Creating "Connections to the Future"

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Abstract

In this article I introduce a sense of society (creating connections to the future) targeted by the NTT EAST Group as a Social Innovation Partner toward a prosperous society through the social implementation of advanced technologies. With this goal in mind, I also introduce NTT EAST Group efforts in "self-enhancement" and examples of initiatives for creating new regional value in collaboration with other companies and society. This article is based on the keynote speech I presented at Tsukuba Forum 2024 held in May 2024.

Keywords: Social Innovation Partner, invisible wall and red line, creating connections to the future

1.   Towards the next-generation NTT EAST Group

At NTT EAST, we are working to implement new technologies that are truly beneficial to all our customers and society to become a Social Innovation Partner. While we have thus far been providing a variety of services centered around communications networks, there is a need to update these services into a next-generation digital platform. We are also making a transition from an era that had been providing only a network to an era that can change the lives of even more customers. NTT EAST has also contributed to areas peripheral to communications such as the cloud and devices, but I wonder if we could also contribute to new areas beyond that such as energy, agriculture, and community development (**Fig. 1**). What are our strengths at NTT EAST? Up to now, it has been our engineering capabilities in maintaining and providing many facilities. The number of metallic lines stands at several million while there are more than 10 million optical lines. Every year, we open up and discontinue more than a million lines putting more than 4000 persons to work on on-site maintenance. Going forward, I would like to provide these engineering capabilities to peripheral areas and new areas using wireless and satellite technologies, which used to be limited to only offices, at even places like factories and farms where it is difficult to provide wired services.

For this reason, we set up a new system in October 2023 that assigned more than 1000 members of NTT EAST to work in peripheral and new areas while working to raise efficiency in existing areas. We also established the Innovation and Technology Department and Open Innovation Center. It is not our intention to use the technologies developed by NTT laboratories just for us but to also provide our customers with useful technologies. To become a company that can contribute to society, I would like to pursue our activities on the three axes of "self-enhancement," "collaboration with other companies," and "collaboration with society."

2.   Self-enhancement

We have strived continuously for "self-enhancement." We have made improvements by incorporating advanced technologies such as a mobile mapping system (MMS) and sensing technologies using optical fiber. However, "invisible walls" exist when introducing new technologies. I think that the concept of invisible walls is something that all companies talk about, not just NTT EAST. While it can be said that we have reached a certain level of improvements in our operations, we must change the way we work when introducing new technologies. When attempting to do so, the risks that can arise become worrisome. We can break through such an invisible wall by addressing the problem within a new field or making changes to the organization. Such an approach may be inefficient for a while, but it can eliminate worry

BPO: business process outsourcing
DC: datacenter
GSS: government solution service

