

# Cultivate Technical Needs and Develop to a Story.

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### **Respond to "storm of new technologies" with "storm of technical needs."**

In the circumstances where new technologies are successively produced from the fields other than the conventional fields of housing and building as social capital, utilization of such technologies is expected to produce great fruits and even lead to innovation. Some words used in this 2018 NILIM Report, such as AI, CNN (a method of deep learning), and AR (Augmented Reality), were not found in the 2015 NILIM Report, which is only 3 years ago. Not only such technologies but new technologies that may be utilized have been increasingly appearing in the recent years, including robot, IoT, drone, ICT, big data / deep data construction, and block chain. It is one of our essential roles to respond to such situation with "storm of technical needs" and build a basis for developing such technologies to practical ones that contribute to field improvement.

### **Importance of cultivating needs technically**

Technical needs rarely exist in a specific form easily recognizable by anyone. They would not be obtained either even if you simply ask others. "Subject title + α" may not directly lead to technical needs even if it is subdivided. Strenuous work is required for cultivation of needs, i.e., it is required to "understand multilaterally the actual status of sites and technical contents accumulated for target projects and cultivate needs for new technologies by prospecting future development of projects and grasping the key points of new technologies." As the content of new technology becomes more abundant, cultivation will become more interesting and sometimes a big task.

### **Concreteness and reliability first required for cultivation**

It is difficult to generalize points of attention in cultivation of technical needs but "concreteness" and "reliability" should not be neglected. Technical study on cultivation of needs would not be practical or realistic unless contents of needs are as concrete as possible, not general or abstract, (i.e., understandable by engineers of other fields), including, first of all, setting of utilization phases, then main functions / performance, restrictions / environmental conditions, cost, and maintenance labor. For this reason, it may be necessary that those having needs approach to such new technologies. Another point "reliability" reflects the basic characteristic as social infrastructure. Some technologies for social infrastructure require great responsibility of ensuring the performance of certain functions for each unit under the conditions where "replacement" is not easy and approach for "on-site testing" of the functions when design external force is applied cannot be taken. In such a case, not only presentation of "new things possible" but sufficient information on reliability is required for new technology. There is an essential gap between demonstration of a breakthrough under organized certain conditions and reliability confirmation of performance demonstration under the conditions encountered on the site, and the work to fill up the gap would be important.

### **Significance of making a "play" in technical needs**

Some cases simply end up with one-way flow where a new technology that meets the needs presented is proposed and smoothly implemented. In many cases, however, "two-way flow" is required between needs and new technology presentation. The latter case

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would rather give rise to the possibility of innovation. Innovation has a characteristic of causing a drastic change to the technology system itself. It sometimes happens that contact of technical needs presented on the extension of existing technology system with a responsive new technology will encourage realignment of needs and end up with general / overall solution of the issue. In order to secure the opportunity of such an emergent reaction of needs and seeds, it is also an important point of attention to include some flexibility or a "play" in presentation of needs. This will also lead to respect for the viewpoint of fostering, rather than hurrying to select the bud of technology utilization.

#### **Interface of needs and new technology is the key.**

In utilization of new technology, as stated, the key point is two-way process after cultivation of technology needs and interface to that effect plays an important role.

However, such interface is very difficult to create. Thus, processes leading to implementation through two-way flow starting with matching of needs and new technology are typified including bottlenecks and issues. In this work, the whole picture of patterns is depicted by checking each representative example of new technology implementation without regard to types of infrastructure, etc. This will make clear that importance of interface varies according to patterns. Thus, a frame consisting of various interface patterns is created, in which implementation is made, and results are fed back for update of the frame itself. This includes not only the aforementioned method of co-creation but method of filling up the gap between needs and seeds, method of technology evaluation, etc. as basic process. Various schemes for approaching without limitation to technical aspect would also be included in pattern organization.

#### **Development to technical needs presentation with a story**

Interface needs energy for operating it. Of some important energy sources, "needs presentation with the vision of technology development" is introduced herein.

Ability to cultivate technical needs concretely means nothing but having a clear image of how to utilize new technology for solution of issues or achievement of targets. It will not end up with individual presentation of needs but lead to "presentation of a concrete story" that (dramatically) improves the site of practice. Then, it is specified concretely and systematically what fruits are produced from technology utilization. As study proceeds, a ground for "self-development of needs," i.e., needs required next are identified one after another, is formed.

A story is the most effective when it makes those who know well the situation of the site concerning the new technology eager to realize it when they recall a concrete target. Further, story presentation also activates the brain of those who offer new technology.

#### **Standard for the roles of NILIM**

New technology utilization is one of the most important matters in the MLIT's technology policy and has been implemented in various forms and the intensity is increasing steadily. NILIM will participate in projects in cooperation with the MLIT, Regional Development Bureaus, etc. and further play its roles. In this regard, blessed conditions unique to NILIM should be utilized to the utmost.

NILIM is a player of R&D having a deep connection with development of individual technologies and application thereof to sites and foresees application of technologies to practice on the whole through preparation of drafts for technical standards, etc. and continues to consider next development with responsibility for technologies. NILIM is accumulating experiences in technical support by making difficult judgments in project sites. Comprehensive technical capabilities thus accumulated can and should contribute to the core part of technical needs presentation and development to a story as stated above.

NILIM continues to take leadership and make efforts so that sincere activities of many fields to improve the national land with the power of technology may be more effective.