

## CTO Message



## Technology Management for Self-Driven Innovation Driven by Social Needs

Representative Director, Executive Officer and Executive Vice President, CTO

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### An Era Full of Opportunities for Innovation Driven by Social Needs

In its management of technology, OMRON defines social issues to be resolved and, backcasting from the desired image of society, formulates and implements business, technology, and intellectual property strategies. Since assuming the position of CTO, I have taken on the challenge of creating organizations and systems to realize “innovation driven by social needs” by drawing growth scenarios based on what I call “near-future design,” which is a concrete depiction of our desired near-future social vision. This is an attempt to continuously pursue as an organization the essence of what our founder Kazuma Tateishi, who was an outstanding engineer and manager, practiced. Two years since the start of the long-term vision “SF2030,” technology management based on backcasting from the near-future design has begun to produce various results useful for resolving the three social issues OMRON is addressing under SF2030.

Firstly, I would like to reflect a bit on the past. In the 1960s, when OMRON was poised for major growth, our founder was convinced that strengthening research and development was essential to prepare for changes in society and for addressing growing market needs. So he invested an amount equivalent to four times the company’s capital at that time to establish the Central R&D Laboratory. Then, he hired a large number of engineers to pursue development of systems and software in addition to development of components for automation such as switches and relays. The background to this was that the founder

predicted the future cashless era and believed that the technological development of systems and software would be crucial in the course of a shift toward a cashless society. OMRON thus expanded its business format from a component manufacturer to a system manufacturer and achieved dramatic growth. OMRON was able to make such a bold decision at that time because of the founder’s conviction that “management means anticipating the needs of future society” and his recognition of the necessity of practicing “R&D-driven management to create a market.”

The founder and his team then developed a theory of future prediction in order to develop a concrete vision of future society and explore business opportunities, presenting it at the International Future Research World Congress in 1970. This is the SINIC Theory. OMRON continues to position the SINIC Theory as a management compass in its initiatives for innovation driven by social needs.

According to the SINIC Theory, year 2023 corresponds to the Optimization Society and is in a transition period leading to the Autonomous Society. There were transition periods in the past. OMRON achieved dramatic growth in the period from late 1960s to the 1970s. It was the transition period from the Automation Society to the Cybernation Society. It was a time when Japan’s high economic growth led to social issues such as traffic congestion caused by the advent of motorization and congestion at train stations due to the concentration of population in urban areas. At its Central R&D Laboratory, OMRON developed a stream of world-first products and systems, such as automated traffic signals, unmanned train station systems, and online automated cash dispensers, bringing about major changes in the way people lived and worked.

The Optimization Society in which we live at present is also a transition period in which population aging and widening economic disparities are creating strains in social and economic systems, and a number of social issues have arisen due to confusion and conflict in the context of much debate concerning the sustainability of life on Earth. In the past few years, the spread of COVID-19 has brought about major changes in our values and ways of working, and the rapid evolution of AI and other digital technologies is changing our lives and our society. Generative AI is now within everyone’s reach, and the ongoing debate around the world about its use and regulation reflects this. We are in a period of great change, with technology, science, and society interacting with one another, in which there are abundant opportunities for innovation driven by social needs.

### Three Approaches and Four Organizations to Self-sustaining Innovation Driven by Social Needs in the Runup to the Autonomous Society

In order to ensure that we seize the opportunities, as CTO, I have been focusing on development of organizations, mechanisms, and human resources to implement strategies based on near-future design. These tasks had to be accomplished in order to transform the tacit knowledge of technology management practiced by the founder into explicit knowledge and organizational knowledge enabling OMRON to continuously engage in innovation driven by social needs. Specifically, we have established four organizations to approach the three elements of the SINIC Theory, “science,” “technology,” and “society,” as well as interaction of these elements and upgraded our approaches. (See [Figure 1](#) and [Table 1](#) )

First, we established the Innovation Exploring Initiative HQ (IXI) in 2018 for “establishment of a business creation process,” an approach whose starting point is “society.” As a platform for the OMRON Group’s innovation, IXI is committed to the ongoing creation of new businesses. In the same year, we also established OMRON SINIC X Corporation (OSX) for “core technology evolution,” an approach that takes “science” and “technology” as its starting points. OSX is responsible for the creation of innovative technologies through open innovation from a broad “scientific” perspective based on a vision of society in the near future. The Technology and Intellectual Property HQ, which is responsible for social implementation of technology, has defined focus domains and directions for strengthening development of core technologies, and reviewed development themes in close cooperation with IXI,

