

# Toward the Realization of Smart Regional Societies, “To Be the Social ICT Pioneer”

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## Abstract

This article introduces case studies on the effort that NTT WEST Group is making as a social ICT (information and communication technology) pioneer to address the issues of local communities and strengthen the connections between people and society to promote smart regional societies. This article is based on a keynote speech given by Ichiro Uehara, senior executive vice president of NTT WEST, at the Tsukuba Forum 2020 ONLINE event held October 29–30, 2020.

*Keywords: Society 5.0, digital transformation, community revitalization*



## 1. What is a smart society?

To promote smart societies according to Japan’s “Society 5.0” initiative (Fig. 1), we need to focus more on a people-centered approach to achieving economic development and addressing social issues, rather than pursuing technology for its own sake. On the other hand, existing social systems have become outdated in terms of their sustainability and environmental considerations. Therefore, we should consider new social systems that focus on the happiness of each individual.

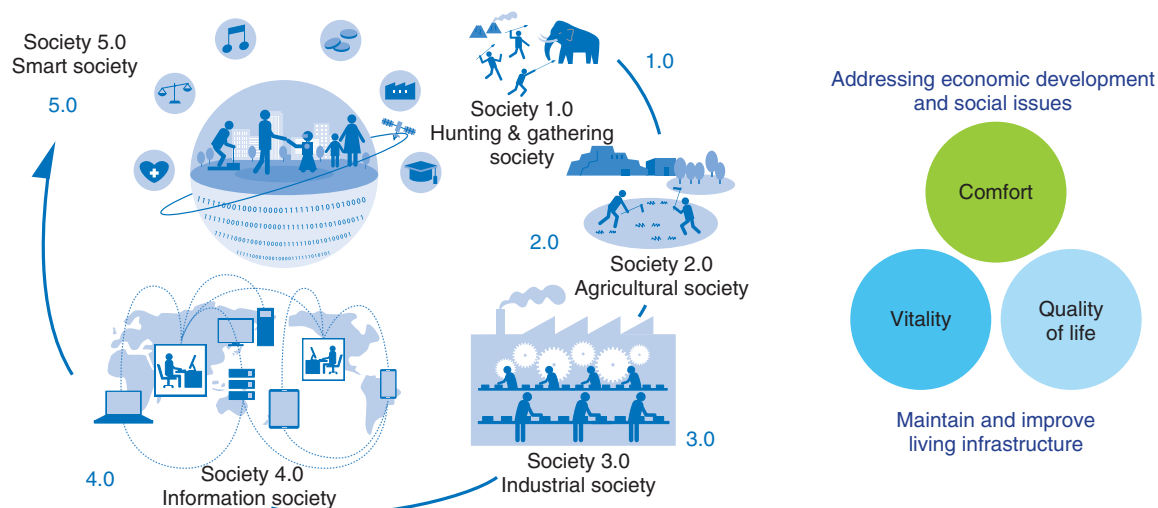
In the *World Happiness Report 2020*, which is a global survey of well-being published by the Sustainable Development Solutions Network, Japan ranked 62nd out of 156 countries. Although Japan’s healthy life expectancy and GDP (growth domestic product) per capita are similar to those of other top countries, it ranked poorly in terms of generosity and perceptions of corruption. In another survey report, *Legatum Prosperity Index 2019* published by Legatum Research Institute, Japan earned low scores for social capital and for social relations and civic participation. A Harvard University report based on a survey of the lives of more than 700 people over a period of about

80 years found that building good relationships with other people is important for happiness and health. This suggests that in Japan, where people are less likely to establish connections with other people or with social communities, it might be possible to achieve higher levels of happiness by improving these connections.

## 2. Addressing local issues and strengthening connections by integrating digital space with the real space

In terms of consumption behavior, the evolution of human society can be broadly divided into the Society 1.0 and 2.0 eras when people consumed goods through hunting and farming, the Society 3.0 era of industrial society, and the Society 4.0 era in which information itself has become a commodity. In the next era, Society 5.0, the concept of digital spaces will be added, creating the important new perspective of time in both real and digital spaces as a commodity that people will seek to obtain as a path to their own fulfillment (Fig. 2).