IOWN: Innovative Optical and Wireless Network
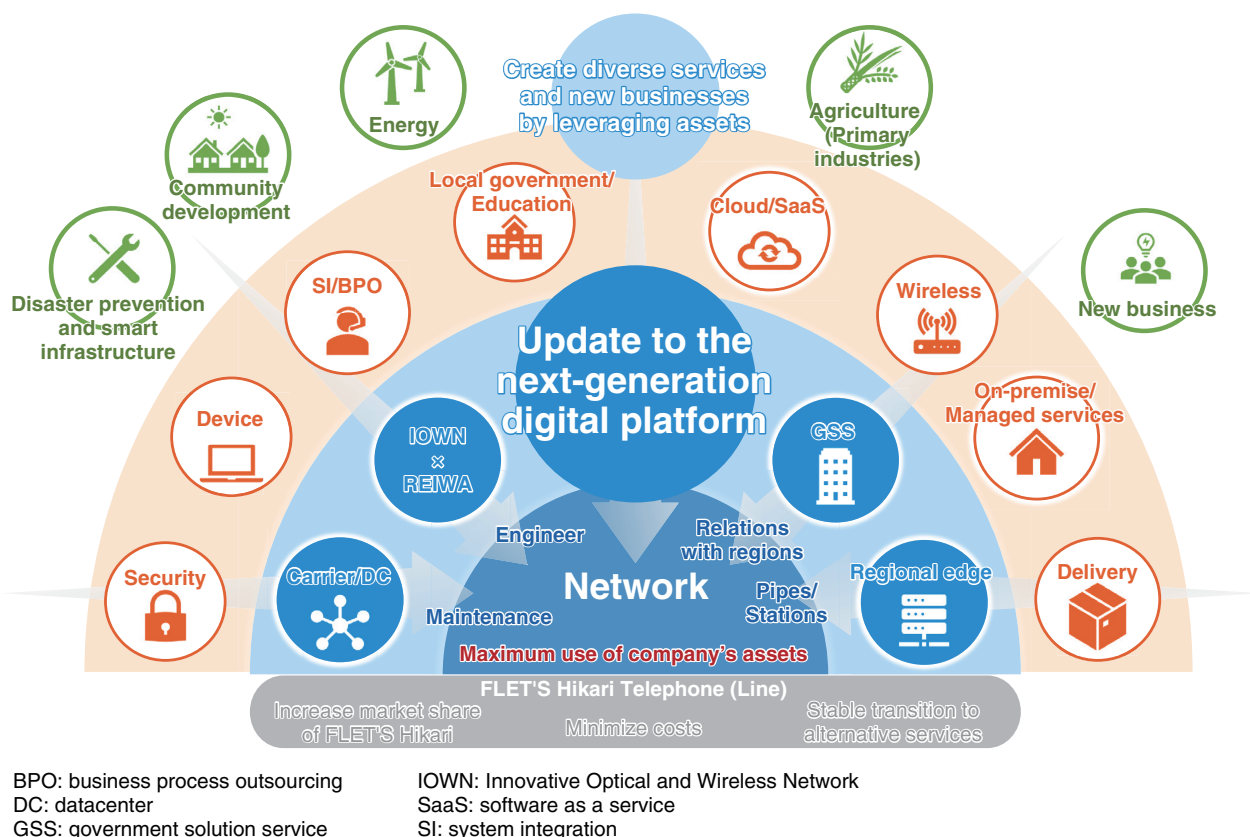SaaS: software as a service
SI: system integration

Fig. 1.   Aiming to be a Social Innovation Partner.

and break through the wall. However, not everything works out in the same way. This is because existing objectives remain fixed, preventing any progress or having those objectives be too vague. Another way of breaking through a wall is to solve a problem and set new objectives so that we can then walk along a new red guiding line toward those objectives (**Fig. 2**). In this way, I believe that we can break through a wall without even realizing it.

3.   Understanding the early impact of failures and improving processing efficiency (using digital technology)

We are not a unique company in that we have problems the same as other companies and local governments. It is important that we solve those problems within our company. It is because we have a proven track record in solving problems on our own that we would like others to choose us as a Social Innovation Partner.

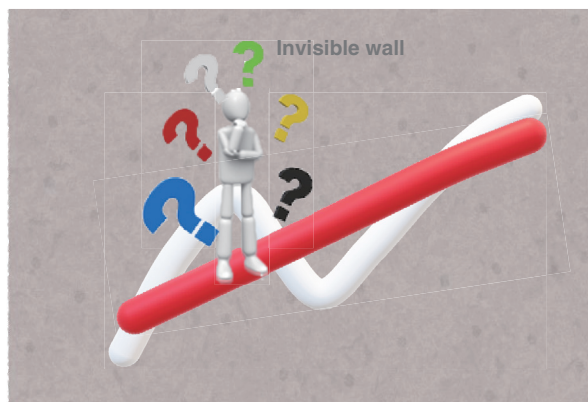The reforms that we are promoting involve the

Fig. 2.   Invisible wall and new red line as a guiding principle.