Figure 1

<Relationships between the SINIC Theory and the Organizations>

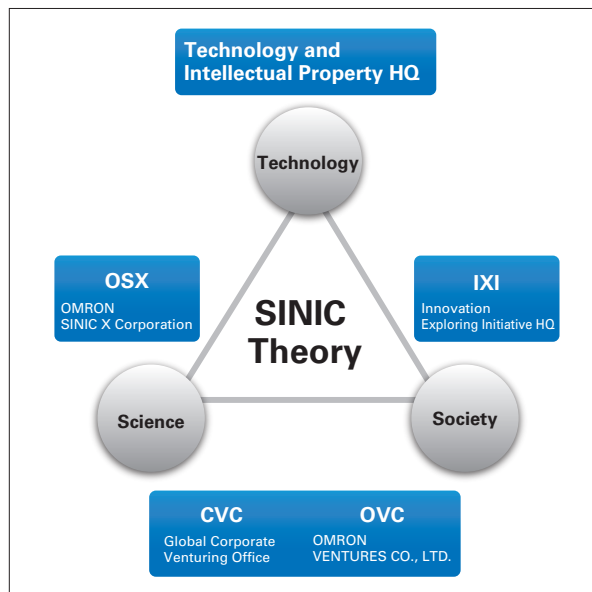


Table 1

<Three approaches to social needs creation by four organizations>

<p><b>Approach 1: Establishment of a business creation process: IXI</b></p> <ul style="list-style-type: none"> <li>● Company-wide platform for management commitment to new business creation and business development</li> <li>● Implement the founder’s “7:3 Principle” as a business creation process</li> <li>● Classify the types of human resources needed for new businesses, attract such talented people from inside and outside OMRON, foster them, and return them to the organizations from which they come</li> </ul>
<p><b>Approach 2: Evolution of core technologies: Technology and Intellectual Property HQ, OSX</b></p> <ul style="list-style-type: none"> <li>● Identify areas of technological focus and strengthen “Sensing &amp; Control +Think”</li> <li>● Develop technologies for “substitution,” “collaboration,” and “harmony” to achieve social implementation of “automation to empower people.”</li> <li>● Attract talent through creation and dissemination of innovative technologies from a scientific perspective based on near-future design and co-create</li> <li>● Formulate a policy for utilization of intangible assets company-wide and implement IP strategy</li> </ul>
<p><b>Approach 3: Co-creation with startups: CVC, OVC</b></p> <ul style="list-style-type: none"> <li>● Invest in promising startups with high growth potential that address social issues</li> <li>● Co-create with business divisions, IXI, Technology and Intellectual Property HQ, and startups for creation of new markets and business innovation</li> <li>● Implement the acceleration program to quicken business growth through involvement in the startups in which OMRON invests</li> </ul>

business divisions, and OSX. The third approach, “co-creation with startups,” which takes “science” and “society” as its starting points, is carried out by OMRON VENTURES CO., LTD. (OVC) and the Global Corporate Venturing Office (CVC). OVC and CVC are taking on the challenge of pioneering social implementation of cutting-edge technologies, and are working to accelerate open innovation through investment in and co-creation with startups to create innovation driven by social needs.

**Human Resources Development to Create Innovation Driven by Social Needs**

Human resources are the key to these initiatives to create innovation driven by social needs through near-future design. I have been paying particular attention to the development of human resources capable of continuously creating innovation driven by social needs. Having classified the types of human resources needed in the business creation process, IXI has focused on fostering “architects” capable of drafting comprehensive business plans (architecture) linking business, technology, and intellectual property. Architects fostered at IXI have returned to business divisions, the Technology and Intellectual Property HQ, etc., to lead new businesses and strategies, or have been dispatched to government agencies, etc., to support their digital transformation (DX). The Technology and Intellectual Property HQ, a source of “core technology talents,” established a specialist system for engineers, defined skill levels, and launched a training system ahead of the rest of the OMRON Group, creating an environment where all employees can fully demonstrate their abilities.

**New Social Needs for Resolution of Social Issues**

Eight years since the start of technology management based on near-future design, I am sensing that innovation driven by social needs is becoming self-sustaining. This is because the four organizations,