It is also important to create new connections among people and between people and society by



Source: Cabinet Office, Government of Japan, "Society 5.0," [https://www8.cao.go.jp/cstp/english/society5\\_0/index.html](https://www8.cao.go.jp/cstp/english/society5_0/index.html)

Fig. 1. A smart society (Society 5.0).

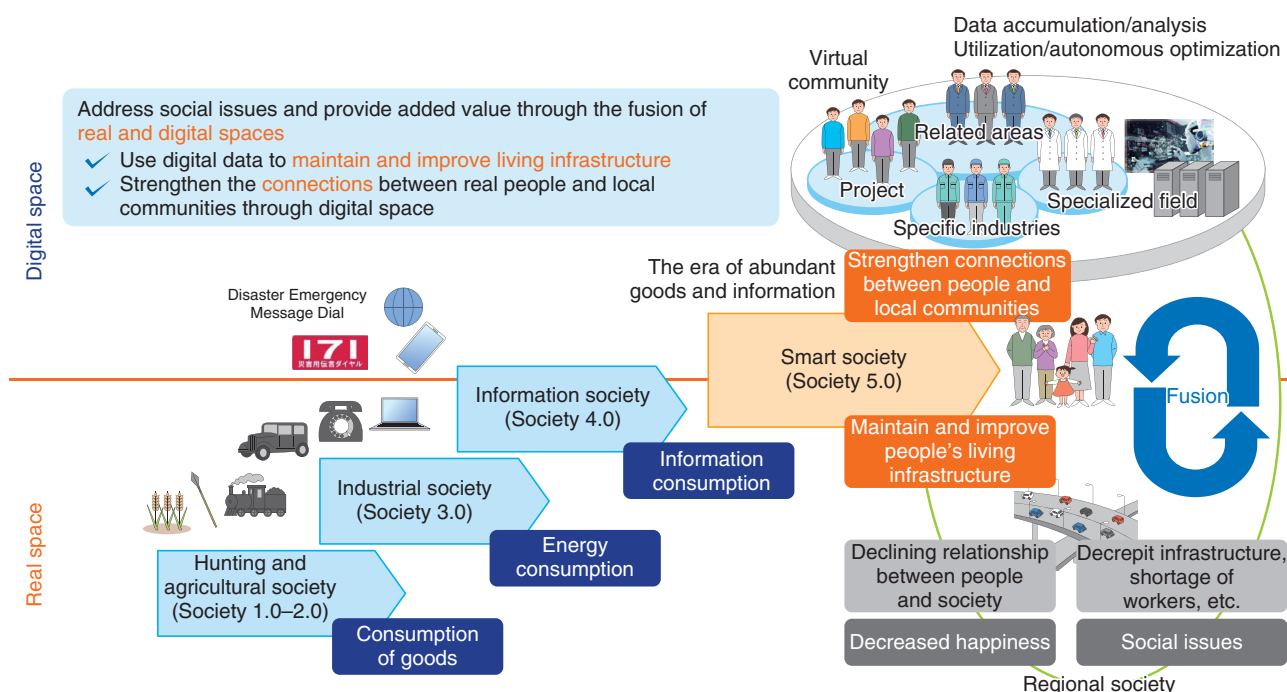


Fig. 2. Creating a smart society (fusion of real and digital spaces).

combining real and digital spaces to address social issues such as the aging of regional infrastructure, worker shortages, and the decline in relationships between people and society.

The high-level fusion of digital and real spaces is

one of NTT's strengths. It is expected that this strength will lead to maintaining and improving the infrastructure of daily life in the use of digital data, strengthening the connections between people through digital space, and adding value.

NTT WEST Group contributes to the development of society as a pioneer (like vitamins for regional societies) that **uses ICT to solve various issues** brought about by changes in the environment surrounding society. We will continue to transform ourselves into a company that is **loved and trusted by local communities**, and contribute to the achievement of SDGs.



