

Yoshinori Yamakawa - Program Manager (PM)



2000 M.S., Graduate School of Science, Kyoto University
 2000 2005 NEC Corporation
 2008 Ph.D. from the Graduate School of Human and Environmental Studies, Kyoto University
 2008 Assistant Professor, GCOE, Graduate School of Informatics, Kyoto University
 2010 2014 Director, Neuro Innovation Unit, NTT Data Institute of Management Consulting, Inc.
 Part-time lecturer, Graduate School of Management, Kyoto University
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 Current Program Manager, IMPACT

Profile: He acquired multifarious perspectives and networks through neuroscience studies in the university, and through industrial experiences.

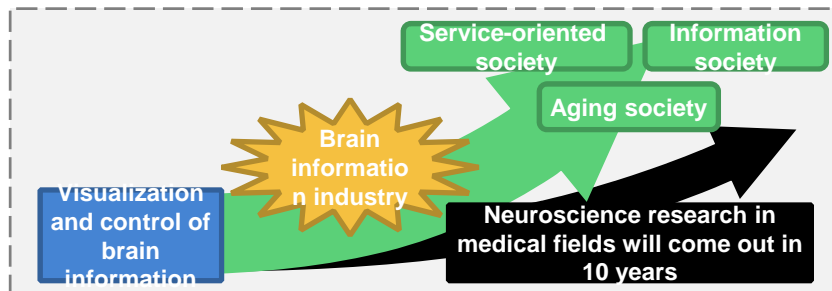
The Challenges and expected impacts

✓Overview and background

- Many social challenges are associated with neurological and psychological issues. For example, aging society accompanies declining brain functions, service-oriented economy requires professional expertise, and IT service which can communicate users' feelings to further develop information-oriented society.
- To tackle these challenges, it will be critical to introduce socially acceptable technologies including brain big data and brain robotics for advanced information use, having a portable brain machine interface (BMI) as a central technology which anyone is able to visualize and control his/her own brain information.

✓Expected impacts on industries and societies

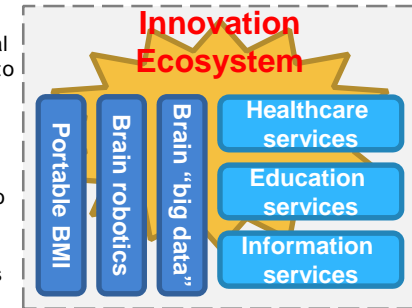
- While Europe and U.S. primarily focus on medical fields, this program will try its best to overcome the social challenges through commercializing the technologies developed within the program. As a result, Japan will be the first to create brain information industry, and actualize energetic life.



Disruptive Innovation

✓Keys to Breakthrough

- Brain information is widely used in medical and R&D field, however, there are barriers to overcome toward commercialization.
- Define model cases of commercialization, and create "innovation ecosystem" for interdisciplinary researchers and industries to cooperate which lead to breakthroughs.
- Reduce brain information acquisition costs to 1/10, and improve performance tenfold.



Scenario for Success and Targets

✓Methods of resolution leading to achievement (approach)

- Facilitate R&D in portable BMI, brain big data, and brain robotics to introduce model cases in the health (brain anti-aging services), education (inherit the spirits of "OMOTENASHI" and information (IT services enabling communication of images) fields.
- Create innovation ecosystems through establishment of brain information infrastructure, including common clouds, common fields, standardization and ethics) which enable timely hypothesis verifications.

Management Strategies

- Establish nine R&D groups of technologies and services.
- 30% of the total budget from each research group will be solicited through open competitive procedures to explore wide-ranging new research possibilities. In addition, by setting "stage gates" and reviewing every 1.5 years, 30% of budgets will be allocated depending on achievements.
- Establish multiple financing schemes to raise funds from external resources in order to accelerate R&D and commercializations.

✓Goals

- The ultimate goals are to introduce model cases and to create ecosystems.
- The technical goal is to reduce the cost to 1/10, and improve performance tenfold.
- The service goals are to launch brain venture companies, provide solutions through industry-academia collaborations, create forums, and achieve sustainable organizations.

