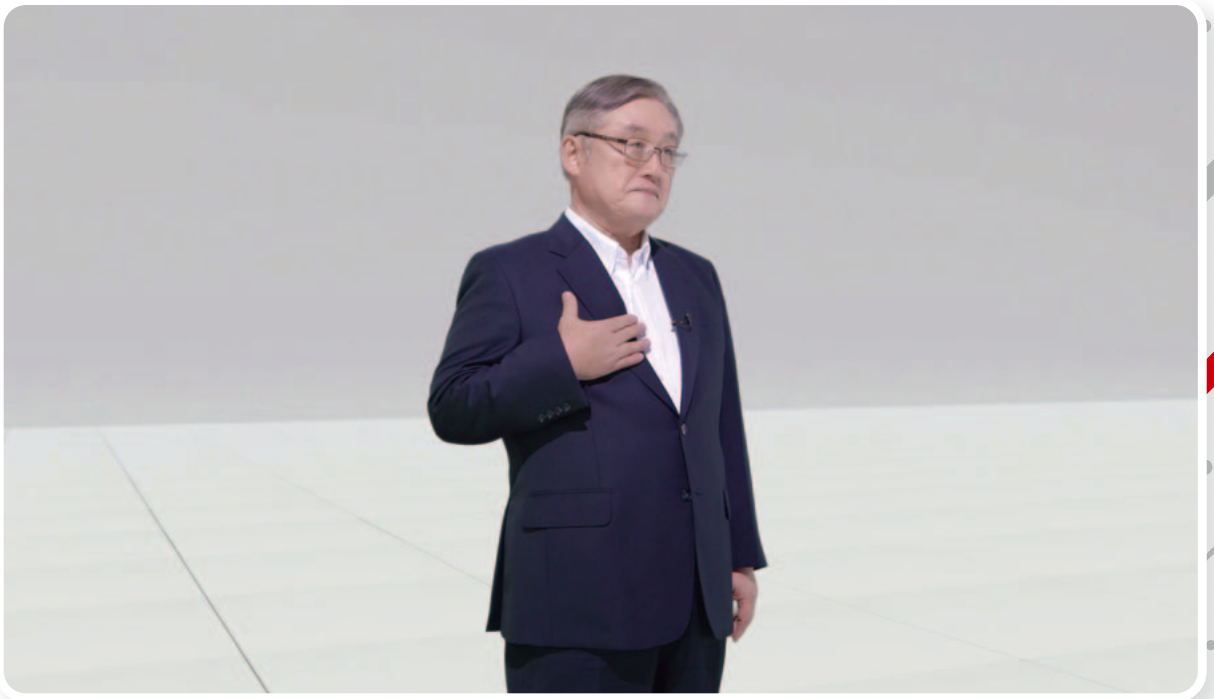
REPORT

Hitachi Social Innovation Forum 2021 JAPAN
Keynote Session

Future Achieved by DX of Social Infrastructure

Sustainable Society and Creative Consumer

Toshiaki Higashihara
Executive Chairman & CEO, Hitachi, Ltd.



Hitachi Social Innovation Forum 2021 Japan, the largest event on the Hitachi Group calendar, was held in October 2021, providing opportunities for collaborative creation with customers and other partners aimed at creating sustainable societies through the global operations of its Social Innovation Business. This was the 23rd time the event had been held. As with the previous year, it was staged as an online event with participants able to attend the various programs via the web. In his keynote session, Hitachi Chairman & CEO Toshiaki Higashihara, spoke about the environmental problems currently facing society and the paradigm shift toward human-centered technology, explaining how Hitachi's digital transformation of social infrastructure is helping to overcome challenges and create sustainable societies.

Chapter 1

Hello everyone. I am Toshiaki Higashihara, Executive Chairman & CEO of Hitachi, Ltd. I would like to thank you all most sincerely for attending today.

The societies in which we live currently face two major changes.

The first relates to the environment. Environmental problems such as global warming, pollution of the air and oceans, and loss of biodiversity can all be seen as the result of human activity.

In a 1968 article, "The Tragedy of the Commons," that appeared in the Science magazine, American ecologist Garrett Hardin put forward the example of public land used for animal grazing.

Once there was a farmer who grazed cattle on public land. While he would normally keep the size of his herd roughly the same, there was another farmer using the same land who chose to increase the number of cattle he grazed. Seeing this, the first farmer also increased his herd so as to earn more income. Other farmers took note of this and did likewise. The end result was overgrazing.