Fig. 3. Leading the way in social ICT.

### 3. Local communities and social ICT pioneers

Due in part to the coronavirus pandemic, the population of Tokyo has been decreasing. Provincial regions of Japan are also facing depopulation issues caused by a declining birthrate and aging population. As a result, employment positions are being left unfilled, and families are finding themselves without successors. If this problem continues, industries will decline, tax revenues will decrease, and it will become difficult to maintain and upgrade Japan's aging infrastructure, leading to a decline in the quality of government services and an even greater outflow of people. We must find a way to break this *negative spiral* and replace it with a *positive spiral*.

At NTT WEST Group, we aim to build on our role as a pioneer in the use of information and communication technology (ICT) to address social issues by playing the role of a regional *vitamin* to promote social development and achieve the United Nations' sustainable development goals (SDGs) (Fig. 3). The branch managers of 30 branches are currently serving as project leaders to address local issues in cooperation with local partners by combining NTT WEST's local expertise and resources with services in ten fields ("Smart10x"). Specific examples of such community revitalization projects are introduced below.

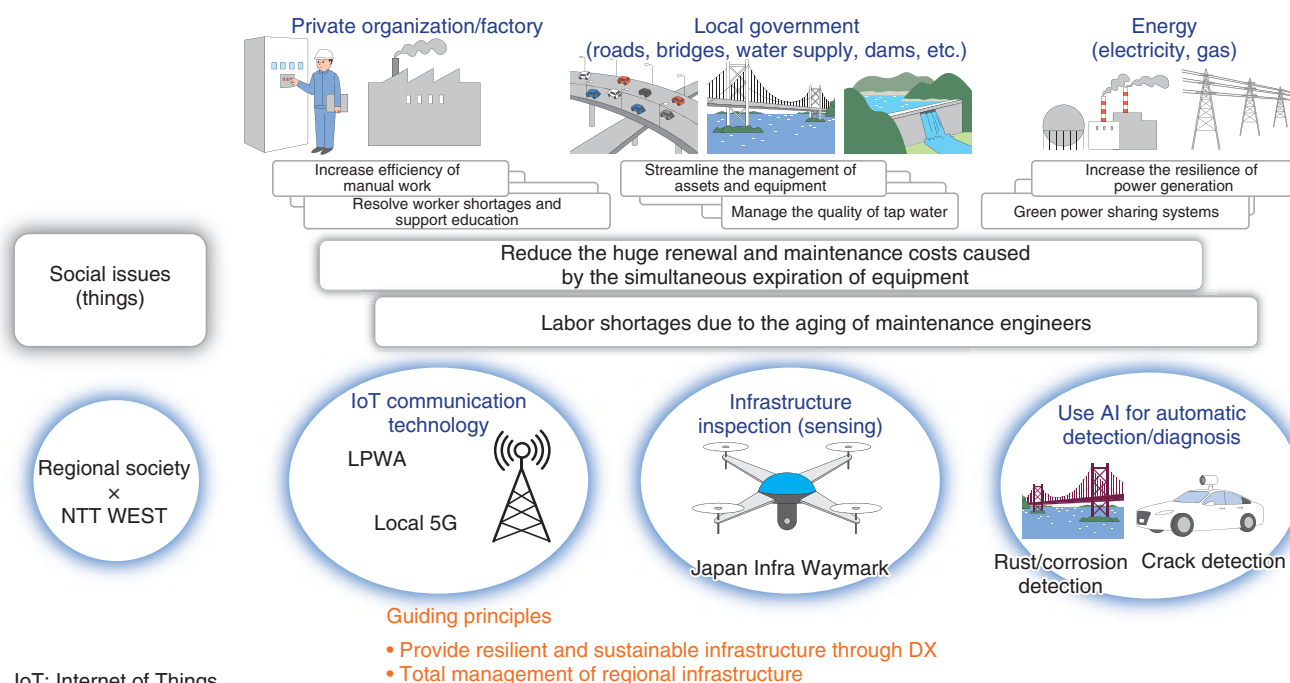
### 4. Examples of community revitalization projects with local partners using local features and connections

#### 4.1 Sustainable social infrastructure

With regard to social infrastructure, we aim to provide resilient and sustainable infrastructure through our policy of digital transformation (DX) to address issues such as the increasing cost of renewing and/or maintaining ageing infrastructure and the decreasing number of engineers available to maintain this infrastructure (Fig. 4).