basic business of protecting communications. Up to now, we have promoted a mechanism that analyzes alarms and executes automatic recoveries. Since we construct facilities to enable services to continue, we have been conducting operations trying to avoid any
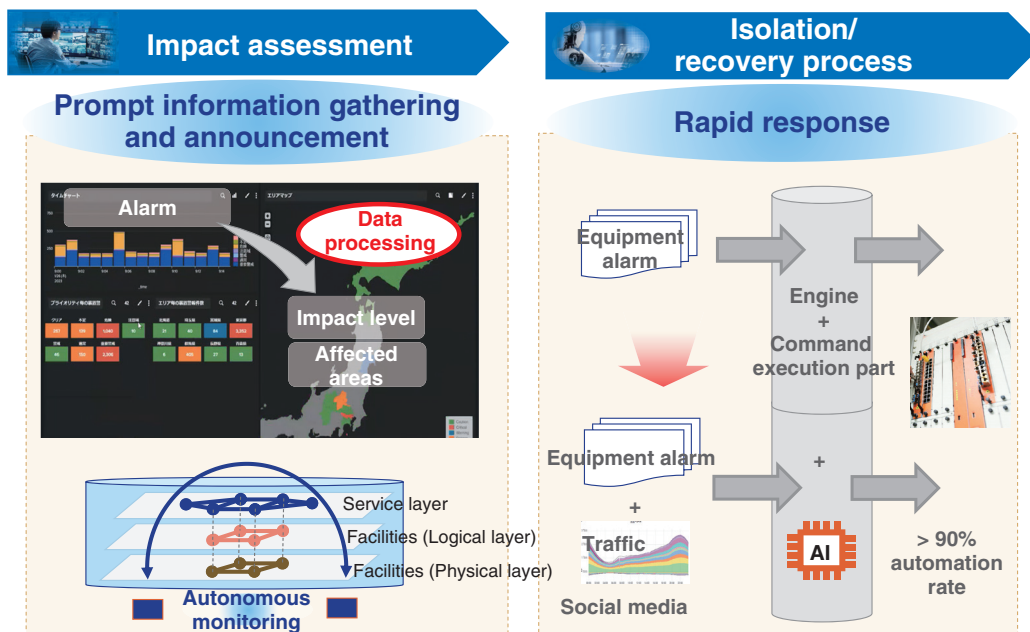
Fig. 3. Understanding the early impact of failures and improving processing efficiency (using digital technology).

impact on our customers even in the event of an equipment alarm. However, network-quality objectives have been vague.

So, what did we do? We automated processes to achieve prompt information dissemination and failure response. Taking a large-scale failure that occurred on April 3, 2023 as an impetus to make changes, we began an initiative for announcing a large-scale failure to the public within 30 minutes. We came to understand certain things during the course of this initiative. To make a public announcement, it is essential that we have mechanisms for gathering and analyzing a large number of alarms and gathering and analyzing traffic and social-media information. Fortunately, many techniques are available for gathering and analyzing data. The need for such techniques is simply common sense, but up to then, we had a different viewpoint on gathering and analyzing data, so we just didn't pursue those techniques.

Similarly, we defined our guiding principle to be that increasing the automation rate of failure response improves quality. There are many situations in which automating a response is difficult such as complex system failures and failures that had not been experienced before. However, once a failure has been experienced, a response can be automated. We also noticed that artificial intelligence (AI) for analyzing massive amounts of data is essential for increasing the automation rate of failure response (**Fig. 3**).

4. Construction of a data-utilization platform (OASIS)

It is also necessary to undertake the construction of a new data platform. All customer data are stored together since they are the same type of data, but facilities-related data are optimized separately depending on the type of operations, thus stored in a distributed manner. To analyze facility data, therefore, it is necessary to develop an application programming interface (API) for multiple systems simultaneously and upgrade servers for each facility objective, all of which can incur enormous development expenses. Assuming the secondary use of data, we have achieved the collection of data through meticulous planning and incorporated improvements tailored to individual system developments without incurring expenses. Let me give an example. By combining behavior history and data on work processes, we can identify the person working closest to the equipment that has failed within a specific NTT building. Additionally, data integration between systems has enabled more detailed analysis.

5. Efforts to redefine business content (on-site fusion)

In October 2023, we implemented an organizational restructuring toward the integrated management of inside and outside on-site operations. A major challenge for NTT EAST is determining how to expand our range of general knowledge without losing the specialized knowledge we have accumulated to date. We are also dividing our efforts into specialized technology and multi-target technology while taking on challenges in both peripheral and new fields.