This is what we call "the tragedy of the commons." Scale this cattle grazing example up to a global level and you get today's environmental problems. If we are to overcome this tragedy of the commons, we need to pool the wisdom of people everywhere.

Another major transformation we are experiencing is that of technological change. The technologies integral to our daily lives, such as telecommunications, transportation, distribution, and healthcare, are all changing at a tremendous pace. However, if we avoid being dazzled by the individual advances and instead focus on what is at the heart of it all, what we find is one overwhelming transformation. This is the paradigm shift toward human-centered technology.

Manufacturing-focused companies were the driving force behind Japan's economy during its era of rapid growth. Economic growth was underpinned by highly productive factories that supplied consumers with manufactured products featuring high quality and performance.

From the late 2000s, however, it became increasingly difficult for any one company to meet the needs of its customers on its own. This marked the beginning of a new era in which value was generated through collaborative creation with corporate partners.

Since 2020, meanwhile, the times have continued to change with even greater effect. In the past, there has been a clear demarcation between companies and customers where companies provide services and customers receive them.

So, how does that arrangement look now? The people, such as YouTubers and Instagrammers, who participate in social media spend large amounts of money on their own activities. Are they consumers? Or are they producers? They are, in fact, neither. The demarcation line has lost all meaning.

They are both consumers and producers. Let's call them "creative consumers." The emergence of these creative consumers equates to a human-centered form of technology.

The wellspring of value has gone through a progression: from manufacturing companies to collaborative creation, and now to people themselves.

Chapter 2

The greatest mission facing us at this point in time is whether, within our limited environment, we can achieve a paradigm shift toward human-centered thinking.

Can we carry out this mission successfully? And what sort of future can we expect if we do so?

In 2030, people should be able to live within the constraints of our environment in ways that make flexible use of technology, without having to be conscious of doing so. With regard to the environment, we should also expect to account for carbon dioxide (CO_2) emissions across all steps in the supply chain, right up to consumption by the end user.

Hitachi has already established its "Powered by Renewable Energy" system for certifying 100% of the electricity consumed by particular equipment or services from renewable sources. This system uses smart meters and blockchain technology to provide transparency as to the extent of renewable energy use by individual equipment or buildings. If the technology were to be operated on a larger scale as part of the infrastructure of society, it has the potential to make a major contribution to CO_2 emission reduction.

Hitachi was the only Japanese corporation to be appointed a Principal Partner to the 2021 United Nations Climate Change Conference (COP26). This is indicative of our strong desire to be an innovator leveraging our technological capabilities to help prevent climate change.

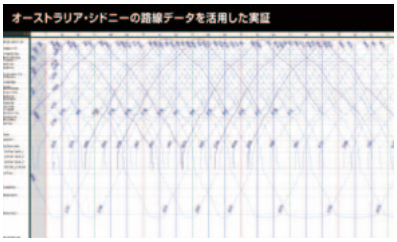
At Hitachi, we have set a target of reaching carbon neutrality in all business sites and production activities by FY2030. We are also participating in the United Nations' Race to Zero Campaign. We have set a target of achieving carbon neutrality throughout our value chain by FY2050, including in procurement from suppliers and the use of products by customers.

Meanwhile, what can we expect from the other major change, namely the paradigm shift toward human-centered thinking? At restaurants, for example, robots may be able to prepare meals that are not offered on the menu, based on CO_2 emissions or personal preferences. This would allow us to order somewhat unusual meals that are not found on the menu.

This concept of putting the consumer in charge of what they can order, rather than choosing from a range of predetermined options, is what is meant by creative consumption. Rather than being a purely online phenomenon, we can expect this shift from ordinary consumers to creative consumers to be evident across a wide range of situations.

Human-centered thinking will create a society that is kinder to everyone. It has been noted that people who are unable to make use of digital devices are put at a significant disadvantage. On the other hand, giving people the ability to access information in a casual and natural





Trial of railway traffic management system using track data from Sydney, Australia

manner should be enough to close the digital divide all by itself. A society that leaves nobody behind is something that the power of technology should be able to deliver.

Beyond its underpinning of creative consumption, two other features of the paradigm shift toward human-centered thinking are of particular importance.

The first is resilience.

Significant public harm occurs when the flow of people, goods, or money is interrupted. It is at times like this that resilience is crucial. Resilience provides the capabilities to unblock these flows quickly and to minimize damage.