#### Inspection of infrastructure facilities with drones using the facility management expertise of the NTT WEST Group

In April 2019, we launched Japan Infrastructure Waymark, a company that uses drones to provide services including infrastructure inspection. It offers a one-stop service that includes inspection, reporting, and support services not only for telecommunication facilities but also for various other social infrastructures including electricity, gas, and solar power supply systems. It can identify the metal to be inspected, thus can identify rust and corrosion in this metal by learning from a large number of on-site images taken by drones as training data. We are currently able to detect rust and corrosion with an accuracy of 99.2%



IoT: Internet of Things

LPWA: low power wide area

5G: fifth-generation mobile communication network systems

Fig. 4. Maintenance and improvement of social infrastructure (smart infrastructure and energy).

and are using this technology to automate and improve the efficiency of rust and corrosion inspection on bridges and other structures. To promote the use of drones for indoor security as well as for infrastructure inspection, we are actively expanding the use of this technology, including participating in a demonstration experiment in which commercial facilities beyond the reach of GPS (the Global Positioning System) signals are automatically patrolled using drones and recognizing humans present in these facilities using artificial intelligence (AI).

#### 4.2 Supporting lifelong learning in the era of high life expectancy and coronavirus pandemic

To address social issues in this era of declining birthrates, aging population, and hundred-year life spans, we are looking at ways of providing learning via a *remote world* and implementing customized life design and learning for each individual (Fig. 5).

##### Promoting computerized and recurrent education

We are currently working with Dai Nippon Printing to make all university teaching materials and textbooks available in electronic form. Although progress has been made with ordinary books, specialized books and teaching materials used at universities are

lagging behind in this regard. In addition to teaching materials, we also hope to promote educational DX whereby learners can visualize their level of proficiency and combine it with attendance and grade data to obtain an individually tailored learning program.

In addition to developing a recurrent education environment that includes remote classes for joint use in collaboration with universities, monitoring of learning progress, and visualization of skills, we are also studying an AI-based counseling framework for recurrent students who wish to return to work. We hope to cooperate with regional banks and other regionally based partners to help match workers with companies.

We also offer a certificate-issuing service that enables people to have graduation certificates and certificates of achievement issued at convenience stores 24 hours a day, 365 days a year. This service is highly rated as it helps people to search for jobs and explore career changes without having to visit universities to perform the necessary processing. Thus far, about forty universities have signed up to this service.

In the future, as life expectancy increases and the demand for lifelong learning grows, we believe that it will become more important for people to be able to