In the process of taking up these challenges, there will, of course, be temporary inefficiencies. However, this will create a foundation for accepting new technologies that provide remote support. The inheritance of skills from one person to another has its limits. The use of AI can be effective in facilitating skill inheritance, but data must be accumulated to train an AI system. I think that accumulated data can be used to train AI by converting remote support work traditionally provided, for example, by telephone to text data and converting on-site work to video data. An important point when working to increase the efficiency of existing operations is how to deal with large-scale disasters considering that improvements in efficiency are accompanied by a decrease in personnel. In past typhoons, failures occurred at 50 times the normal rate, requiring a support system of about 600 people.

One measure in this regard is to focus on technology. For example, the work of inspecting utility poles that is needed when a disaster occurs can be made more efficient by using an MMS. However, machinery may stop running when a disaster hits, so there is a need to secure support personnel for such times.

At a forum held by NTT EAST on improving on-site capabilities, we conducted a competition on climbing up utility poles at the time of a disaster targeting people who work away from the field. From this competition, we learned that the number of people who could no longer safely climb up utility poles to perform maintenance work was higher than expected. We will continue to take advantage of various opportunities to secure and train personnel who can provide support in emergency situations including personnel to handle the front desk for inquiries regarding failures.

6. CX initiatives

The entire NTT Group is promoting activities to improve customer experience (CX). We learned from these activities that improving CX is beneficial to both our customers and employees. That is to say, improving CX provides an opportunity for achieving digital transformation (DX) and improving employee experience (EX). By making our customers fans (F) of NTT EAST through business (B), we obtain an ongoing flow in the form of "B, C, D, E, and F." Using front desks as an example, we are working to improve CX by turning the speech of customers from several hundred thousand calls per month into transcription data, summarizing those data by generative AI, and classifying the results into negative and positive calls. The final step is analysis, and although this is done manually, it is still analysis that could not be done in the past.

Of importance in this initiative is that members of the Corporate Strategy Planning Department are the ones who conduct this analysis on their own while studying AI and asking engineers for help. This is certainly an example of making effort to walk along a red guiding line. Members of facility design are likewise undertaking a CX initiative. The quality of experience in the network, which used to be vague, has now been quantified. In analyzing quantified quality, we found that the quality of experience had been ensured in terms of the usage level of web services when using a fair control function. However, some changes occurred in the process of quantifying the quality of experience. One was that the members involved in this initiative started searching for evaluation technology on their own and began using technology from NTT laboratories. Even members who had previously said that they didn't understand the process began to act on their own the instant they drew a red guiding line. I believe that it is exactly actions like these that are needed to break through a wall.