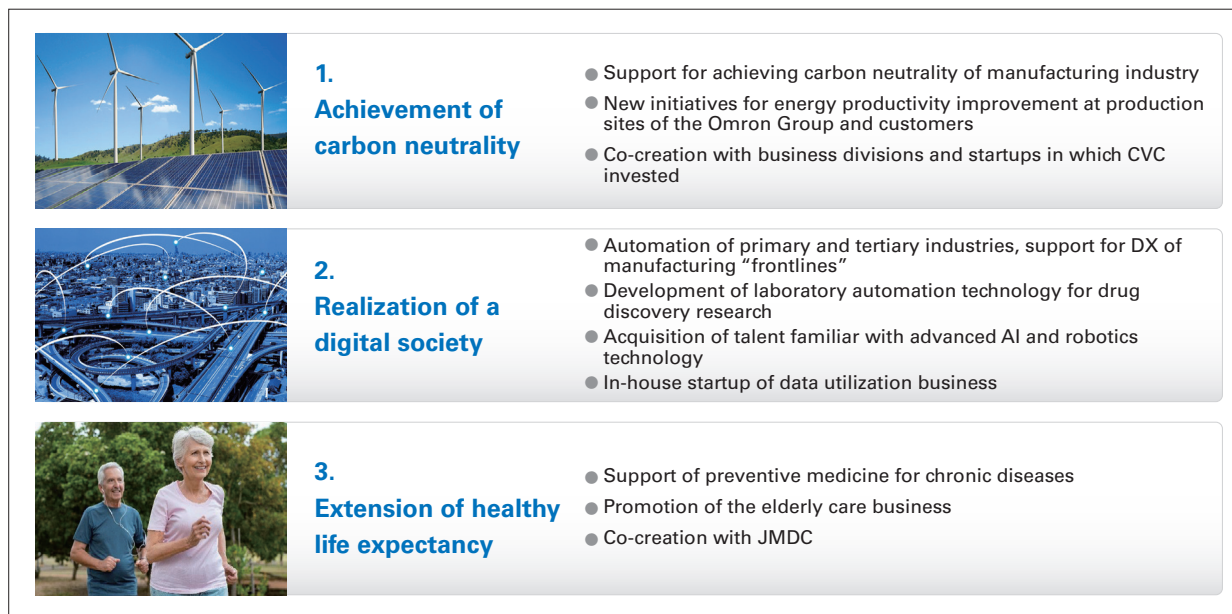
three approaches, and human resources implementing the near-future design are beginning to produce results, such as new businesses and development of core technologies, in the focus domains to resolve the three social issues defined under SF2030. (See [Figure 2](#) )

For “achievement of carbon neutrality,” our near-future vision is to achieve carbon neutrality of manufacturing sites and entire factories. In addition to the development of products and systems, and services in the business divisions and the Technology and Intellectual Property HQ, co-creation with startups in which OMRON has invested has also begun. Attempts are underway to quickly link the latest technologies possessed by startups to social implementation.

With regard to “realization of a digital society,”

adoption of our services to support utilization of data at manufacturing sites is widening, especially by small and medium-sized companies whose manufacturing sites have impeded promotion of DX in manufacturing industry. From the current fiscal year, OMRON’s first in-house startup to emerge from IXI has begun full-scale business activities for these data utilization support services. The Technology and Intellectual Property HQ and its research subsidiary OSX are developing AI and robots that assist people and enhance their potential and creativity, with the aim of realizing a “people-centric society” in which everyone can play an active role through the use of AI and robots, in addition to data utilization. The joint research with Chugai Pharmaceutical Co., Ltd. in the field of drug discovery, which began in July 2023, is an attempt to create “innovative technology to evolve the

[Figure 2](#) <Focus Domains for Innovation Driven by Social Needs and Achievements>



relationship between humans and machines” toward realization of the Autonomous Society, and will trigger innovation in the field of drug discovery research. In addition, OSX brings together world-class researchers in the AI and robotics fields who have been inspired by OMRON’s vision. Through open innovation, they are developing unique advanced technologies that will contribute to the realization of the Autonomous Society. More than 40 papers have been presented by OSX and accepted for publication at prestigious international conferences, indicating our technological capabilities for development of AI and robotics. Nowadays, OSX is visited by people from many research institutes and different industries, and many co-creation themes are proposed to OSX. Regarding data-driven healthcare for “extension of healthy life expectancy,” IXI is promoting development of a new business. As population aging accelerates and various issues related to nursing care emerge, a service to support the independence of the elderly, which focuses on “preventing nursing care itself” rather than supporting nursing care, is in the final stages of verification for commercialization. In addition, as we enter the era of 100-year life expectancy and the need for a society in which people can continue to work in good health, issues such as the financial soundness of corporate health insurance associations and the curbing of ever-increasing medical expenses are becoming more pressing. In order to concretize a future vision of data-driven healthcare that will resolve such social issues, IXI has taken the lead in various co-creation projects to create new value in the healthcare solution field with JMDC, with which OMRON entered into a capital and business alliance in March 2022, and is accelerating digital transformation of the OMRON Group. Going forward, as well as making JMDC a consolidated subsidiary\*, OMRON plans to develop IXI into a new organization, the Data Solution Business HQ, so as to apply JMDC’s capabilities throughout the OMRON

Group. The Data Solution Business HQ will directly report to the President and CEO. These moves are proof that OMRON is beginning to demonstrate its ability to create innovation driven by social needs in the transition period to the Optimization Society. OMRON’s founder advocated that “To the machine, the work of the machine, to man the thrill of further creation” Inspired by the OMRON Principles and this management philosophy bequeathed by our founder, we are always thinking about a near future in which people can become more creative and fulfill their potential. OMRON is able to take on the challenge of creating innovation driven by social needs because everyone involved, including our employees, sympathize and resonate with this idea. This allows us to continue to advance vigorously as an autonomous organization, bringing together leaders and engineers from around the world who are passionate about resolving social issues by applying their capabilities and shaping the future.

