

# MESSAGE

## Contributing to SDGs and Society 5.0 through Open Collaborative Creation and Innovative Research

### Hitachi's Research & Development Group Aspiring to become a Global Innovation Leader

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Industry is expected to play a central role in resolving the diverse challenges that confront society in the efforts to build a sustainable future society. The Hitachi Group has been globally expanding its Social Innovation Business, which contributes to resolving challenges faced by society and customers by leveraging digital technologies in collaborative creation. In its 2021 Mid-term Management Plan, which commenced in FY2019, Hitachi plans to further strengthen its Social Innovation Business to become a global leader, and thus drive progress on the Sustainable Development Goals and Society 5.0, and contribute to generating social value and improving quality of life. How will the Research & Development Group support the new directions being taken by society and the role that Hitachi intends to undertake? In this article, Norihiro Suzuki, Vice President and Executive Officer, and the General Manager of the Research & Development Group, talks about his hopes for the newly established “*Kyōsō-no-Mori*,” a place for open collaborative creation, and his vision for research and development that pioneers future society.

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#### Evolution in Social Innovation Business

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With advances in digitalization, major changes are taking place in the business environment. Digitalization has two facets: “lights” and “shadows.” The “lights” which bring benefits, release us from the constraints of time and place. Progress is being made in increasing efficiency and reducing effort. Further, greater opportunities for new business are being brought about by the chain of various values.

At the same time, we should not forget that “shadows” also exist, such as security risks including cyber-terrorism and data leaks, the digital

divide and growing inequality, and the apprehension in relation to singularity. Such new issues arising from digitalization are matters that should be addressed by society as a whole, and concrete measures to address these issues are currently being discussed.

I believe that we need to clearly recognize and address these “shadows” as we progress towards creating a prosperous and sustainable society, and seek to expand business and improve quality of life.

It is against this backdrop, that efforts are being made worldwide to link business with resolving issues in society to achieve sustainable development. Internationally, these efforts can be seen in the pursuit of the Sustainable Development Goals (SDGs). In Japan, this is being promoted



Joined Hitachi in 1986 after graduating with a master's degree from the School of Engineering at the University of Tokyo. After working on research and development in fields such as digital image processing and embedded systems, he was appointed Senior Vice President and CTO of Hitachi America, Ltd. in 2012, General Manager of the Central Research Laboratory in 2014, and General Manager of the Global Center for Social Innovation at the Research & Development Group in 2015. He was appointed to his current position as Vice President, CTO, and General Manager of the Research & Development Group in 2016. He has a Ph.D. in engineering. He is a member of the Institute of Image Information and Television Engineers and the Institute of Electronics, Information and Communication Engineers, and a senior member of IEEE.

through Society 5.0. Since its foundation, Hitachi has continued to put into practice its corporate mission of “contributing to society through the development of superior, original technology and products,” and was ahead of the times with its focus on its Social Innovation Business. The Social Innovation Business itself is expanding beyond just advancing infrastructure. It is evolving to resolve the various challenges faced by society and customers using the latest digital technologies such as artificial intelligence (AI) and the Internet of Things (IoT), to create even more value by raising social value, environmental value, and quality of life (QoL), and is becoming increasingly integrated with SDGs and Society 5.0.

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### To be a Global Leader in Social Innovation Business

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FY2019 is the first year of Hitachi its three-year 2021 Mid-term Management Plan, which has just begun. A key strategy of the previous plan that ran from FY2016 to FY2018 was to become an

“Innovation partner for the IoT era.” The 2021 Mid-term Management Plan builds on this by seeking to make Hitachi a global leader through its Social Innovation Business. While the objective of combining Hitachi’s strengths in IT, operational technology (OT) and products, and using digital technology to bring innovation to societal infrastructure, remains unchanged, the plan reinforces the aim of advancing the fields of the SDGs and Society 5.0 by generating social and environmental as well as economic value.

To achieve the core strategy, Hitachi is also strengthening its business structure. The plan identifies “Mobility,” “Smart Life,” “Industry,” “Energy,” and “IT” as five growth sectors, and seeks to achieve the top global position by assigning relevant business units to these sectors and concentrating resources.

Lumada is a common platform across all five sectors, and serves as a collaboration platform to generate value from customers’ data and accelerate digital solutions. It employs a wide variety of R&D resources and supports value creation as well as expediting solution delivery. The Research

& Development Group is deeply involved in the endeavor to resolve customer issues, from developing and applying the methodology and tools of NEXPERIENCE — an important element in the collaborative creation process, to acting as the frontline in collaboration activities as well as conducting solution development.

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### CSI Shifts into High Gear for Global Collaborative Creation

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In accordance with the core strategy of the 2021 Mid-term Management Plan, the Research & Development Group is reinforcing research contributing to the growth sectors within an overall strategy to become a global innovation leader.