7. Initiatives to expand business areas with other companies

There are limits as to what a company can do alone, so we are starting "collaboration with other companies." To give a concrete example, let me discuss a network initiative. In our REIWA project, we aim to link the mobile network, cloud, and other elements to provide an efficient network and regional edge and carry a variety of applications on that infrastructure.
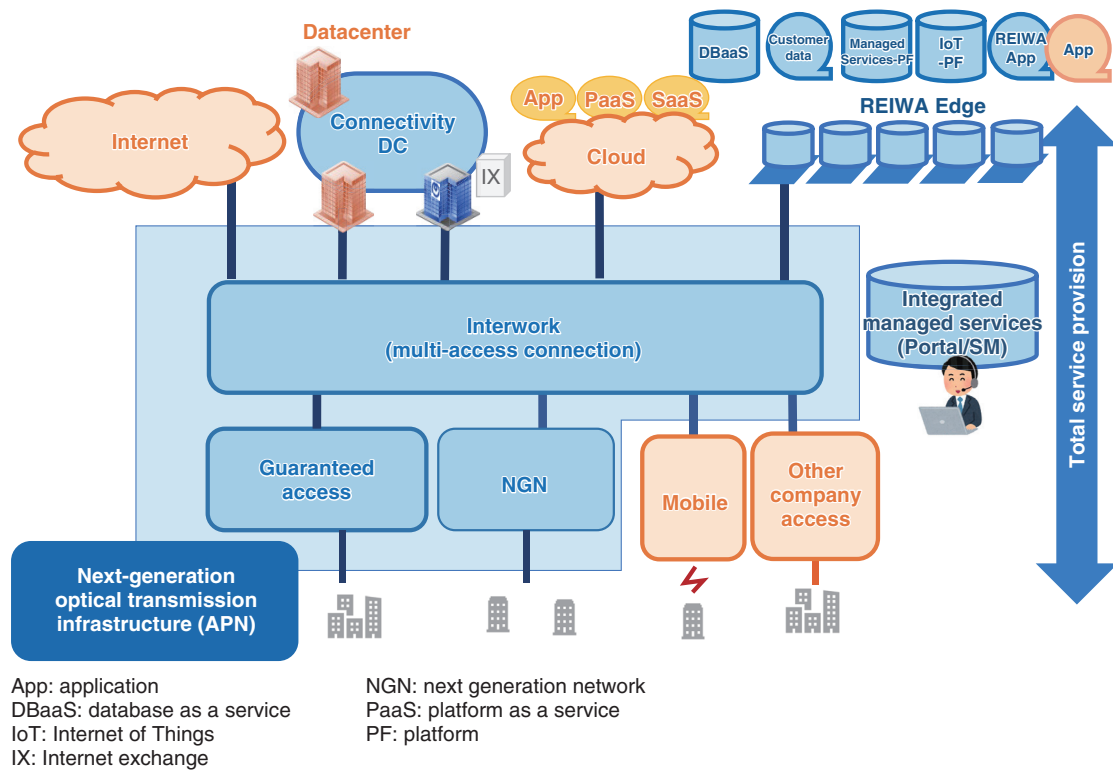
Fig. 4.   REIWA project.

Making this a reality will require collaboration with other companies (**Fig. 4**).

We would also like to create an efficient and low-latency nationwide network based on the All-Photonics Network (APN). However, a network created by us alone would be unusable. Datacenter operators demand a shortest-path network, so we would like to create a connectivity datacenter network that includes datacenters.

More than simply being entrusted with the network, our objective is to create the next-generation network together with everyone. This is because the demand for datacenters in Asia is growing and it's important that Japan be chosen and not just NTT. For this reason, we aim for optimal network construction toward the construction of datacenters in cooperation with many companies. We have also started offering consulting services to business partners who wish to use our constructed cable infrastructure (**Fig. 5**).

We pioneered private 5G (fifth-generation mobile communications system) and started out with the No. 1 market share. However, in the wireless field as well, this is naturally something that we could not have done by ourselves.

We are now beginning an initiative called the "co-creation project." Our aim is to intensify our collaboration with other companies providing base stations, devices, software, and other products across the industry. This type of collaboration is important, especially overseas given the use of different radio-wave frequencies.

What we can do is make infrastructure investments and train engineers in advance. We will therefore train engineers and engage in a variety of initiatives while asking NTT Group companies for assistance.

8.   Initiatives on solving social-infrastructure problems in collaboration with society

We are exploring new areas together with NTT Group companies including NTT Anode Energy, NTT InfraNet, and NTT FACILITIES. In the course of this effort, we have come to understand that this means "collaboration with society."

A case study with NTT AgriTechnology is typical example of this effort. Up to now, we have been in charge of constructing agricultural greenhouses, and among our members involved in this work, there is