\* As of this writing (September 15, 2023), the tender offer to make JMDC a consolidated subsidiary has not yet closed. The share acquisition is scheduled to be executed on October 16, 2023.

### **Capturing the Tide of Discontinuous Technological Innovation and Creating Innovation Driven by Social Needs**

In this way, I have been implementing technology management that anticipates the needs of future society and promotes R&D-driven market creation, as our founder did, through creation of organizations and structures and human resources development, but many issues remain to be addressed. Specifically, in order to realize innovation driven by social needs in a period of great change as we progress toward the Autonomous Society, we need to “search for the seeds that will become themes,” which are essential to the implementation of near-future design, “gain insight into technological innovations taking place around the world,” and “further strengthen the human resources” who will engage in these initiatives.

This is because the degree of change in all areas of society, science, and technology is greater and more complex today than it was when the founder and his team were striving to create innovation driven by social needs. Not only the rapid spread of generative AI since the beginning of 2023, but also materials science that produces innovative new materials, quantum computers that exceed the performance limits of conventional computers, and biotechnology such as genome editing and regenerative medicine, could potentially have a tremendous impact on society and transform people’s lives. In the course of implementing these technologies in society, various issues, such as those related to ethics and economic rationality arise, and the new technologies are disruptive because they do not fit existing social systems and values. In order to capture the tide of discontinuous technological innovation, continuously create new businesses and innovations, and achieve sustainable growth, it is not sufficient to simply envision a future society in which technology has become diffused. For bringing the future society into sharper focus, defining specific issues, and resolving them, an individualistic approach will not work. It is necessary to collaborate with organizations and individuals worldwide at the forefront of every field in order to envision a society we aspire. We also require human resources capable of grasping the ebb and flow of society, science, and technology, and of finding the seeds that emerge and cultivating them one after another. As CTO, I will continue to achieve “value-up” of our technology management while endeavoring to enhance each employee’s ability to create innovation driven by social needs in pursuit of sustainable growth. I will take on the challenge of realizing “automation to empower people” for the benefit of the new society, the Autonomous Society embodying the management philosophy of our founder, working together with our diverse stakeholders.

