Let's Open the Door beyond Limits with Hope

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Abstract

The NTT Group is taking on the challenge of creating a Smart World that enriches the lives of all people around the world through its efforts in a variety of fields. By implementing the Innovative Optical and Wireless Network (IOWN), the group aims to solve social issues and create innovative services. We interviewed Katsuhiko Kawazoe, senior executive vice president of NTT, who coined the term "IOWN," about the development status of IOWN and his approach to his work as a top executive.

Keywords: IOWN, research and development, space datacenter

The target for implementing IOWN is set to be achieved by Expo 2025 Osaka, Kansai, Japan

—Congratulations on your new position. What changes have you seen since assuming your current position?

The change in my position from the head of the Research and Development Planning Department to my current position as senior executive vice president of NTT has changed the sense of time in which I perceive matters. For example, we must predict and create the future during the research process. If we do not proceed while constantly thinking about what lies ahead of current technology, by the time the research results are published, they may be obsolete. When I was head of the Research and Development Planning Department, my main focus was advancing research and development by looking at the results that would be achieved in the near future while considering the direction and importance of the research and technology in question from a medium- to long-term perspective.

On becoming senior executive vice president, I've become responsible for not only research but also technology in general as chief technology officer. My prime mission is to solve the social issues we are currently facing as quickly as possible by using our technologies. This mission also includes improving or developing technologies for securing communications as social infrastructure in times of disaster and other emergencies and technologies for providing high-quality and stable services. Of course, I'm also in charge of research and development, so I'll promote such activities from a medium- to long-term perspective. Another important role of mine is to smoothly introduce the results of advanced research and development into our business in a manner that contributes to society; in that sense, I believe the implementation of IOWN is a symbolic theme.

I also hold the positions of chief information officer (CIO) and chief digital officer (CDO), who must focus on digital transformation (DX). Akira Shimada, the new president and chief executive officer of NTT, has stated that he will "create better CX (customer experience) through better EX (employee experience)." DX is essential for this purpose, so I intend to actively promote DX in cooperation with other CIOs and CDOs of NTT Group companies.

—What initiatives should we pay attention to? First, let's talk about IOWN, the term you coined, which has entered its third year.

Since the announcement of the concept of IOWN in 2019, various social issues have been highlighted, such as the importance of achieving carbon neutrality, the recent shortage of semiconductors, and ensuring Japan's economic security against the backdrop of unstable global situations. In light of the need to respond quickly to these issues, we moved the target set for implementing IOWN forward five years from 2030 to 2025. This change was largely due to the influence of the IOWN Global Forum (IOWN GF) established in 2020. To tackle these social issues, we must collaborate with experts and global partners in a wide range of research and technical fields. IOWN GF, launched with the support of Intel and Sony Group, has grown to include more than 100 participating companies and organizations, including major technology companies such as Ericsson of Sweden and NVIDIA of the US. The number of companies participating in the forum is increasing annually, demonstrating that IOWN is attracting attention worldwide. Thanks to the progress of discussions at IOWN GF and research at NTT, we could move the IOWN implementation target forward. Consequently, we plan to present IOWN-related products to the world at Expo 2025 Osaka, Kansai, Japan, which will draw global attention.

Various innovations are possible with IOWN, and I'd like to talk about one of them, the Space Integrated Computing Network. In July 2022, in collaboration with SKY Perfect JSAT, we established Space Compass Corporation to construct the first *space datacenter* in human history in a manner that overcomes the current limitations on the use of space. As I mentioned in my interview in 2019, when I joined the company in 1987, my research theme was satellite communications, and NTT was developing and operating communication satellites even then. Later, due to the widespread use of terrestrial optical fibers and the enormous cost of developing communication satellites, NTT withdrew from the business. However, recent technological innovations have enabled high-speed communication by using higher frequencies. Because of the potential of these innovations, we can say that the possibility of achieving what we had previously abandoned has increased.

As exemplified by the recent disruption to social life caused by communication failures in Japan, building a solid infrastructure that can cope with uncertainties is NTT's social mission. Communication satellites are playing an increasingly important role in accomplishing that mission. Against this background, we plan to establish the first space datacenter to address this social mission.

The initiative for building the Space Integrated Computing Network consists of two projects: (i) a high-capacity communication and computing infrastructure in space and (ii) a communication infrastructure for beyond fifth- and sixth-generation mobile communication systems (beyond 5G/6G). The former project's aim is to provide a high-capacity communication and computing infrastructure in space, i.e. a space datacenter, by sequentially deploying geostationary orbit satellites equipped with advanced computing capabilities. NTT plans to demonstrate its high-capacity optical transmission technology in space at the aforementioned World Expo

and intends to expand this service worldwide.

The latter project's aim is to launch space radio access network businesses, such as image sensing through high-altitude platform stations installed in the stratosphere. By taking up the challenge of building new infrastructures, such as optical wireless communication networks in space and mobile networks in the stratosphere, we hope to contribute to developing the global space industry and creating a sustainable society.

NTT's strengths are its underlying technology and accumulated knowledge

—I'm fascinated by IOWN and other ambitious projects. They are being developed through the research and technological capabilities of NTT, correct?

I believe that one way to hone our foresight in research and development is to continue our research activities while thoroughly pursuing basic research. The current times, issues, and trends tend to drive people to focus on technologies and research results that can be used immediately; for example, GAFA (Google, Apple, Facebook, and Amazon) are heavily investing in artificial intelligence (AI) now. Some say that companies or researchers and developers with such a mindset are using the achievements of others to develop the technology underpinning AI.

