

Summary of Opinions Given at the 1st Visionary Council

<Program Design>

- ✓ In the Apollo program, thorough planning was designed to promote the American national interests in the various categories, including, the establishment of American predominance in the aerospace industry and military capability, acquisition of technical know-how in large-scale projects, and strengthening system science, etc., in addition to the purpose of “going to the moon.” So, we need to sufficiently understand research modality, before carrying out projects. (Hiroaki Kitano)
- ✓ In the program design, we need to be fully aware of the difference between the Moonshot Research, exploratory basic research, and focus area research. (Hiroaki Kitano)
- ✓ The Moonshot Research is classified into 2 types, the grand challenge project which aims to set the socially important targets, and the project which does not necessarily connect to the social significance directly, such as RoboCup and AlphaGo. (Hiroaki Kitano)
- ✓ (The factors for success of the Moonshot Research is) 1) leadership and vision which can be easily understood by everybody, 2) the scientific theory which supports the feasibility of Moonshot Targets, 3) the platform where various types of technology are utilized, and 4) the proper management. (Hiroaki Kitano)
- ✓ The fundamentals of Moonshot Research are as follows:
 - 1) Setting targets is the most important. So, the targets should be easily understood by everybody with an impact. Program design which can lead to getting the initial results at an early stage (generation of spin-outs within 5 years) is required, though it will take time to achieve the final targets.
 - 2) Basically, the large-scale technology project with the following features:
 - *Expectation of achievement of targets by the concentration of resources
 - *By-products and repercussions of project are foreseeable, and many spin-outs are actually generated
 - *Technology has the potential to accelerate the related science
 - 3) Project management with the following features is extremely essential:
 - *Consistent management toward the goal, despite doubts and criticism surrounding the project
 - *Persuasive achievement to enable the project team to continuously execute the long-term project (namely, the solid portfolio) (Hiroaki Kitano)
- ✓ Firstly, we should clarify our goal. Then, we should consider how to choose the leader, concept creator, and innovation engineering specialist who can realize the goal. (Yoshimitsu Kobayashi, Chairperson)

- ✓ Since shrinking of domestic market can't be avoided, whether we can build the ecosystem where overseas researchers and entrepreneurs can join or not is the key factor for overseas expansion of the project. (Hiroaki Kitano)
- ✓ The process where JST and NEDO not only adopt the proposed project but also design the program through discussion together with us is required. (Hiroaki Kitano)
- ✓ The system where proposals and discussion can be conducted in English is essential to adopt interesting ideas from abroad. (Hiroaki Kitano, Taiyo Fujii)
- ✓ Flexibility which enables the agile adjustment to proceed projects toward the big goal is necessary. (Makiko Eda, Naohiro Nishiguchi)
- ✓ We need to establish the framework where various researchers including those in the humanities can join the project. (Makiko Eda)
- ✓ We should cooperate with the network of global research organizations regarding Sustainable Development Goals (SDGs), to proactively absorb their knowledge to aim for the achievement of targets. (Naohiro Nishiguchi)
- ✓ Proactive appointment of more female researchers is essential. (Taiyo Fujii)

<Setting Targets>

1. Contents and Number of Targets

- ✓ Contribution to solution to the worldwide challenges (environmental and population challenges) as well as strong growth in Japan is desirable. (Makiko Eda)
- ✓ If we set the ambitious targets to be realized, on the basis of deep understanding of SDGs which are common goals to the world, it is not unrealistic for us to get many people eager to participate in the project. (Naohiro Nishiguchi)
- ✓ Realization of sustainability of environment, society, and human beings is the truly disruptive innovation, and also the essence of Moonshot Targets. (Yoshimitsu Kobayashi, Chairperson)
- ✓ The theme which we have previously tried to but failed to get results, and the theme which is scientific but we can afford no further delay in working on, including the artificial photosynthesis, are still worth retrying. It might be a good idea to make an approach to various types of peripheral technology in the dynamic framework such as a carbon recycling society and circular economy, by clarifying targets to citizens. (Yoshimitsu Kobayashi, Chairperson)
- ✓ We should implement projects which require the comprehensive design which can't be realized by only single technology, such as, always keeping the number of people killed by natural disasters to zero at the time of natural disasters, and creation of the environment where 80% of the world population can receive adequate medical

treatment. (Naohiro Nishiguchi)

- ✓ The program should also include the project to aim for the future potential prosperity which is realized by the innovative technology brought by the Moonshot Targets, because if all projects are those which backcast social challenges, people may get less excited.
(Hiroaki Kitano, Taiyo Fujii)
- ✓ Generation of synergistic effect with the strategy in the field of AI technology, biotechnology, quantum technology, and safety and security which are the focused themes in Integrated Innovation Strategy Promotion Council is also important.
(Yoshimitsu Kobayashi, Chairperson)
- ✓ The massive budget should be also approved for research in the humanities (e.g. research on the negative impact of technology, etc.) to support such researchers.
(Taiyo Fujii, Hiroaki Kitano, Makiko Eda)
- ✓ The program should also include the targets which accept many citizens' uneasiness about how to survive "the 100-year life", and consequently lead to getting the young proactively eager to join the project. (Makiko Eda)

2. Approach and Criteria for Setting the Moonshot Targets

- ✓ The budget of 100 billion yen is needed to be spent as a trigger to let all people throughout Japan think about the Moonshot Targets which are dreamy in a sense, and move toward the targets in cooperation between the public and private sector. Therefore, setting targets should be able to show the possible and ambitious dream to citizens, including the private companies, researchers, and students. (Naohiro Nishiguchi)
- ✓ The enthralling targets which can get overseas researchers ambitious to participate in projects one after another are desirable. (Naohiro Nishiguchi, Hiroaki Kitano)
- ✓ The targets should be able to show the ambitious and story-like dream to citizens, especially the young, which consequently can get them enthralled and excited. Careful hearing from citizens, especially the young, is important for setting the targets. (Yoshimitsu Kobayashi, Chairperson)
- ✓ The targets should be imaginable enough for most of citizens to visualize the image of the future where the targets are realized (the image of goal) in their mind. (Naohiro Nishiguchi, Hiroaki Kitano)

- ✓ We should implement projects which require the comprehensive design which can't be realized by only single technology. (Naohiro Nishiguchi)
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- ✓ Generation of synergistic effect with the strategy in the field of AI technology, biotechnology, quantum technology, and safety and security which are the focused themes in Integrated Innovation Strategy Promotion Council is also important. (Yoshimitsu Kobayashi, Chairperson)
- ✓ The program should also include the project to aim for the future potential prosperity which is realized by the innovative technology brought by the Moonshot Targets, because if all projects are those which backcast social challenges, people may get less excited. (Hiroaki Kitano)
- ✓ The overlapping with SIP (Cross-ministerial Strategic Innovation Promotion Program) and PRIZM (Public/Private R&D Investment Strategic Expansion Program) should be avoided. (Yoshimitsu Kobayashi, Chairperson)