# Innovation Exploring Initiative HQ (IXI)

## “Takeoff” From Business Validation to Business Launch

Executive Officer Senior General Manager, Innovation Exploring Initiative HQ

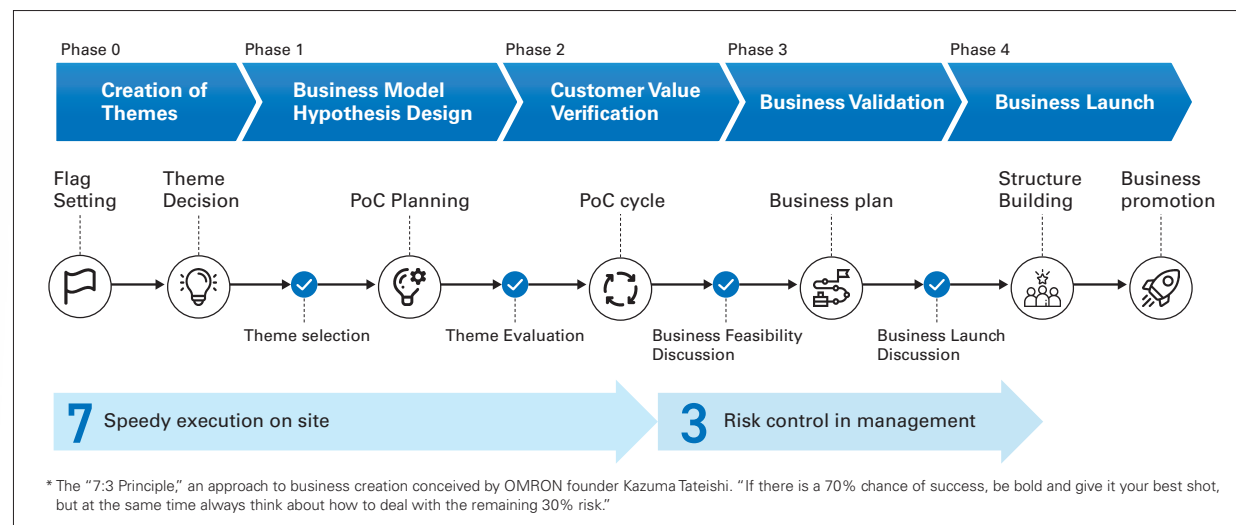
### Hidetaka Ishihara

The Innovation Exploring Initiative HQ (IXI) aims to be an organization that anticipates new rapidly emerging social issues, including the trajectory of the ongoing technological evolution as well as social needs likely to emerge in the near future, and to be a source of new businesses corresponding to the opportunities and challenges inherent in these developments. In the five years since its inception in 2018, IXI has established a “Business Creation Process” for launching new businesses with high reproducibility. This is a “mechanism enabling an organization to operate autonomously.” (See [Figure 1](#)) We have built a solid foundation (organization, processes, and human resources) for our execution of high-potential themes.

Fiscal 2023, the sixth year of IXI, is an important year for us in which we intend to make a big leap toward the achievement of SF2030. We got off to a flying start. For example, the on-site data utilization support solution business (pengu), for which we have been conducting business validation ahead of other themes, was launched in the current fiscal year as an internal start-up. In addition, the elderly care solution business and the agri-automation business have advanced to the final stage of business validation and are scheduled for launch in fiscal 2024. Regarding collaboration with JMDC Inc. (JMDC), with which OMRON formed a capital and business alliance in February 2022, IXI led the planning and promotion of

the Health & Productivity Management Alliance aimed at enhancing the competitiveness of Japanese companies and securing the sustainability of corporate health insurance through improvement of employee health. The Health & Productivity Management Alliance was established on June 30, 2023, with seven lead managing companies. (See P66.) Leveraging the Health & Productivity Management Alliance as a corporate health platform, we will co-create various healthcare solutions. The relationship with JMDC will be further deepened by making it a consolidated subsidiary\*. Each of OMRON’s businesses possesses vast amounts of data not only in the healthcare solution domain, but also in the social solution domain and the industrial automation domain. IXI will lead the creation of a new data solution business by leveraging JMDC’s outstanding data management technology and solution development expertise to transform all the data held by each business of OMRON into value. These fascinating themes are about to blossom.

Figure 1 <Format of Value Verification>



Fiscal 2023 will be a year in which the themes we have been working on take-off as businesses addressing social issues.

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### Five New Business Fields Envisioned by IXI

In order for businesses to take off one after another over the medium to long term, it is essential to compile a portfolio of well-developed themes. IXI has identified five new business fields that will contribute to resolving the three social issues OMRON is addressing under SF2030, namely, “achievement of carbon neutrality,” “realization of a digital society,” and “extension of healthy life expectancy.” They are “data-driven healthcare,” “automation for food industry,” “support for achieving carbon neutrality of manufacturing industry,” “support for DX of manufacturing sites,” and “decent work.” (See Figure 2 ) Based on these five themes, we will compile a portfolio of themes and create groups of

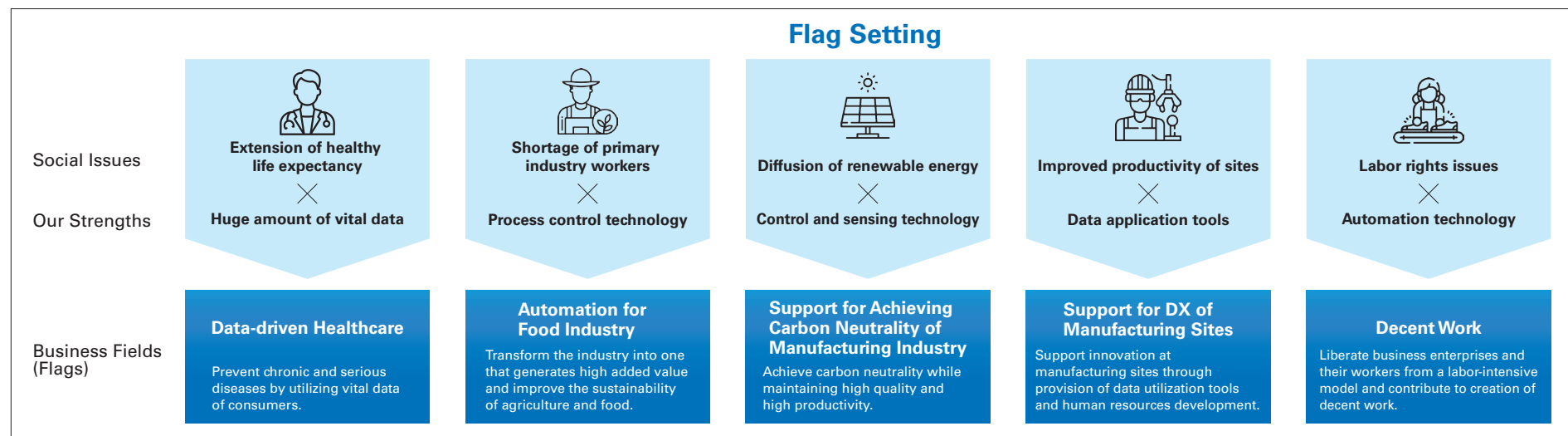
businesses through investment in startups, collaboration with other companies, and development of solutions utilizing OMRON’s business assets.