NTT laboratories, however, are involved in basic research and fundamental technologies. The basic research on light that supports IOWN has accumulated over more than 60 years since the 1960s. NTT's strengths are its foundational technologies and accu-

mulated knowledge. We can continue our research by generating research funds from the profits from our businesses and can use these hard-earned profits to demonstrate the necessity and importance of basic research. Precisely because our researchers have been fulfilling their responsibility to demonstrate their ideas, we have been able to continue our research activities to this day.

Throughout my career at NTT, I have served as both a researcher and developer. Perhaps more than half of my work has been in business-oriented development. When I joined NTT, research and development were likened to the two wheels of a cart, emphasizing the importance of keeping both wheels running well. In other words, there were roles for people specializing in either research or development and for people responsible for both, turning both wheels, so to speak. I was positioned right in the middle of research and development—turning both wheels.

—It is reassuring that you know about both research and development. Do you have a specific vision for how research and development should be conducted?

The idea that I'm currently developing is to ask employees responsible for research and development to focus on either research or development instead of the two roles that I have played in the past. I understand that this is a difficult request. Research life has its ups and downs, and when things aren't going well, one may work on development, get an idea from it, then resume research to find a way to survive. By taking on both roles, one will be able to take on a certain amount of work in a stable manner and probably get

a sense that they are doing their job and serving a purpose. However, if one is asked to focus on research or development, they must work extremely hard because their escape route is cut off.

Doing what I suggest is tough, and not everyone will be able to overcome this challenge, but I want them to understand how much greatness awaits beyond that pain. As senior executive vice president, it is my job to create a challenging environment that fosters a willingness to work hard. I also strive to secure enough resources for research and development to ensure that our researchers, developers, and employees can enjoy their work and be happy.

Think of work and private life as a combination rather than as separate

—I understand that you are also active as the head of various organizations. How do you balance work and private life?

In addition to being president and chairperson of IOWN GF, I'm also president of the Institute of Electronics, Communications and Information Engineers and, in a different vein, president of the Japan Windsurfing Association.

I'm sometimes asked, "How do you manage your time when you are so busy?" I do not try to distinguish between work and private life; rather, I view my work and private life as a combination.

For example, let me talk about windsurfing. When it was decided that a major international sporting event would be held in Tokyo, Tsuneo Hasegawa, then president of the Japan Windsurfing Association, visited me and said, "Mr. Kawazoe, please make windsurfing a popular sport. Can't we do that by using NTT's technology and ideas?" In response, I said I wondered if it would be possible to use Kirari!, NTT's ultra-realistic viewing technology, to deliver a realistic sensation of watching a competition in a remote venue. We were very excited about the idea. I was told that Mr. Hasegawa said before his death, "I'd like to ask Mr. Kawazoe to be the next president." I decided to accept the offer because I used to windsurf in my student days. When I'm practicing windsurfing while remembering those days, ideas and applications for the next technology or service come to mind, and the conversations with the other windsurfers inspire me to apply the ideas that come to mind for my work.

I'm also involved with cooking, and to improve my cooking skills, I joined the All Japan Food Association. Chefs and cooks who met me at conferences and other events talk about archiving their cooking and food through the technology of NTT. They say, "The food we create is a once-in-a-lifetime work of art, and we want to preserve it." Their words express their wish to record the entire food-preparation process—from the filleting of a fish to preparing the dish—with the power of information and communication technology. My visions and ideas began to expand as I wondered what kind of technology I could use to help them actualize their passion or what IOWN could do for them. This situation illustrates exactly what I

mean by thinking of work and private life as a combination rather than separate, in a way that is fun and meaningful. Don't you think that everything is connected and that both work and play stimulate each other in various ways?

—*It is important to have a broad perspective and comprehensive view of matters. Finally, please say a few words to researchers and developers.*

To researchers, I'd like to see you hone your expertise in either research or development rather than both. Aim to be number one in your field of expertise and accomplish what no one else has done. With the spirit that you are the only one working on this research, you should aim to be the very best. Unlike researchers, developers are constrained by development costs and time and must consider what they can do within those constraints. You should challenge yourself while keeping a strong awareness of what you can do within those constraints of your goals and the conditions. Whether your focus is research or development, sometimes you may feel uneasy; nevertheless, at such times, it is essential to set a starting point based on yourself or to think of yourself as a source of inspiration. If you are a researcher, you'll take great pleasure in achieving results in the form of papers or academic awards and being respected by society; if you are a developer, you'll take great pleasure in seeing your developments implemented in society and in people's daily lives. I hope that you will approach your daily work with that joy in mind.

Although I won't say it's my motto, I always keep the phrase "stress-free" in mind and try not to stress myself too much. Speaking like this may make me seem emotionally detached, but that's not the case. On the contrary, if you force things while trying to break through a metaphoric brick wall, you will be left with feelings of pain and even more stress, just as hitting an actual wall with your hand hurts. Alternatively, when you take on a big challenge, rather than thinking of the process as forcing something to break through a wall, imagine a door. Then, open the door while imagining what could be on the other side. Let's open this door with hope, even if others say we are at our limits.

■ **Interviewee profile**
Katsuhiko Kawazoe joined NTT in 1987. He became vice president of the Research and Development Planning Department in 2008, head of NTT Service Evolution Laboratories in 2014, head of NTT Service Innovation Laboratory Group in 2016, and executive vice president, head of Research and Development Planning Department in 2020, and assumed his current position in June 2022. He has also served as director of NTT Research, Inc. since April 2019 and president and chairperson of the IOWN Global Forum since January 2020. He received a Ph.D. in engineering.