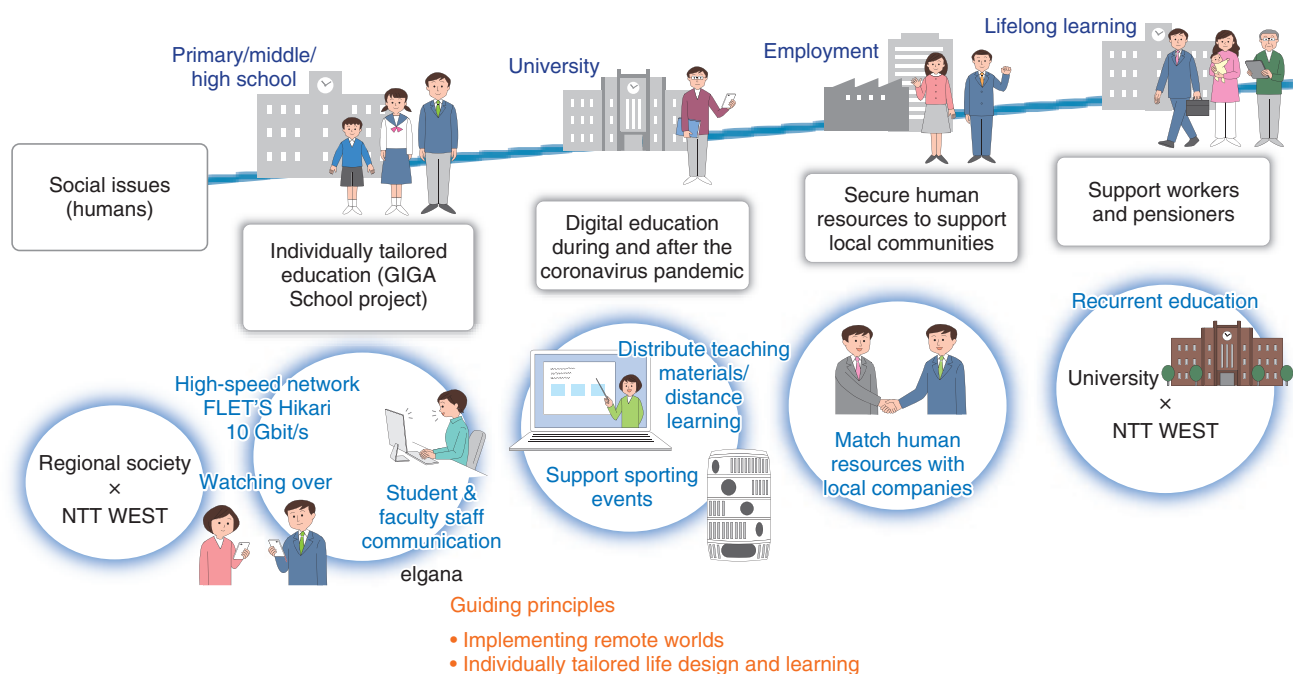


Fig. 5. Individually tailored lifelong learning & life design.

manage and record their learning activities with a consistent identifier (ID).

#### Using AI cameras to distribute video of amateur sports events during the coronavirus pandemic

As part of our effort to revitalize local communities, we established a company called NTTsportict on April 1, 2020, with the aim of promoting amateur sports. This company provides a service whereby unmanned cameras developed by Pixellot are used to capture video of sports events, and AI is used to automatically execute camera work and editing in accordance with the characteristics of the sport before distributing the video.

Pixellot provides an environment where people can watch amateur sports by making it easier to distribute video content than ever before. Even though the coronavirus pandemic has made it impossible for supporters to attend sports matches, we offered to distribute a hundred student sports games free of charge, and received over 700 applications.

#### 4.3 Working closely with local communities to achieve DX of primary industries from a regional perspective

Smart Agri is an initiative for revitalizing primary industries, i.e., agriculture, forestry, and fisheries. By taking advantage of our close ties to local communi-

ties, we aim to optimize the value chain and provide added value while collaborating with people who are actually involved in local primary industries and integrating real and digital technologies (Fig. 6).