Create new value through collaboration with various providers

Establish connection points with submarine-fiber landing stations in different areas to improve connectivity with the world
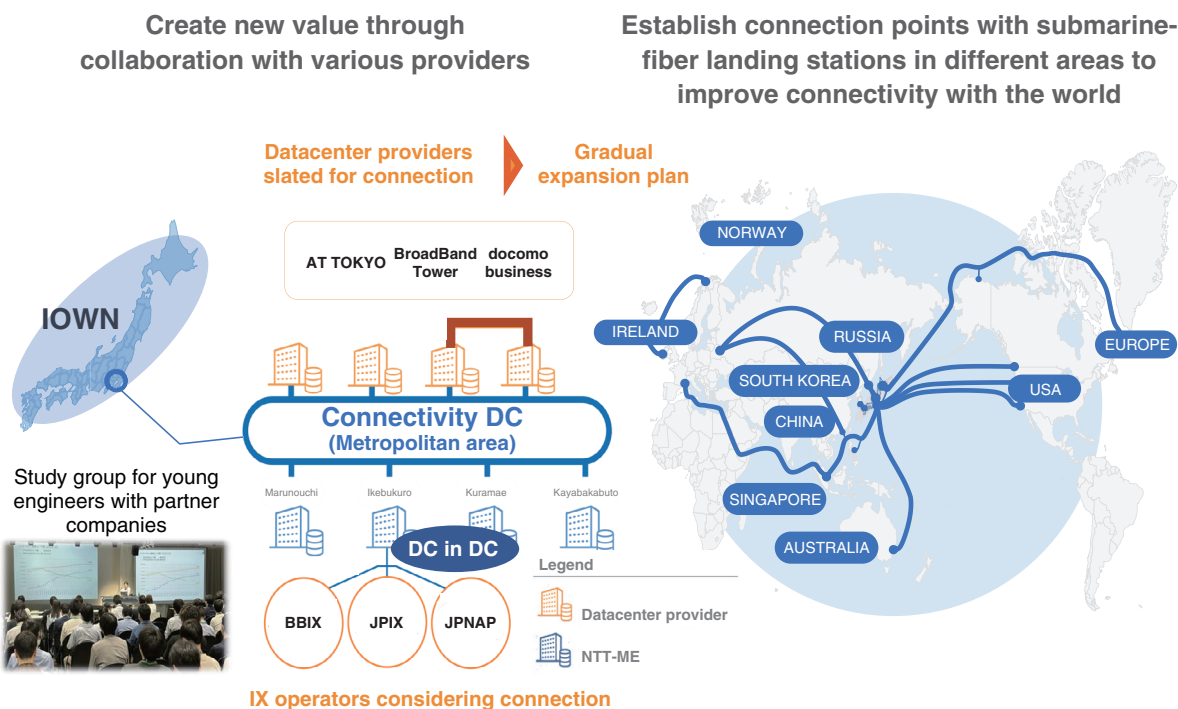

Fig. 5.   Network toward datacenter construction.

one who has been continuously recognized as a Maintenance Master over a ten-year period for the number of circuit-failure repair cases handled. He quickly became a leader. While this is a different business, it was my feeling that our essential expertise and skills could be put to use here in such a way. On entering this business, we provided NTT Agri-Technology with an in-house developed system called Digital Farmer. This system was selected as one of the top ten most promising software products. In the same manner, we are providing remote-cultivation support and production guidance and making agricultural robotics a reality. I believe that it's because we get involved with farmers and execute AI-type fine-tuning that we have been chosen as the No. 1 company attracting the attention of the farming community (**Fig. 6**).

We have also been putting much effort into disaster prevention. On the basis of our experiences with the 2024 Noto Peninsula Earthquake, we are making social contributions as one of our goals. We are working in collaboration with professors at the University of Tokyo to assess disaster countermeasures in local governments. Through this assessment, we have uncovered a variety of issues related to the operation of evacuation centers and stockpile management.

Making a decision on when to open an evacuation center is a particularly difficult issue. Taking the heavy rainfall that occurred in the Okitama area of Yamagata prefecture in 2022 as an example, an evacuation center was opened up five hours after heavy rain began to fall. Some people wondered whether this was too much of a delay.

We have begun providing information by collaborating with Weathernews Inc. and organizing regional operation centers. We are also exploring collaborations with software companies in such areas as electronic locks for evacuation centers and river monitoring. We are a company that creates a variety of partnerships to grow together. I would like to expand this initiative to other regions with the aim of making further contributions to society.