Shifting to what each research center is doing, the Global Center for Social Innovation (CSI) has adopted a new policy of strengthening collaborative creation in global solutions. Central to this policy is *Kyōsō-no-Mori*, launched at the Central Research Laboratory. The thinking behind consolidating CSI's main functions for collaborative creation with customers (previously based in Akasaka) at the Central Research Laboratory in Kokubunji is to deepen the integration of advanced research with work on collaborative creation with customers. *Kyōsō-no-Mori* invites stakeholders from around the world to engage in open collaborative creation with Hitachi researchers and designers, both to come up with new ideas and to speed up the value creation process by prototyping and testing these ideas in practice.

Further, Umeshwar Dayal, Senior Vice President from the Research & Development Division of Hitachi America, Ltd., has been appointed as General Manager of CSI and is setting about to build a truly global organization. As he is a specialist in AI and data analytics, he will no doubt also put his skills to work on the use of digital technology for global collaborative creation. The research and development sites in Silicon Valley and Detroit in North America; Brazil in South America; London, Cambridge, Copenhagen,

Sophia Antipolis, and Munich in Europe; Beijing, Shanghai, and Guangzhou in China; and in India, Singapore, Thailand, Malaysia and Australia, seek to contribute to global society by serving a core role in their regions and by working with customers and other parts of society in those regions to resolve the challenges they face.

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### Creation of World-leading Technologies at CTI

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The core strategy adopted by Hitachi's Center for Technology Innovation (CTI) is creating and focusing on world-leading technology. To become a global leader, it is essential for Hitachi to offer a wider range of world-leading products and services. Hitachi has a track record of supplying world-class technologies, products, and systems in fields as diverse as industrial equipment, energy systems, information and telecommunications, control systems, storage, and electronics, examples of which include high-speed trains, elevators, proton beam therapy techniques, biochemical and immunological systems, electric motors, and air compressors. The intention is to continue working on research and development with a focus on the five growth sectors (including the above fields) to extend Hitachi's strengths.

One major field of research and development is the implementation of cyber-physical systems (CPS) that will help further develop Lumada. CPSs perform sophisticated control of real-world systems using data collected from these systems as a basis for modeling the real world in cyberspace, identifying optimal solutions in real time, and for providing the results of analysis as feedback. This will make them a core technology underpinning Society 5.0. Examples include the potential for CPS to implement or enhance things like optimal traffic management achieved through the integration of digital technology with railways (in the mobility sector), smart cities that use autonomous driving to relieve congestion (in the smart life sector), smart manufacturing and smart maintenance (in the industry

sector), smart grids (in the energy sector), and fin-tech and blockchain applications in the IT sector.

Therefore, CTI is focusing on key technologies for CPSs, namely those associated with AI, fifth generation (5G) mobile telecommunications, and robotics. In the field of AI, in particular, CTI's multifaceted research includes equipping AI with the reliability needed for use as an infrastructural platform and the ability to explain its conclusions, and also advances in AI analytics and interactive AI. Meanwhile, a lot of effort is also going into fields such as cybersecurity and trust platforms as we recognize that techniques to underpin the secure flow of data will be essential for the further development of mechanisms through which data generates value, as in CPSs.

The aim of these developments is to integrate the real world and cyberspace to go "Beyond Digital, Beyond Real."

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### CER's Pursuit of Open Innovation and Contribution to Resolving Societal Challenges

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Along with concentrating investment in those areas such as AI where the pace of technological progress is particularly rapid, another important role of the Research & Development Group is to provide comprehensive support for technologies that are worked on over time such as the material sciences and life sciences. In acknowledgment of the 2021 Mid-term Management Plan, the Center for Exploratory Research (CER), which undertakes this basic and exploratory research and development of technology, has as its core strategy the pursuit of exploratory research aimed at resolving societal challenges.

A vision that the SDGs and Society 5.0 have in common is the creation of a human-centric society in which people everywhere enjoy the benefits of development and technological advances. To achieve this, CER is seeking to accelerate the emergence of disruptive technologies through open innovation quantum computing and regenerative

medicine are also seen as key fields, together with the study of material properties that will transform both industry and society as a whole. Hitachi Cambridge Laboratory is the primary site for the development of quantum computing and is making steady progress on this computing architecture that has the potential to help resolve large-scale societal challenges. For regenerative medicine, we set up the Hitachi Kobe Laboratory as a center for research and development in the Kobe Biomedical Innovation Cluster in 2017. The laboratory is engaged in collaborations between industry, government, and academia that include the development of cell cultivation systems and data analysis techniques that will underpin commercial applications. Meanwhile, the Happiness Planet project being undertaken by the Future Investment Division, which supports workstyle reform, and takes the form of open innovation by user participation will also help create a more human-centric society.

Another key expectation of fundamental and exploratory research is that it will provide visions to lead the way in Society 5.0. In 2016, Hitachi established laboratories in collaboration with the University of Tokyo, Kyoto University, and Hokkaido University. Through these joint laboratories, we are promoting open innovation to resolve challenges in society drawing on the research expertise of each university, and sharing the achievements with the world.