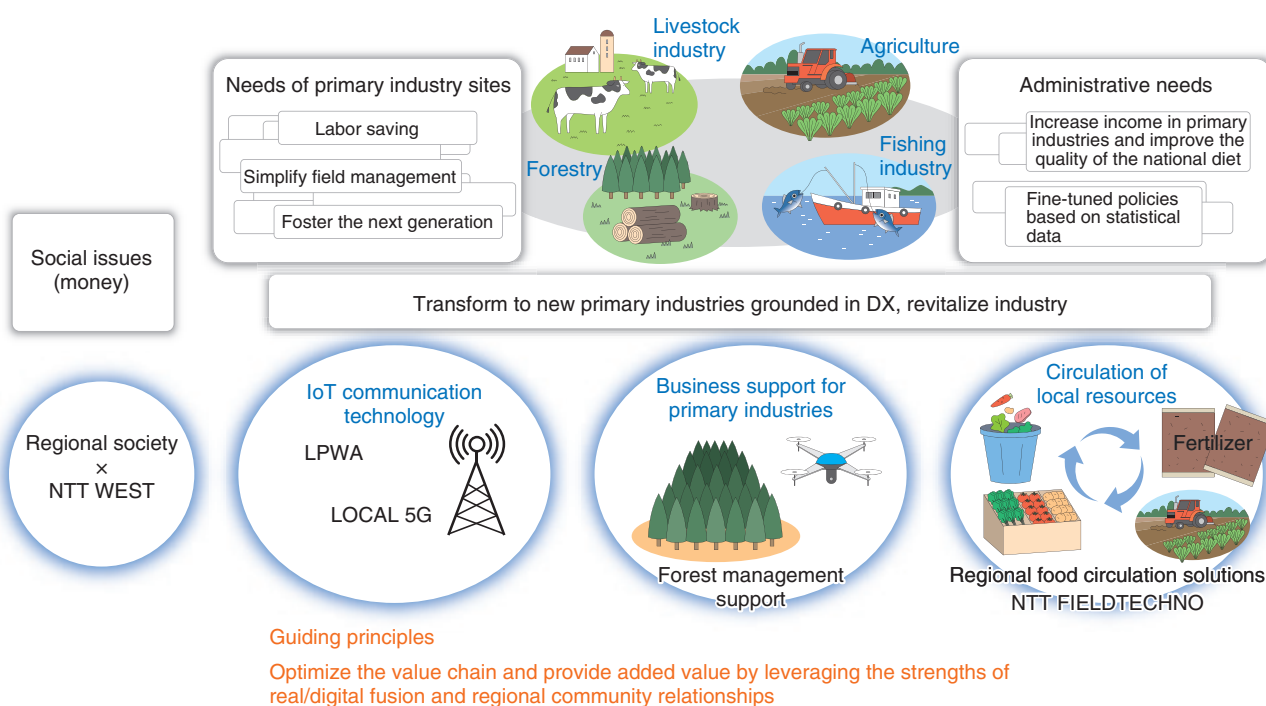
#### Applying ICT to forest management

Miyazaki Prefecture has abundant forest resources and has ranked first in Japan in the production of cedar for 29 years. Although forestry is the mainstay of the prefecture's economy, it faces challenges such as ensuring safety (there is a relatively high mortality rate among primary industries), complying with forest management requirements, and expanding the distribution of harvested timber. As a management model for forests, which are said to be upstream of the supply chain, we established a system that uses tools, such as drones, to efficiently count and measure the trees in a target area and store the data in the cloud. We are also working to revitalize distribution by establishing a downstream supply chain, including matching demand with lumber mills and house builders. At the same time, we are studying how biomass power generation can make effective use of thinned wood and branches that are ordinarily left unused on the forest floor.

#### Recycling of local waste materials as organic fertilizer

It has been reported that Japan generates about 28





\*Smart Agri: A term that refers to the use of smart technology not only in agriculture but also in forestry, fisheries, etc.

Fig. 6. Revitalization of primary industries and circulation of local resources (Smart Agri).

million tons of food waste every year. In Shiga Prefecture, the cost of incinerating non-native fish, such as black bass, and water plants in Lake Biwa is also an issue. We are working at implementing a food cycle by providing waste-decomposition equipment so that waste can be converted into organic fertilizer and distributed to producers so they can produce organic vegetables for distribution and sale. By using AI to analyze organic fertilizers in terms of soil data, compost composition, and so on, we hope to match them to the most suitable vegetables and fruits so they can be circulated to where they are needed on the production side.

#### Using data to provide new tourism and mobility experiences and regional mobility as a service (MaaS)

We aim to promote sustainable local communities and cities by using data distribution related to transportation and tourism to help provide comfortable transportation and attractive tourism. As a first step, we are working on the use of data for driver safety education. To provide each individual with optimal educational support, we are also combining this with information about the weather and road conditions (including traffic jams or accidents), and the driver's

habits (e.g., a tendency to perform sudden maneuvers or a history of traffic violations). As the next step, we hope to collect data on customers' needs, interests, and preferences so as to not only provide smooth transportation but also attract customers to nearby sightseeing spots and improve their purchasing motivation. Although the pandemic has caused a reduction in tourist numbers, we are also working to create a system that provides a variety of information in the pre-travel phase to stimulate interest and attract more visitors.