Renewable energy initiatives are difficult, but we have received many requests. We are introducing a power purchase agreement (PPA) model* with TNcross Corporation, a joint venture with TEPCO, but this in itself is not a real contribution. We are therefore launching initiatives in this field such as

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* PPA model: A model for introducing solar-power equipment in public facilities, etc. in which the power seller and power purchaser directly conclude a PPA.
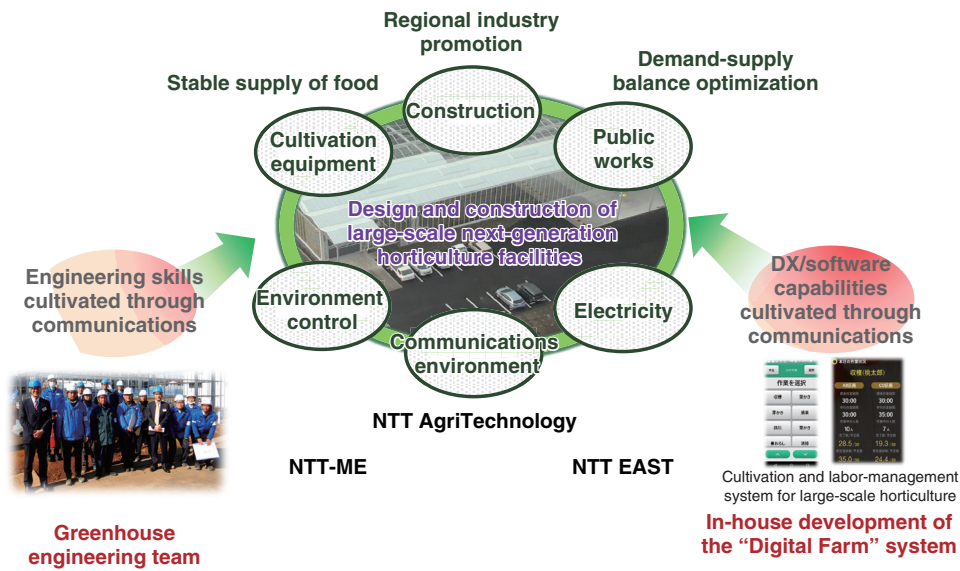
Fig. 6.   Contribution to solving problems in the agricultural industry.

providing consultation on a variety of power-generation methods including wind power and consultation services for the regional power company and retailers in the Yonezawa area of Japan.

Through such activities, we have gained the trust of our customers while also being able to expand our goals together.

9.   Toward the creation of new value

In the video field, we began by making videos of safety education and technical expertise starting out with only two people. Later, with a team of several hundred people, we turned to social issues such as the preservation of cultural assets and the video distribution of e-sports. More recently, we addressed the social issue of theft of copper cables at solar power plants by developing AI that can analyze video of those sites. We have been making similar efforts in the fields of drones and software. On recruiting drone pilots from within the company, about 500 employees have taken up the challenge of pesticide spraying and becoming drone-school instructors. In the software

field, we established a company called NTT e-MOI in Vietnam. Although starting from scratch, about 150 employees are fully committed to developing software products and implementing them in society.

10.   Creating "connections to the future"

We aim to implement advanced technologies in society by undergoing self-transformation and growing together with society. It is exactly this type of effort that is necessary for NTT EAST to be chosen as a Social Innovation Partner.

Our creation of "connections to the future" is nothing new. The metallic cables that we provided are decreasing in number every year, and we could not maintain them without the cooperation of various stakeholders such as manufacturers and construction companies. Creating "connections to the future" includes ways of making changes to connect to new things together with these stakeholders in a stress-free manner and the building of new relationships with everyone. Thank you for your ongoing support of NTT EAST.

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   Representative Member of the Board, Senior Executive Vice President, NTT EAST Corporation.
   He joined Nippon Telegraph and Telephone Corporation in 1990 and became a member of the Board of Directors of NTT EAST Corporation in 2018, president and representative director of NTT-ME Corporation in 2020, and senior executive manager of NTT EAST Network Business Headquarters and president and representative director of NTT e-Drone Technology in 2022. He assumed his current position in June 2022.