

Advisory Opinion

Promoting industrialization-oriented type (value acquisition type) R&D in the ICT field



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Science Council of Japan

**Committee on Electrical and Electronic Engineering
Subcommittee on Communications and Electronic
Devices**

This Advisory Opinion is issued in accordance with the outcome of the deliberations of the Subcommittee on Communications and Electronic Devices of the Committee on Electrical and Electronic Engineering, Science Council of Japan.

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Executive Summary

1 Background

It's been a long time since we heard the saying, "We win with technology, but we lose with business." Since the 6th Science, Technology and Innovation Basic Plan raised the flag of promoting problem-solving through social implementation of science and technology, many research and development (R&D) projects have been formed with a focus on social implementation. The actual situation is, however, that a significant number of these projects have halted after only conducting Proof of Concept (PoC) activities. Many projects end with just a simple demonstration or surveys of a small number of users.

A large portion of R&D projects have still been driven by technology. In order to acquire new value through technology and open up a new society, we believe that it is necessary to redefine the approach to funding from government and related organizations. With this belief, we hereby issue this advisory opinion.

2 Current Situations and Issues

Information and communication technology (ICT) possesses the power to fundamentally reshape various industries such as the environment, urban development, agriculture, resources, distribution, civil engineering, medical care, and education. It has the potential to bring about significant changes not only in industrial, but also economic and social structures. Enhancing the productivity of these industries and acquiring new societal value through the utilization of ICT will contribute to the overall strengthening of our national power. The robustness of our nation's on-site capabilities along with the broad foundation of our diverse industrial sectors are key assets.

In addition, there is a growing trend towards dismantling traditional industry ecosystems through initiatives like openness and software-oriented approaches. Furthermore, there is an increasing expectation towards our nation from the perspective of securing economic security and supply chain integrity, which further propels the momentum behind our nation's ICT industry sectors.

However, while the direction of promoting problem-solving through social implementation is appropriate, many R&D projects have ended up focusing solely on conducting PoC. It goes without saying that PoC is a passing point, and the steps following PoC are crucial for successful social implementation. Among R&D projects funded by the government and related organizations, there are unfortunately only a few innovative R&D projects that lead to the acquisition of value, even in projects where industry is the main implementation body.

3 Advisory Opinion

Developing outstanding technology alone will not be enough to enrich society or companies richer. It is essential to acquire value in the form of economic worth (such as

added values and profits) and receive compensation. Both the former, "value creation," and the latter, "value acquisition," must be present for innovation to be realized.

In this advisory opinion, the latter type of R&D that leads to value acquisition is referred to as industrialization-oriented type (value acquisition type) R&D.

What is crucial in industrialization-oriented type (value acquisition type) R&D is not the technology being newly developed, but the value that can be newly provided. We should promote industrialization-oriented type R&D that acquires values after thoroughly digging into customer value and combining it with technology, and acquires value.

(1) Fundamental reform of fund allocation

The conventional approach of funding primary centered around researchers and engineers will not work sufficiently for promoting industrialization-oriented type R&D. Conventional fund allocation is based on the premise that developing good technology will naturally lead to the creation of a business. Industrialization-oriented type R&D requires new funding allocation with a view to business development.

Business development can be broken down into phases: concept design, strategy formulation, decision making, and execution. Even in R&D, it is imperative to allocate sufficient funds to the upstream phases to increase the probability of success. Instead of the conventional focus on funding only in the execution phase, it is necessary to allocate funds focused on inclusive and symbiotic value acquisition teams in the upstream phase.

(2) Promotion of industrialization-oriented type R&D by an inclusive and symbiotic value-acquisition teams

The promotion of industrialization-oriented type R&D should be carried out by an inclusive and symbiotic value acquisition team, which is completely different from the technology demonstration teams often seen in conventional R&D. In addition to R&D personnel, the inclusive symbiotic value acquisition team includes business development personnel, marketing personnel, intellectual property / standardization personnel, public relations personnel, finance personnel, etc.

As the word "inclusion" means "recognizing each other's individuality and characteristics and working together", we use the term "inclusive symbiotic" because we work together equally as a team while respecting each other with diverse backgrounds.

Until now, government-supported R&D projects have been carried out mainly by R&D personnel. When aiming to acquire new value in industrialization-oriented type R&D projects, it is necessary to consciously appoint personnel with diverse backgrounds and ensure task-based diversity.

(3) Establishment of evaluation criteria for industrialization-oriented type R&D

Research funding agencies that conduct research evaluations need to evaluate

research based on value when evaluating industrialization-oriented type R&D. The evaluation should consider whether the research delves deep into the identified pain points (explicit concerns or dissatisfactions) and gain points (latent desires) of the customers, regarding whether appropriate research objectives have been set and if activities are geared towards acquiring value. Further, the evaluation should ascertain whether resource allocation is being directed not only downstream but also upstream.

(4) Specific measures for achieving the above-mentioned

- Formation of industrialization-oriented type R&D projects: Formation of industrialization-oriented type R&D projects that emphasize the acquisition of "value" rather than the development of "technology". Recognizing that the act of acquiring value itself constitutes significant research, we do not intentionally seek to create new technologies in public solicitations or evaluation.
- Introduction of an R&D Accelerator: Introducing an R&D accelerator, which is an organization that takes responsibility for R&D programs from inception to promotion, increases the probability of success of R&D projects, thereby promoting R&D. It is an organization that supports the pursuit of industrialization (value acquisition) through trial and error, and is a diverse and neutral organization that digs deeply into issues related to industrialization, by digging into the issues etc. for industrialization.
- Team composition with task-based diversity: R&D accelerators and R&D project teams will be driven by an inclusive and symbiotic value-acquisition team that connects research to business. It is imperative to allocate funds not only to R&D personnel but also to the personnel necessary for pursuing industrialization, ensuring task-based diversity.
- Evaluation: The evaluation of industrialization-oriented type R&D projects should prioritize emphasis based on axes of what new value has been acquired, rather than focusing solely on technical novelty. However, it may not be possible to clearly define the acquired value in advance. While it is important to have some assumptions, it is crucial to continue delving into customer pain points and gain points while engaging with customers. As R&D progresses, it is essential to gain a deeper understanding of the market, grasp changes in market and customer needs, and acknowledge the need for bold strategic shifts when necessary. In pursuit of customer development, it is advisable to introduce a methodology known as "lean," which involves continuously re-evaluating and making adjustments based on feedback from the market and customers. Additionally, the process of continuous review itself should also be properly assessed.