possible to adopt separate research approaches depending on the progress of research. A bold revision of this portfolio is scheduled for the third year, as noted above.

(3) Links with other Moonshot Goals, external projects and organizations

Depending on the technology you are researching and developing, you may be required to cooperate and link with projects under other Moonshot Goals or other R&D projects. It is hoped that by engaging with others not just on R&D but on effective communications or with performers around Japan and worldwide, for example, unprecedented synergies might be found. It is envisaged that the overall Goal and the individual projects will require active pursuit of exchange with external people and groups and open-platform initiatives for a flow of personnel and ideas.

(4) Industry-academia-government collaboration and application in society

In the R&D process, it is hoped that research outcomes will be generated that can create spinoffs for various industries. For this to happen, outreach activities to gain the endorsement of private companies and local government agencies will be needed. However, application in society under this Goal is not limited to industrial applications: it is also envisaged that there may well need to be tie-ups with NPOs and local governments too, for example.

(Reference 2) FY2023 R&D project Application

PD's supplement (Moonshot Goal 9)

PD : KUMAGAI Seiji (Professor, Institute for the Future of Human Society, Kyoto University)

We plan to hold a call for proposals for additional PMs to “Aiming to relieve negative feelings and prevent related phenomena in children (e.g. depression, stress, anxiety, loneliness, abuse, suicide)”, which is lacking in the current program portfolio.

1. Moonshot Goals

In recent years, social issues related to our mental status have become increasingly severe. The key to creating a mentally healthy and dynamic society is to develop a comprehensive understanding of mental status, and kind interpersonal and intergroup communication that will lead us in the direction we wish.

The Moonshot Goal 9 program aims to realize increased peace of mind and vitality by creating technology to realize “understanding of individual mental status and transitions” and “mental health support in terms of interpersonal and intergroup communication” so as to increase peace of mind and vitality. For more information, please refer to the "PD's Supplements to the FY2021 PM application" at the end of this policy.

2. Direction of research and development

(1) Area and field to promote challenging R&D

This R&D program aims to develop technology that will support better knowledge of and healthier mental status, targeting individuals, groups and society. The program adopts R&D projects that center around the brain and neuroscience, from the molecular level to the population level (from mice to people), which integrate the humanities, for instance the arts and meditation, in order to conduct research and development that utilizes cutting-edge “comprehensive knowledge” related to the understanding of mental status and transitions. In addition, the program also includes R&D with the potential to significantly change the future

structure of society, such as those related to data management systems and new forms of child-rearing, education, and family systems, and consists of extremely challenging R&Ds that will span a wide range of areas from the molecular level to society.

The program portfolio consists of two types of R&D projects: “Core Research,” which is pursued based on an overall scenario developed by backcasting from a vision of society in 2050, and “Feasibility Study,” which boldly explore specific ideas, but for which it is difficult to depict an overall scenario at this stage. Each R&D project pursues its own R&D while also engaging in cooperation and collaboration with the other projects, aiming to achieve the program goal of realization of a mentally healthy and dynamic society.