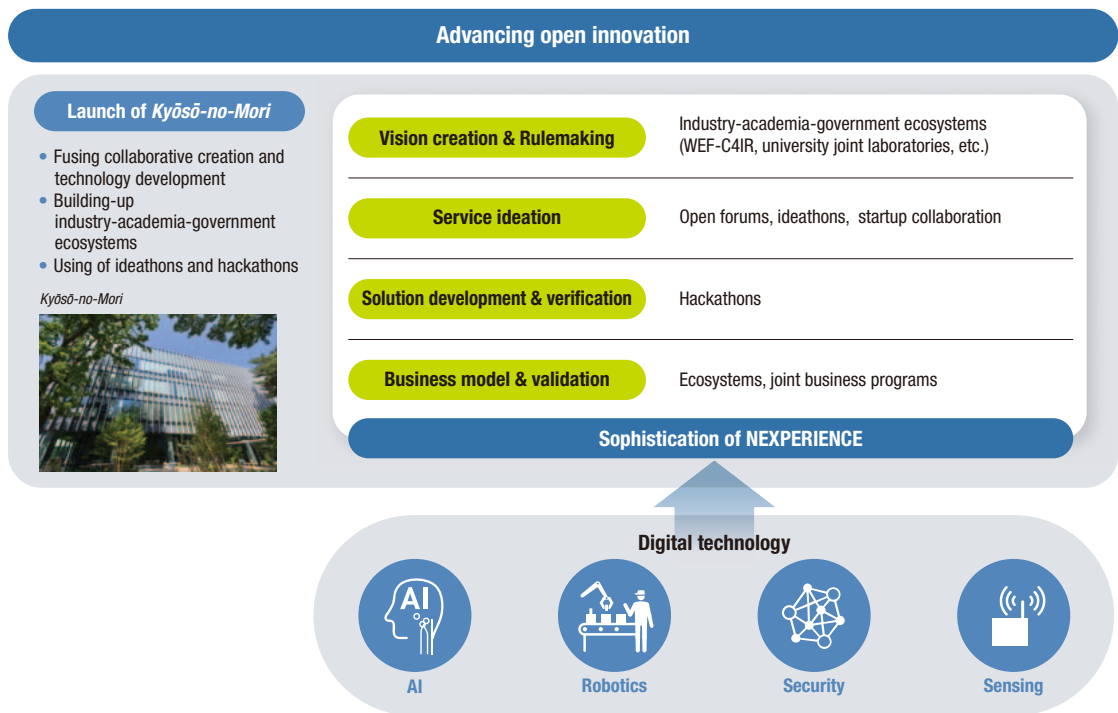
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### Relentless Pursuit of New Value Creation

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From the perspective of open innovation, Hitachi also established the Corporate Venturing Office in April 2019. The Corporate Venturing Office seeks to facilitate resolution of challenges being faced customers and other parts of society, by integrating the disruptive technologies or business models devised by startup companies with Hitachi's technology, expertise, and customer base to support and accelerate innovation. The hope

## Progress on Open Innovation Driven by the Research & Development Group



AI: artificial intelligence

WEF-C4IR: World Economic Forum - Centre for the Fourth Industrial Revolution Network

is that, by working with and investing in startups, this initiative will both enhance Hitachi’s capacity for identifying innovation and bring some fresh air into its corporate culture.

The structure of industry is undergoing major change, including the significant changes in the political and economic environment touched on earlier in this article and the emergence of new business models brought about by advances in digitalization that transcend the boundaries of traditional industries and business sectors. If these changes are to be exploited as business opportunities, Hitachi will need to not only help customers resolve challenges and undergo transformation, but also to accelerate its own transformation.

To take active steps to assess changes and consider entry into new business areas without resting on past laurels is part of the research and development culture at Hitachi. The Hitachi Henjin-kai, a group that I chair, can be seen as epitomizing this. Hitachi Henjin-kai is an association of current and former Hitachi employees who have doctoral degrees, with more than 2,100 members (as

of April 2019). The group’s activities include the Kujin Awards, a program for honoring members who, rather than remaining within the safety of the field where they gained their degree, have published an academic paper of note that contributes to the progress of science, technology, and industry in another field. I doubt there are many other companies in the world that operate such a program. We have inherited this history and tradition, and place a high value on the relentless pursuit of studies that generate new values.

*Kyōsō-no-Mori* has just begun to grow from this rich soil of Hitachi’s research and development history, and can be described as a new challenge to continue creating new values. In addition to helping *Kyōsō-no-Mori* to grow into a base from where we spread the message of innovation, the Research & Development Group also intends to contribute to the realization of a future society as envisaged by the SDGs and Society 5.0 by fully maximizing the power of knowledge. Under the slogan of “Powering Good,” we hope to light up the world together with our customers.