### “Business Creation Process” and “Architects” Supporting IXI’s Creation of New Businesses

The most difficult aspect of creating a new business concerns decision-making to “go” or “stop” while making and testing hypotheses and changing directions repeatedly. The larger the organization, the more rigid it becomes and the more difficult it is to be agile. IXI has established the “business creation process” as a “mechanism enabling an organization to operate autonomously.” In this process, senior executives who make investment decisions, the managers who lead the projects, and the members of the project team have a shared recognition of the actual difficulties, discuss what should be considered and decided in each phase, and create new businesses with a high degree of reproducibility

through iterative “trial and learning.” This process is never-ending and is evolving day by day. Over and above that, the business creation process hinges on human resources. As the business creation process proceeds to a new phase, the capabilities and skills required for a project team become more diverse. The success of a new business depends on the ability to manage this diversity so that it strengthens the team’s capabilities. Among the diverse capabilities and skills, IXI has focused on improving capabilities and skills of “architects.” Specifically, they are capabilities and skills to repeatedly test hypotheses, identify intrinsic value for customers, and shape a business model. Through mid-career hiring and development of internal human resources, IXI has developed more than 60 “architects” over the past five years. Several people have returned to the business companies and are demonstrating their capabilities in the business field as leaders in the evolution of the business models of existing businesses.

Figure 2 <Five Flags Planted by IXI>



### IXI's First New Business: Support for DX of Manufacturing Sites

The first in-house startup originated from IXI, the "pengu" business, which provides support for DX of manufacturing sites, was launched in March 2023. Many companies are investing in "management" DX such as the introduction of enterprise systems for their organizations. Meanwhile, in order to increase organizational productivity and maximize business output, "on-site" DX is also essential. On-site DX<sup>®</sup> (See [Figure 3]) is an innovation that creates value by dramatically evolving the triggers for improvement that emerge from day-to-day operations through the combination of business operation automation tools and training programs. If frontline personnel are equipped with IT skills to automate and streamline routine tasks such as voucher entries at each site, devote more time to new tasks, and increase productivity, this will lead to on-site DX<sup>®</sup> that will take management to new heights. IXI Data Utilization Solution Business Department not only provides and supports "on-site" DX itself but also a mechanism to connect "on-site" and "management" through pengu. We currently provide services to customers in a broad range of manufacturing industry, including automotive parts, machinery and electrical

products, electronic components and devices, materials and processed materials, semiconductor-related equipment, food, cosmetics, and consumer goods. We are challenging to further expand our services.

### Services to Meet the Challenges of Manufacturing Sites

Another feature of pengu is training support. Besides introduction of pengu, we offer training of on-site personnel according to their skill levels in order to upgrade their skills so that they will be able to create automation tools tailored to their tasks and improve business operations.

Milbon Co., Ltd. is a cosmetics manufacturer that manufactures and sells hair care products and hair colorants exclusively for beauty salons. Milbon's factories were experiencing a growing need for data aggregation. In view of the urgent necessity of implementing effective measures, Milbon decided to introduce OMRON's pengu because of its attractive characteristic of "no special skills required for use." Mika Onoda and Miho Maekawa, who are using pengu at Milbon's Yumegaoka Factory, gave us some feedback.

"In my department, I am in charge of logistics. I have automated the Excel-based daily warehousing

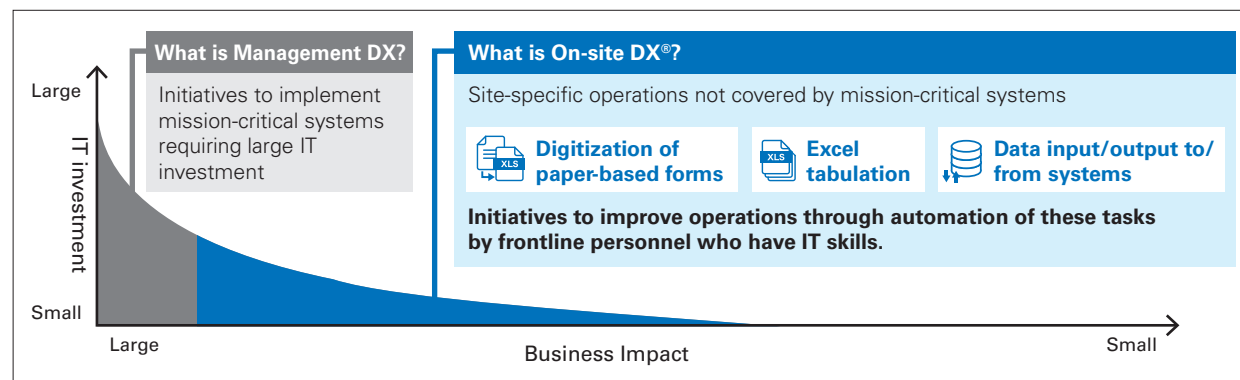
operations, using pengu's SUISUI ETL. Previously, I had to manually calculate and update the Excel file based on the daily changing inventory status, which took several hours. Utilizing pengu saves me a great deal of time and effort." (Onoda)