#### 5. LINKSPARK co-creation labs to promote customer DX

A co-creation lab is a place where new community initiatives are encouraged. Ours are called LINKSPARK, where we support our customers' DX activities by using digital data and design thinking to address issues and create new value. Our first one opened in Osaka in August 2019, and the second opened in Nagoya in October 2020. In Nagoya, we have many customers in the manufacturing industry, so we are keen to support their DX efforts in production and manufacturing and help them create new



Fig. 7. Addressing social issues with LINKSPARK (co-creation lab).

products. In 2021, we plan to create our third co-creation lab in Fukuoka (Fig. 7).

## 6. The future of society

Preparations for the Osaka-Kansai World Expo 2025 have already started. In accordance with the theme of this event (“Designing Future Society for Our Lives”), we are promoting places for co-creation that will contribute to achieving the SDGs and enable the creation of Society 5.0. This would be a good time for us to think about the design of this future society while conducting various verification trials and to think about new ways of living and the creation of future society.

### 6.1 Half a century of change: 1970–2020

The last World Expo in Osaka took place in 1970, exactly 50 years ago. The theme then was “Human Progress and Harmony.” At the time, Japan was experiencing a period of rapid economic growth, and “photochemical smog” was a major concern. Against this backdrop, the focus of the Osaka Expo in 1970 was economic development while pushing technology to the forefront. The theme of the Osaka-Kansai World Expo 2025 is “Designing Future Society for Our Lives.” Since the winner of Japan’s buzzwords

award for 2019 was “One Team,” it is important to consider how we can all connect, cooperate, and co-create. The mid-point of this half-century was 1995, during which Japan was hit by the Kobe earthquake. Since then, Japan has continued to suffer the effects of earthquakes and typhoons, and now we find ourselves facing a global pandemic. Although we have made progress in the development of technologies, we must think carefully about how to address issues resulting from these large-scale disasters since we are unable to control nature.

### 6.2 A natural world expo that transcends time and space

To prepare for the expo, the expo association is seriously discussing how to combine real and virtual venues and how to connect or integrate the two so that everyone can enjoy the event. In this sense, the expectations of the NTT Group are very high.

We will have to work hard to achieve a seamless, natural connection between the real and virtual worlds without any boundaries to obtain diverse data from the digital world, gather knowledge through Digital Twin Computing for the real world, and make effective use of this knowledge and data. At the NTT Group, we will work hard together on this project, and by taking on the role of an experimental site for

future society, I hope we will be able to test and propose specific services such as immersive systems and MaaS on the basis of future forecasting.

### 6.3 500 years of change (smart society then and now)

Earlier, I mentioned the World Expo that took place 50 years ago, but it is now over 500 years since the concept of utopia was discussed by the British philosopher Thomas More. In his book on the subject, there were 54 cities, all within a day's travel of each other. People worked fixed hours and spent the rest of the time studying whatever subjects they liked, such as art and science. They were also able to travel to all sorts of places without having to bring anything with them and lived a trouble-free existence. At the begin-

ning of this article, I mentioned Society 5.0, and how the essential features of the ideal society that people seek include the close connection between people and cities and the ability of each individual to lead a fulfilling life. In this sense, although technology has transformed our lives beyond recognition over the last five centuries, the essence of what we all seek from life has remained the same all this time.

### 6.4 The IOWN concept

Finally, as set forth in IOWN (the Innovative Optical and Wireless Network), we will work to create a smart society of the future and make local communities smarter by using ICT to enhance natural connections and impart a sense of well-being.

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He joined NTT in 1988. He served as president and representative director of NTT Neomeit from 2013 to 2017. He has been the director of the Corporate Business Headquarters of NTT WEST and president and representative director of NTT Business Solutions since 2017 and became senior executive vice president of NTT WEST in July 2019.

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