interview No.22

In Preparation for Scientific and Technical Regrowth in Japan

- Recommendation with a View to Industry, Academia, and Intellectual Property - （II）

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The level of Japan's basic studies reach one of the best in the world

Chair: Is it still possible for Japan to lead on a technical level?

Mr. Hosono: Japan, taken as a whole, is strong at basic studies, I think. For instance, Koreans are surprised to see Physical and Chemical Research Institutes when they come to Japan. There is also a large-size photon source (SPring-8) and a maximum intensity proton accelerator center (J-PARK) in Japan, but a country providing so much money for basic studies can be considered rare. However, this strength is not always utilized. For example, Korea focuses on a favorable field, while Japan faces in many directions, so that the strength is dispersed. So, I think it is natural that Samsung Electronics in Korea can lead in the field of display equipment. In other fields, however, Japan is farther advanced than Korea. The thicknesses of strata are different, and the levels of academic circles are quite different. Even compared with the U. S., Japan is not at all defeated.

Mr. Sawai: I feel that it is different between Japan and overseas countries whether those engaged in basic studies are conscious that they are useful to the world or not, in a specific way, irrespective of rewards.

Mr. Hosono: Particularly recently, there seem to be many who publish theses in scientific journals such as "Nature" and "Science" as a final goal of their studies. This must be one milestone in the field of materials. I think this is one of the main causes that there are scarcely seen cases, in the last twenty years or so, that academic breakthroughs have resulted in large-scale industrial applications.

Chair: Can Japan exert its strong points, depending on how it approaches the situation?

Mr. Hosono: I hope so. If, for example, students of the department of science take an interest even temporarily in applying one of the strongest fields in their universities to

technology... After all, strength in basic studies is the strength of those of the departments of science. If we can cooperate well with them even a little, Japan would display considerable ability.

Mr. Sawai: I agree. While preparing a patent specification for a material system in the company, an interesting incident occurred. A senior employee who specialized in physics asked me something like, "What is the meaning in physics of this? "While discussing with him, we were fast led toward the essence of an invention. From there, the invention could grow into a very strong patent with a scientific support.

Mr. Hosono: If you would like to utilize excellent people from the department of science in Japan, it should basically be through consulting. However, no advantage will be born, unless we try to understand each other. So, it is important to translate each other's language, but it takes considerable ability to do this, and few people can do so.

Chair: How about human resources in the fields of science and technology?

Mr. Miki: In many communities, women are working considerably hard in social/business fields. Women are providing a service and many other people are supporting.

Mr. Hosono: Women are the greatest human resources left in Japan. Before now, however, we Japanese have not tried so much to make use of women's abilities.

Mr. Miki: Even in forums or symposiums held in Japan, the number of female-participants is less than a few percent. It seems unusual, doesn't it?

Mr. Sawai: In that sense, Japan is an unusual country. In Southeast Asia, you can find many women acting in the field of intellectual properties.

Mr. Miki: That's true. For example, women are in many cases responsible for organizations engaged in technological transfers in Southeast Asia. In Japan, too, capable female workers are increasing, but there are only a few examples where a woman sits at the top. We must expand more and more places for women to act.

Cooperation of "Sciences" and "Liberal Arts" as a determining factor

Chair: What do you think we should do to enhance Japan's scientific and technological

strength?

Mr. Miki: I think we should definitely invest in basic studies. This is fundamental, I believe. At the same time, it is also important to clarify the purpose of advancing one's own research in relation to society and to share that information. Once an arrangement is made to convey to a researcher how useful his work is to the world, the situation will change for the better. It is desirable that people who can draw up an ideal result of their work will increase. Support from universities is also important for that.

A family motto of a long-lasting liquor store in Fukuoka says, "This is not a trade taken from ancestors, but a trade trusted by descendants." What matters is to pass to descendants what we have taken over from our ancestors, plus an added value. The same can be said with respect to science/technology. In research and development, it is important to disclose when the need arises, and positively receive overseas human resources. Human resources who undertake research and development in our country need not be only Japanese. Mentoring (cultivation to encourage autonomy) by the senior generation is also very important.

Mr. Hosono: I think that, basically, the role of the university is to undertake the basic studies and cultivation of human resources. There is also collaboration with industries and universities, but it is eventually based on a breakthrough from an academic aspect. In my opinion, it is best that universities persistently seek that breakthrough. However, it is considerably difficult to actually initiate it. It takes concentration and patience, so it is usually universities who carry it out. There, a bold breakthrough is to be aimed for. This is absolutely necessary. An attitude to praise admiral attempts is also important. There can be no research without failure. However, there are not so many admiral attempts. It may be likened to climbing a mountain from an apparently favorable starting point, but eventually it turns out to not be so favorable. I wish Japan would be such a country as to recommend and evaluate these sorts of admiral attempts. Without challenging ourselves, and with only several percent of improvement, we cannot lead, and nothing will remain in the future. In a project for young researchers which I supervise, I always say, "ignore the small fish, aim at the big fish". If you are particular about small things, your research outcome will be small. If you aim at big things, even if you fail to cover everything, you can achieve something larger than expected. This is a very important matter.

Another matter is to make use of an academic field such as science, at which Japan is strong. In such a case, it takes time and is almost impossible for respective fields of study to be integrated. So, I think there is no other way but to increase these connections. This is how to make an ideal team against problems that need solving, to collaborate through connections, and to recombine them according to our needs. However, Japan has no way of leading against Western countries in the field of science. In terms of physical strength, it is impossible to compete with developing countries such as China. If Japan has a chance of leading, it's in "advanced techno-science." I feel that a stance to intensively approach with "techno-science" in which science & technology are closely and promptly combined would be effective as positioning.

Mr. Sawai: My favorite word I was taught by a venture capitalist is the "Big-Picture." It means that, when you do something, it is important that first you draw an entire image of what you are going to perform. Recently, people often use the word "innovation," but what they talk about is fundamentally just the technical basis. As the technology exists for a society, nothing will be visualized without writing down whatever we think, even imagination or the like, concerning what sort of society will be brought about if a technological innovation comes true. From a social point of view, aid to research and development and tax cuts for an invention as an access to society are, of course, necessary, but it is also very important how to politically make a market as an outlet to society.
So, if we really want to start innovating, we should discuss more, utilizing knowledge from people in liberal-arts; what are the potential issues in the present society? What change in our lifestyle is socially significant? What are the required technical innovations needed for the purposes? And so on. If we consider such matters in a proper manner, there are still many regions to cultivate. As there should be an image of the intended society ahead of science and technology, it is necessary to reconsider its base, redesign various matters, and draw the "Big-Picture". It is an urgent need, I think, especially, in Japan which experienced the Great Eastern Earthquake in 2011 and the Fukushima nuclear accident.

In the process of realizing such a "Big-Picture," I hope that Japan will be able to draw up a set of world-class rules. It will be necessary in the future for Japan to survive global competition, not by competing hard in compliance with the rules made by Western countries, but by making rules before the rest of the world. To realize this, it is essential for people who majored in the science

and engineering fields and those who majored in liberal arts to collaborate more closely and create innovative ideas, involving not only natural science but also social science.