"I am engaged in labeling. Using SUISUI RPA, I can now automatically print labels to be attached to packages. This has also eradicated errors attributable to manual input." (Maekawa)

They both say that the key to mastering the tools was the support they received from OMRON. "People from OMRON repeatedly instructed us in the basics, helping us master the tools. We appreciate the in-depth support, not only on how to operate the tools, but also on organizing and reviewing the best way for us to proceed based on OMRON's understanding of our business operations." (Onoda and Maekawa)

Terukazu Takahashi, General Manager, has high expectations for the impacts of automation. "If we can improve issues one by one, we will be able to identify the appropriate number of personnel and their allocation. But reducing the number of people deployed isn't our ultimate goal. This is a process enabling us to tackle new themes. In our quest for optimization, we have great expectations of OMRON's support tailored to our on-site needs."

Figure 3 <On-site DX>



## Elderly Care Solutions centering on Nursing Care Prevention

The “supporting elderly care business” is the second in-house startup originating from IXI that is now in the final stage of business validation. Japan is facing a super-aged society ahead of the rest of the world. In Japan, a country where there is a shortage of caregivers for the growing numbers of elderly people who require nursing care, the need to extend healthy life expectancy, enabling people to lead healthy and independent lives, has become a social issue. It is known that about half of those with light needs for long-term care are in such conditions due to a decline in physical and mental functions attributable to inactive lifestyles. Such conditions are preventable and there is high possibility of improvement.

Promotion of nursing care prevention, that is, helping these people regain physical and mental functions so that they can be independent in their daily life and participate in society, is also a great opportunity to create new businesses. IXI Supporting Elderly Care Business Promotion Department has developed solutions that enable unskilled caregivers to provide support on a par with that available from skilled caregivers. Know-how based on skilled caregivers’ experience and insights is presented in the form of text and charts and implemented on an ICT system. By combining this system with human support, it has become possible to improve operational efficiency and raise the skill level.

To verify the effectiveness of our solutions, we are currently collaborating with several municipalities that are working to support the elderly so they can live independently and endeavoring to prevent progression of the level of care required. Through verification in municipalities with different regional characteristics, the effectiveness of solutions combining ICT and human-based support is steadily being demonstrated. Specifically, by homing in on the difficulties that the elderly experience in their daily life and the causes of

those difficulties, it is now possible to identify elderly people who may be able to lead independent lives. As a result, we are able to help determine the most appropriate support plan for each individual, and thus for three consecutive years we have helped a growing number of the elderly improve their life functions and regain their independence. It has also become clear that by utilizing data on the elderly and the community accumulated in the ICT system, we can contribute to community development through support of independence. We have presented these results at academic conferences. Through exchanges of opinions with experts and municipalities throughout Japan, we are also working to expand recognition of our initiatives.

In fiscal 2023, we will complete verification of business profitability and scalability. We aim to launch the business in fiscal 2024.

## Launch of the Health & Productivity Management Alliance in Collaboration with JMDC

In addition to creating new businesses organically based on our business creation process, we are also working on creation of businesses through M&A (alliances) based on the business strategy. As a first step, we formed a capital and business alliance with JMDC in 2022. “Extension of healthy life expectancy” and “realization of a sustainable healthcare system” are two goals universally desired in the healthcare field. As society becomes more mature, the issues they involve become more pressing and yet the difficulty of achieving both goals simultaneously become starkly apparent. OMRON is accumulating vital data of consumers and patients in their everyday lives. On the other hand, JMDC possesses medical and healthcare data, such as health insurance claims and health check-up data, which OMRON does not possess. By combining these data, we develop and

provide preventive solutions for chronic illness and for worsening conditions so as to “extend healthy life expectancy” and “realize a sustainable healthcare system.”