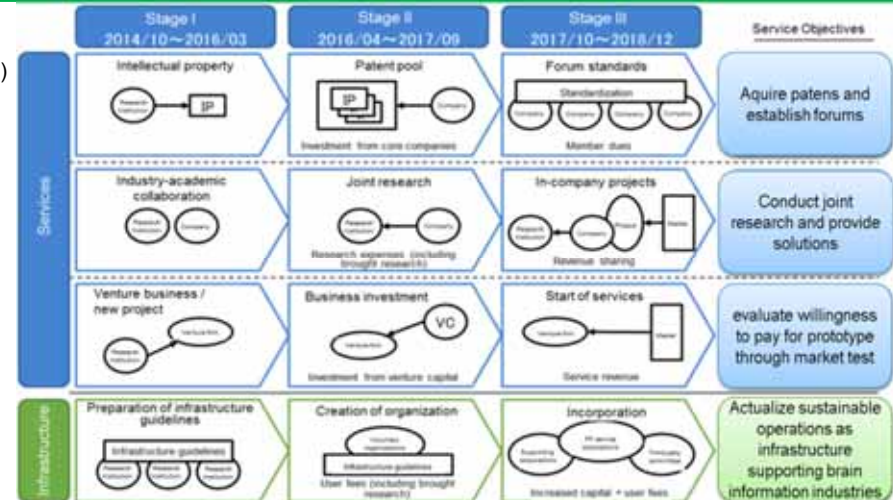
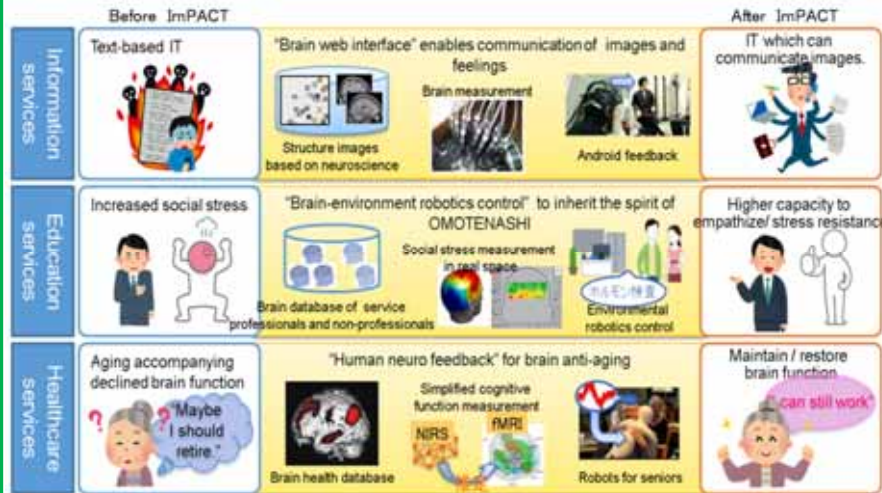
✓Risks

- Strong commitments are required from all participating entities to set and pursue high-risk and high-payoff goals.
- In addition to ethical issues, concerns may arise from stakeholders during establishment of ecosystems.

Actualize Energetic Life by Creating Brain Information Industries

PM's Visions for R&D Program Structure

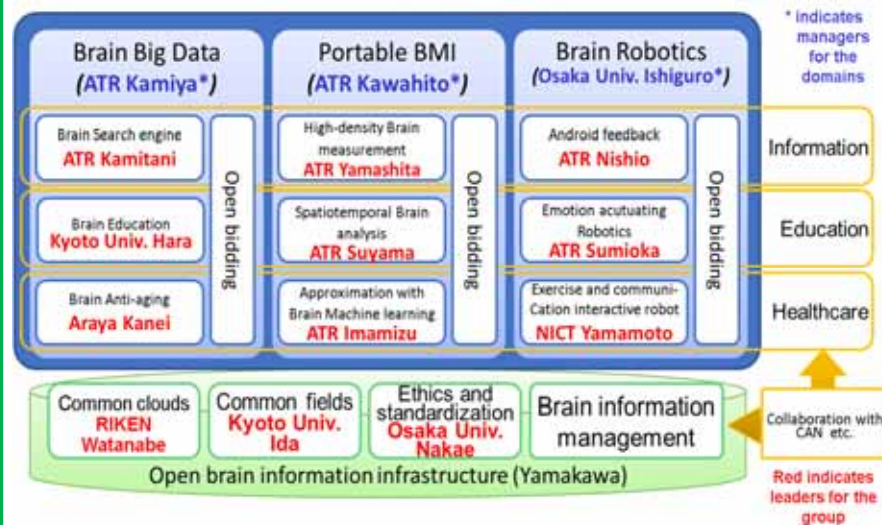
- Establish three model cases and conduct R&D that coordinates brain big data and brain robotics, having portable BMI as a central technology (see the figure below).
- Establish funding schemes in accordance with R&D progress (see the figure on the right)



Total R&D Program Cost
JPY3.0 billion
 (+ external budget of JPY 15M including cost share)

- Subjected to modifications.
- Budget may increase/decrease depending on the progress of R&D.
- Expenses for PM activities and support will be budgeted separately.

Organization Structure



✓ Key points for implementation

- Based on the left matrix, 9 R&D groups will be established as modules including technologies (portable BMI, brain big data, and brain robotics) and services (health, education, and information). A general technical officer will be appointed for each technical module.
- The research activities of brain information infrastructure include common clouds, common fields, standardization and ethical issues. In addition, conduct reviews of business models and liaise with external organizations as a brain information management.

✓ Selection process

- To introduce model cases, institutions already have R&D capabilities will be considered.
- During the selection process, in addition to research achievements, availability of research facilities for this program, willingness to start venture companies, and openness to collaborations are plus.
- Main research institutions that fulfill the above requirements will be assigned as shown in the left figure.
- 30% of the entire budget will be allocated through open competitive procedures. Expecting responses for solicitations from young researchers with innovative ideas, researchers from any fields, and private corporations.