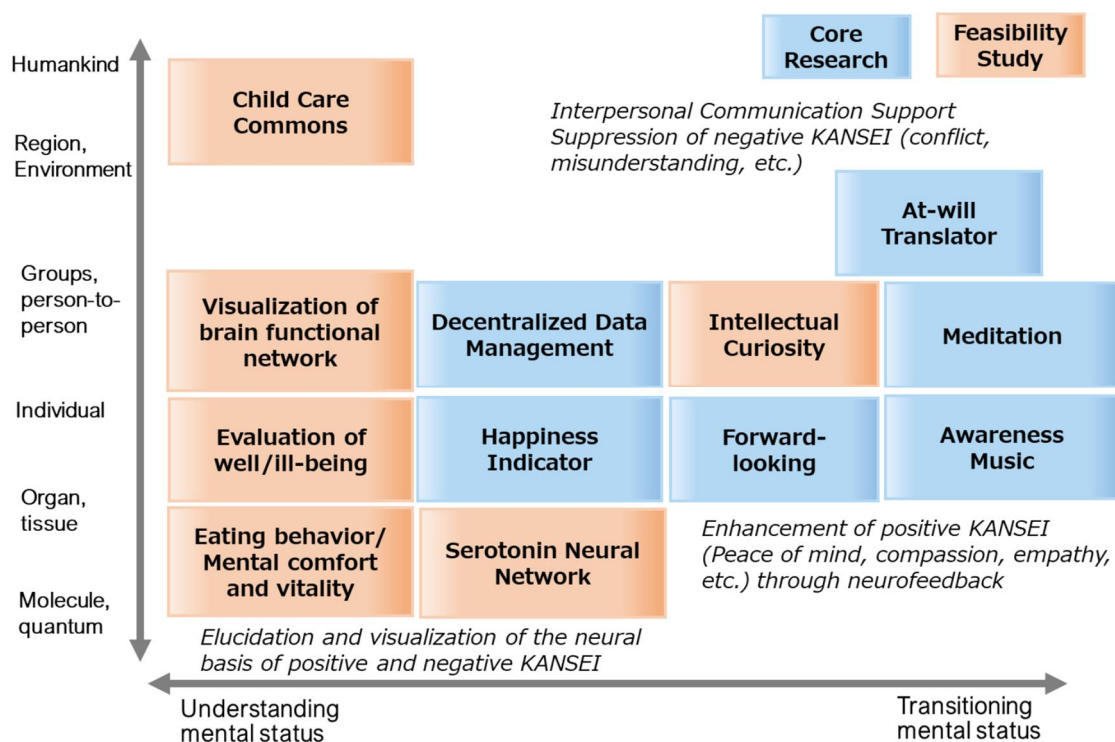


Fig. 1 Portfolio of this R&D program

(2) Current Initiatives

This R&D program consists of six Core Research projects and six Feasibility Studies which are conducting R&D while dividing roles as described on the previous page.

This MS Goal is pursuing R&Ds that will lead to happier mental status for individuals and groups through the development of “technologies for managing our own mental status” and “technologies that supports smooth

communication with others,” but in order to achieve the goals for 2050, it is not enough for each PM-led project to proceed individually and deliver results. Addressing the ethical, legal, and social issues (ELSI) associated with new technologies related to mental status and the conditions for its use is essential. Therefore, we are attempting to maximize the results of the program as a whole by providing a forum for the PD, sub-PD, advisors, and PMs to come together to discuss and clarify the vision of society that the program aims for as a whole and problems in terms of ELSI, along with further deepening cooperation and collaboration among PMs. To backcast from our vision for society in 2050 and to be able to conduct small-scale proof of concept tests of the technology by 2030, we believe it is crucial to not only demonstrate the feasibility of the technology, but to also carefully examine social issues and ELSI as well as the potential for misuse of the technology and social conditions, and to build the foundations for social acceptance so that the new technology will be widely accepted in society.

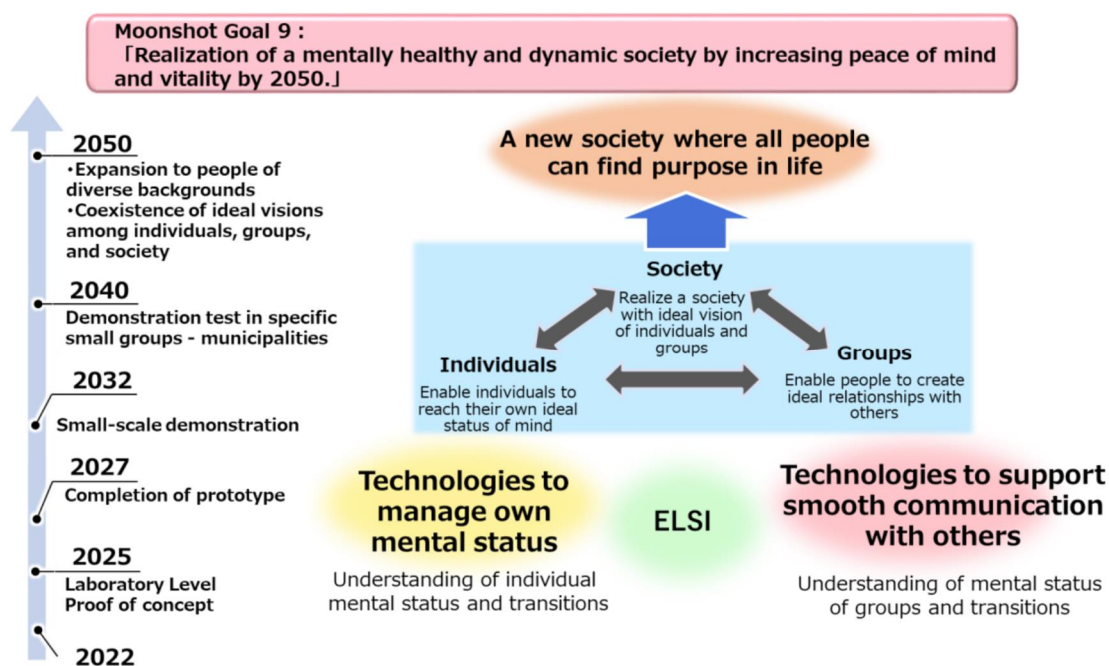


Fig. 2 Scenario for achieving goal

(3) Direction of research and development for realization of the Goals

In MS Goal 9, we aim to develop technologies to promote happiness along 2 axes: relieving negative emotional states and furthering positive emotional states. In doing so, we have actively pursued R&D related not only to adults

but also children. This call is to solicit proposals for PMs to implement R&D programs related to “Aiming to relieve negative feelings and prevent related phenomena in children (e.g. depression, stress, anxiety, loneliness, abuse, suicide).”