Railways offer one example. In the event of a disaster or accident, it is important to restart railway services quickly and restore scheduled operations.

As it happens, I have been personally involved with the development of railway management systems since I first joined Hitachi. As a company, we have for many years been engaged in the development and supply of systems that can shorten the time it takes to get services back up and running normally after an incident.

We are currently working to develop a system that can automatically recover from schedule disruptions, training artificial intelligence (AI) to predict future train movements by learning from traffic management practices used by operations controllers in the past. In other words, the system uses predictive AI to automate recovery from schedule disruptions. In a trial conducted using track data from Sydney, Australia, the system has already demonstrated its ability to generate a new optimal schedule in approximately 10 s.

A second feature is health.

Regenerative medicine is expected to become progressively more commonplace as we get closer to 2030. Regenerative medicine is a form of therapy that uses cells to restore organs or other physiological functions that have been lost due to disease. At the present point in time, considerable hurdles to its use still remain to be overcome. If regenerative medicine is to be made available to larger numbers of people at a realistic price, the reliable, high-volume production of high-quality cells is essential.

At Hitachi, we are working toward the commercialization of automated cell mass culture systems for induced pluripotent stem (iPS) cells through our participation in a national project in partnership with Sumitomo Dainippon Pharma Co., Ltd. and Kyoto University. The project is making good progress, including a FY2020 clinical trial of a treatment for Parkinson's disease that made use of cells cultured on a system developed as part of the project.

In 2030, we should be living fuller lives despite the constraints of our environment. To achieve such a way of life, the digital transformation (DX) of social infrastructure will be essential.

Commercialization of automated cell mass culture system for iPS cells

Chapter 3

Being so complex and multi-faceted makes social infrastructure a very difficult target for DX. Nevertheless, at Hitachi we have what is needed to achieve it. There are three reasons for this.

The first is that we are one of the few companies anywhere in the world with a breadth of operations that covers operational technology (OT), IT, and products. Invariably, all three of these have a part to play when working on social infrastructure.

The second is Lumada. Lumada delivers greater value by connecting things together.

In 2019, Suntory Beverage & Food Ltd. used Lumada at its major plants in Japan to automate the generation of production plans based on factors such as manufacturing capacity constraints, inventory levels, and predicted demand. Testing to assess the benefits of the system demonstrated that it could complete, in one hour, work that previously took 40 hours.

In 2021, we helped the Suntory Kita-Alps Shinano-no-Mori Water Plant accelerate DX in plant management and working practices by linking not only production line equipment, but also IT systems for procurement, production, quality management, and shipment. By providing traceability down to the level of individual bottles, this enabled Suntory Beverage & Food to supply its products with greater safety and confidence than ever before.

It is this creation of new value by linking different sources of data together that represents the scalability of Lumada.

Lumada is also boosting our links with partners. We launched the Lumada Alliance Program in November 2020. People from many different companies are participating in the program and expanding the scope of our collaborative creation efforts. We also established the Lumada Innovation Hub Tokyo in April 2021 to serve as a base for closer links with partners. In the future, we intend to use facilities like this to continue engaging with you in collaborative creation.

Another initiative is our acquisition of the US company GlobalLogic Inc., which we see as playing a key role in the global expansion of Lumada.

GlobalLogic has a staff of more than 20,000 and operates design studios and engineering centers around the world. By combining its capabilities with the technologies and expertise of Hitachi, we provide more global support for DX by our customers. A collaborative creation project was launched in September 2021 that involves the Lumada Innovation Hub Tokyo and five GlobalLogic sites in the USA, India, Ukraine, Poland, and the UK.

In this way, Lumada is leveraging its ability to connect things together to make steady progress on the paradigm shift toward human-centered thinking.

Collaborative creation with Suntory Beverage & Food Ltd.

Collaboration between DX sites led by Lumada Innovation Hub Tokyo

Now we come to the third reason. This is the most important of all: that so many of our partners have chosen to attend this presentation.

The DX of social infrastructure is not something that one company can do on its own. The society of the future will be one in which companies engage with one another in collaborative creation, also coming together with consumers to create value. To create value, your cooperation is essential. We need to work together, bringing to bear the combined capabilities of companies, local and national governments, universities, and other stakeholders. In this, I hope you will lend us your support.

Let's work together to achieve the DX of social infrastructure and create a new human-centered world that functions within the constraints of our environment and leaves nobody behind.