

President's Message: Open Innovation



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1. Introduction

The significance of open innovation and its importance are pointed out and discussed throughout the world these years. The concept of open innovation when its necessity was first stressed in the U.S. was that companies could not possibly cope with the competitions only with their original in-house technologies, but should best utilize external intellectual properties and technologies, such as of other companies or universities. Therefore, while serving in the industry I understood that open innovation is a concept for the management of R&D and technological strategies of the private sector.

However, once I moved as president to a public research institute, AIST, whose mission is to conduct research to respond to the social needs, open innovation began to appear as “the very concept to be applied to AIST.” It is because our research results acquire their intended meanings only when companies in our society put them into

actual use.

Also, for Japan, a small country with scarce resources, which had been trying to catch up with the Western countries and arrived at the leading edge of the world only these decades, it is quite evident that continuous innovations are essential. I think open innovation as means of continuous innovations has a special meaning for Japan.

2. Why Open Innovation?

Anyone would agree that the various innovations applied in the modernization process of Japan were introduced mostly from the then developed countries of Europe and America. It is the same with the technologies that supported Japan's modernization. Since the Meiji Era until the mid 1980's, our major and consistent national concern on technologies was how to catch up with Europe and America. Finally from the mid to late 1980's, Japan began to gain credible recognition at home and abroad

that it had caught up and joined in the world's leading group. Some even overestimated Japan's ability that there was nothing any more to learn from abroad, while at the same time Japanese industry had to experience harsh pressure through the tightened pro-patent policy and other measures of the U.S. As a member of a research institute of a company, I myself had to confront the Japan-U.S. semiconductor trade conflict, and keenly felt the severity in competing and surviving in the vanguard.

Soon after Japan reached the world's R&D forefront, China and Korea started to catch up with us. An example can be found in the transition of the number of patent applications of major countries surveyed by the Japanese Patent Agency. The number of applications of Japan which had been the top for more than 20 years was overtaken by the U.S. again in 2006. Japan's growth rate of the application numbers, in the last few years, has been far below those of China and Korea. Though the patents should be evaluated over the quality and not the quantity, this tendency is worrisome. More efforts than before might be required for Japan to maintain the leading status of the world.

In order to successively obtain achievements such as intellectual properties and products, solid results of basic and fundamental research are indispensable. However, the industry nowadays has pressing needs to focus on the business competition, and has less remaining power for research. Consequently, it is the universities and public research institutes, such as AIST, that could meet the extensive, compelling needs and expectation of the industry. Promotion of open innovation through substantial collaboration of industry, academia, and public sectors becomes increasingly significant.

3. AIST's Efforts for Open Innovation

Since the days of the former AIST, the Agency of Industrial Science and Technology, collaboration with universities and industry has been our great focus. The mission to maintain and enhance our industrial competence,

I believe, has become even more crucial. I introduce here some of the cases I keep my eyes on, selected according to my own criteria and interest.

1) Digital human: child accident prevention

The Digital Human Research Center, AIST, aims to create a safe ergonomic environment for children to play as freely as they like. Here, accident surveillance systems collect accident information, whereas accident prevention contents service is provided based on our invention of "Bodygraphic Information System." This initiative could be defined as a new model of open innovation, and AIST functions as the hub of a network of variety of people and organizations, such as hospitals, nurseries, kindergartens, elementary schools, municipalities, universities, housewives, and businesses. Along with the development of research, valuable data have been fully accumulated, which in total serve to upgrade the quality of research.

The concept of "Digital Human" was invented and advocated by AIST. It means digitalization of data on human body and behavior, which enables mathematical and statistical approaches. Besides the above cases, it offers totally new guidelines for designing in wide areas that covers a variety of social services and products related to human behavior. It is gaining worldwide attention as an innovative concept born in Japan.

2) Photovoltaics (PV): for low cost and longer life

Japan is believed to have been leading the photovoltaic research. However, countries in Europe and America, China, Taiwan, and others are focusing on it lately, which results in fierce competitions. AIST, therefore, recently established "Consortium on fabrication and characterization of solar cell modules with long life and high reliability" in collaboration with 31 companies, both large and small. It is to strengthen Japanese competitive power in the PV fields for a great breakthrough. Extensive studies that are not feasible by one single company will be possible through cooperation among companies, or companies and AIST, on major module components, such as encapsulants, back

sheet, interconnectors, and sealing materials. By acquiring improved reliability and a longer life of PV modules, drastic reduction of electricity cost would be possible.

In cooperation with the Photovoltaic Power Generation Technology Research Association (PVTEC), the research achievements of PV module components themselves as well as evaluation and testing methods will be proposed as standards that would help secure the competence of the participating companies.

3) Upgrading of nanotechnology competence

In collaboration with the National Institute for Materials Science (NIMS), the University of Tsukuba and the industry, AIST is going to reinforce nanotechnology R&D. There used to be state-of-the-art R&D projects on semi-conductor technologies on the initiative of the private sector in cooperation with AIST, by using the AIST Super Clean Room. We need to overtake the U.S. and the

EU countries in this field, in closer partnership with the industry, academia and public sectors. Nano-electronics, nano-MEMS (Micro-Electro-MechanicalSystems), carbon nanotubes, power-electronics, and safety evaluation of new materials would be the cores of researches. We aim to create technologies indispensable in realizing a low-carbon society, such as highly efficient power devices, though they may not be achieved all at one stroke. Thus, we are ready to persistently tackle the issues to improve our industrial competence and to address the global environmental issues.

Here, I would like to make my last remarks. AIST promotes *Full Research* that covers from the basic research through product realization research. In fact every AIST research unit has been very eager to collaborate with external organizations. We are proud to say that all of AIST functions as the hub of open innovation. If you are interested in the details, please visit our website at the URL below.

AIST website: http://www.aist.go.jp/index_en.html