Children have less social experiences than adults, which makes it harder for them to tolerate stress, and they are exposed to environments that can lead to negative emotional states more often than adults. In addition, it is believed to be much more difficult for children, who struggle to verbalize the situations they are in, to accurately recognize their own mental status than it is for adults. Furthermore, traumatic experiences in childhood may have long-term psychological effects after people reach adulthood. Therefore, we believe that R&D which aims to relieve negative feelings in children is a challenging area that can be developed in a mutually complementary manner with R&D projects that are already under way.

3. R&D themes and their requirements in the application

(1) R&D themes

Aiming to relieve negative feelings and prevent related phenomena in children (e.g. depression, stress, anxiety, loneliness, abuse, suicide)

* Applications exclusively related to medical treatment, such as R&D related to treatments for mental illness, will not be included in this MS Goal. Moreover, social applications for R&D projects that focus exclusively on animal models will not be considered; social applications must be based on research involving human subjects (children). As this is a short-term project that will run until March 2025, we expect applications to be for R&D which is focused primarily on proof of concept.

(2) Overall application policy

When submitting the application for your R&D project, please clearly indicate what kind of novel R&D challenge you will be undertaking and how much of a leap you expect to take compared to existing technologies and past research (or whether there is anything comparable), and set specific goals to be achieved by March 2025. Please explain the project objectives by stating the key components for achieving the MS Goal as well as the key challenges and bottlenecks to the overall objectives. Please include a description in the application form of how you yourself perceive the multidimensional structure of a “mental status” and which

aspect you will approach from to broaden the scope of R&D. In addition, against the backdrop of actual society, in which individuals face problems including depression, stress, anxiety, loneliness, and suicide, and abuse, domestic violence, bullying, friction, conflict, and intolerance of diversity exist interpersonally and within groups, in relation to the goal of “Realization of a mentally healthy and dynamic society by increasing peace of mind and vitality,” please clearly define “what kind of children will be saved and how children’s lives will be changed by utilizing the research results of this R&D project,” presented in terms of the specific image of society you aim to realize through your R&D project, and conceptualize scenarios. In addition, please describe how you would deal with aspects such as collaborating with diverse colleagues and interdisciplinary research, including any solutions or principles you might apply.

(3) Application Requirements

[1] R&D project

R&D related to “Aiming to relieve negative feelings and prevent related phenomena in children (e.g. depression, stress, anxiety, loneliness, abuse, suicide)” which carries out a feasibility study that tackles at least one of the following themes: (a) elucidating the mechanisms of mental status, (b) transitions of mental status, or (c) social applications (excluding, however, R&D that focuses solely on “(c) social applications”). During R&D period, verification and evaluation will be conducted as to whether the objectives set initially will be met, whether there is the possibility for research outcomes to be integrated as elements of core research, and whether the team is capable of addressing elements (a), (b) and (c). Regarding feasibility studies that can be developed or accelerated into core research, they could lead to R&D in 2025FY and f2026FY once they have been designated for either integration into an existing core research R&D project or as new core research. Your project may be subject to substantial revisions during the elaboration carried out after adoption.

[2] The periods to implement R&D projects

In principle, until FY2024 (March 2025).

[3] Monetary amount for R&D projects (Direct cost)

The total amount should be between 30 and 50 million yen.

However, proposal for amounts significantly less than this are completely acceptable.

(4) R&D milestones

MS Goal 9 places emphasis on linking the project to real-world environments through technological demonstrations. Therefore, in addition to the milestone that is set independently for each proposed R&D project, the following common milestone defined by MS Goal 9 must be achieved by the end of the fiscal year 2024.

- The ability to objectively grasp a part of one's own mental status, limited to a laboratory-level environment.
- Verification of elemental technologies that enable transitions between mental status, in the general direction desired by the individual.

*Within the limits of laboratory-level conditions and a laboratory environment, elemental technologies will be verified that increase peace of mind and vitality, such as technologies that allows people to objectively grasp some part of their own mental status, to transition between mental status in the general direction desired by the individual (positive, negative, etc.), and to communicate smoothly with others.

(Reference)

- Moonshot Goal 9 Website

<https://www.jst.go.jp/moonshot/program/goal9/index.html>

- Moonshot Goal 9 Kickoff Symposium (September 12, 2022)

<https://www.jst.go.jp/moonshot/sympo/20220912/index.html>