Freedom of Mind and Value Co-Creation through Decentralized Data Management

### R&D item

# 1. Decentralized Management of Personal Data (PD)

# Progress until FY2023

## 1. Outline of the project

We will improve and expand PLR, which is a mechanism to manage PD by aggregating it in the person herself, and the apps incorporating it to enhance convenience and security, and develop personal AI (PAI) that intermediates various services in response to user interaction and prevents behavioral manipulation through dark patterns and fakery. In parallel, we will examine the legal and social validity and acceptability of decentralized management, improve PLR and PAI based on this, standardize the governance mechanism of PAI internationally, and socially implement PAI that protects mental freedom.

#### 2. Outcome so far

We improved PLR and apps embedding it, and conducted demonstration tests of services such as infant health checkups based on decentralized management, as well as small-scale actual operations of family caregiver support. We collaborated with other MS9 projects handling PD, and three projects were prepared to implement decentralized management.

However, we realized that decentralized management is brought about by PAI mediating various services through dialogue, as shown in the figure on the right. Since PAI can be implemented with existing technologies and will rapidly spread because while eliminating the digital divide, we must start research on the development and governance of PAI soon.

We have organized and selected research targets of the survey on the latest trends of domestic and foreign legal systems and theories about self-information control, which will serve as the theoretical basis for



social implementation of PAI. We asked domestic and foreign researchers to conduct surveys on three regions (Europe, North America, and East and Southeast Asia). We held workshops with them based on their reports, and summarized international trends in legal systems and theories on self-information control in a working paper.

We developed a hypothesis on decentralized PD management for manufacturing companies based on a preliminary quantitative survey in FY2022 and conducted interviews with key stakeholders of the services targeted by this project. In addition, Swedish researchers were invited to Japan to discuss the compatibility of PD protection and social acceptability. As a result, we developed a model in which uncertainty avoidance, long-term perspective, and manufacturing culture increase recognition of the need for services and reach more advanced service businesses, as manufacturing companies aim for higher-order services through PD utilization.

If PAI mediates services, service providers cannot

exploit users' cognitive biases to manipulate their behavior, thus protecting the freedom of mind. The premise for this is that PAI be properly governed. Since it is impossible to predict in advance the specific risks of the PAI, the PAI governance is an agile process of continuously evaluating the quality of the service while operating the PAI. Therefore, a system should be established in which the PD aggregated by the individual is collected and analyzed by service auditors to clarify the value of each service (including PAI's service) to the users. It is necessary to make this system an international standard to make it enforceable in some way.

Here begins our new MIRAI

MOONSHO

### 3. Future plans

In FY2024, we will confirm the technical feasibility of PAI and proceed with the design of the PAI and its governance mechanism. We plan to design in detail a PAI that mediates (selects and executes) appropriate administrative services in response to user interaction. In addition to examining the legal status and social acceptability of decentralized PD management, we will investigate relevant laws and regulations, international standards, and social acceptability of PAI for international standardization project is planned to launch in 2025.

#### Performers:

HASHIDA Koiti: The University of Tokyo YAMAMOTO Tatsuhiko: Keio University TOYA Keiko: Meiji University



Goal9 Realization of a mentally healthy and dynamic society by increasing peace of mind and vitality by 2050.

Freedom of Mind and Value Co-Creation through Decentralized Data Management

# R&D item

# 2. Decentralized Data Platform for Human Research

# Progress until FY2023

## 1. Outline of the project

We will develop a method for low-cost, longitudinal developmental research with low attrition rates utilizing a decentralized PDS. Specifically, we will establish a research platform for conducting developmental research while multiple independent research institutions share research participants.

We first establish a method of indirect collaboration among three or more research institutes based on decentralized data management, and show that it is possible to efficiently conduct research not only through collaboration among fixed research institutes, but also through dynamic changes in the collaboration structure as research progresses. In other words, a mechanism will be established whereby independent research institutes will operate data from their own perspectives based on decentralized management. This will not be a 5 mere collaboration between two institutions, but will show that research can be developed efficiently while dynamically increasing the number of collaborating institutions as research progresses.

Since the decentralized management of PD (Personal Data) is to manage and operate personal data by the person (his/her PAI) with his/her name in his/her hands, it is especially important to generate new PD useful to him/her and to operate it flexibly under the decentralized management, especially in the field where there are few databases that aggregate PD useful to him/her. It is important to generate new PDs that are useful to the individual and to operate them flexibly under

decentralized management. Therefore, we will demonstrate that flexible control, such as preventing the disclosure of research methods and ideas that belong to the researcher, is possible under decentralized management by aggregating new PD to the person in question and limiting its disclosure to specific collaborators such as the experiment conductor.

### 2. Outcome so far

- A separate experiment was conducted by Kyoto University on participants in an experiment conducted by Osaka University two years ago. The dropout rate was 56%. The results suggest that maintaining participant motivation and implementing measures such as online experiments are necessary to conduct developmental studies in multiple institutions using conventional methods.
- A study of procrastination and stress in adults (questionnaire survey) found that those who believe that "future stress will not be greater than present stress" are less likely to have serious procrastination habits. In this study, we introduce new indices, "temporal stress" and "temporal well-being," and show that having an optimistic future may contribute to the improvement of procrastination habits.



• We have prepared for the establishment of a public interest corporation "Baby Lab 5.0" aimed at facilitating developmental research by research institutions. (Scheduled to be established on June 3, 2024)

Here begins our new MIRAI

MOONSHO

# 3. Future plans

In FY2024, long-term and longitudinal developmental studies will be conducted using decentralized PDS. For long-term, longitudinal developmental research, it is essential to operate long-term and securely with data that are named to individuals (children). This is best accomplished using a decentralized PDS. In addition, no previous studies have found a way to safely utilize decentralized data in developmental and cognitive sciences, and this is considered to be a world-leading study. For example, the relationship between parents' daily child-rearing behavior and developmental changes in their children's social cognition is an important issue in cognitive science, and it is expected that new research methods will clarify this relationship.

### Performers:

HIRAKI Kazuo: The University of Tokyo MORIGUCHI Yusuke: Kyoto University KANAKOGI Yasuhiro: Osaka University