In the business alliance with JMDC, seven working groups have been established to promote collaboration. One of the major achievements was the launch of the Health & Productivity Management Alliance on June 30, 2023, with the vision of “revitalizing Japanese companies and securing the sustainability of company-run health insurance societies by promoting employees’ well-being.” As of September 30, 2023, 244 companies and organizations have participated. Nine companies (Ajinomoto Co., Inc., SCSK Corporation, OMRON Corporation, Kirin Holdings Company, Limited, Shimadzu Corporation, JMDC Inc., Nippon Life Insurance Company, Nomura Research Institute, Ltd., and Sumitomo Mitsui Banking Corporation) from across the economy are lead managing companies. They are working with companies in the Alliance to practice health & productivity management and share and accumulate know-how. The Alliance will also promote collaboration with government and academia, aiming to contribute to optimization of ever-expanding healthcare costs, going forward.



Management of the eight lead managing companies of the Health & Productivity Management Alliance



### Creation of Solutions to Prevent Disease Aggravation using a Health Data Platform

The initiatives of the Health & Productivity Management Alliance go beyond the practice of health & productivity management and the sharing and accumulation of know-how. The Alliance also aims to develop and provide solutions for health promotion and prevention of disease aggravation, thus benefitting companies and health insurance associations engaged in health & productivity management, and to develop a co-creation platform to verify the effectiveness of those solutions. OMRON's initiatives have been primarily focused on solutions for cardiovascular diseases and asthma. However, many diseases in the world need to be addressed and the need to prevent their aggravation is increasing. In order to meet these social needs, OMRON will expand the range of diseases it targets based on the health data platform it has built and provide more preventive solutions. Through the Health & Productivity Management Alliance, we will promote development of three preventive solutions for disease areas that cause significant losses to management. (See [Figure 4](#) )

An example of these initiatives is the “hypertension improvement program.” As a demonstration experiment, we have been conducting field testing of the effectiveness of the program at OMRON since June 2023. Specifically, OMRON identified those at high risk of severe hypertension from the results of health checkups and solicited their participation in the hypertension improvement program. Through three months of blood pressure monitoring and interviews with doctors and healthcare professionals, many of the participants were able to achieve their antihypertensive goals as a result of improved diet, exercise, and lifestyle modifications. By contacting those who are neglecting to receive treatment at an early stage, it is expected to be possible to prevent the development of severe cerebral and cardiovascular diseases whose origin is hypertension. This will not only help individuals maintain health but also lead to the maintenance and stability of the company's workforce. Another example is “health support for women.” As women are expected to play more active roles, many companies are aware of the challenges they face with regard to their health. Facing social issues, OMRON

and companies participating in the Health & Productivity Management Alliance are collaborating to develop solutions. The demonstration experiment will utilize OMRON Healthcare's basal thermometers. By providing health information reflecting the data on changes in basal body temperature, a vital rhythm unique to women, and tailored to the changes that women experience with the passage of time, as well as online health consultation services, behavioral changes in working women and changes in their performance will be verified. These services are expected to help women play active roles in the workplace and reduce labor losses due to ill health. Through the Health & Productivity Management Alliance, we will address social issues related to health and develop preventive solutions to improve the quality of life (QOL) of employees for diseases and conditions that result in major losses for management, such as prevention of aggravation of hypertension, health support for women, and mental health-related support, thereby contributing to the extension of healthy life expectancy.

Figure 4 <Health Data Platform-based Solutions for Companies to Prevent Disease Aggravation>

Contribute to the Health & Productivity Management Alliance by developing preventive solutions to improve employees' QOL for diseases that result in major losses for management		
	Needs of employees and management	Business summary
<b>Prevention of aggravation of hypertension</b>	Prevention of severe cerebral and cardiovascular diseases caused by hypertension	<b>Screening for high-risk individuals + RPM</b> Providing risk screening and remote patient monitoring (RPM) services for high-risk individuals using medical examination/billing data and, in future, vital data such as blood pressure
<b>Health support for women (Femtech)</b>	Improvement of presenteeism and absenteeism caused by women's health issues	<b>Women's health support services</b> Supporting women's success by providing one-stop services ranging from awareness-raising through seminars, basal body temperature management apps, and self-care/RPM services
<b>Mental health prevention and improvement support</b>	Improvement of presenteeism and absenteeism caused by mental disorders	<b>Mental health support services</b> Early detection of at-risk individuals through stress checks, pulse surveys, etc., and provision of mental risk intervention solutions using sleep data

### Creation of a Data Solution Business Going beyond the Healthcare Solution Domain

In the social solution domain, we are collaborating with OMRON FIELD ENGINEERING Co., Ltd. (OFE), an OMRON Group company, on its management & service business. Taking advantage of its 140 sites throughout Japan and 1,200 maintenance and service personnel, OFE provides operation, maintenance, design, and construction services nationwide in wide-ranging fields, including finance, rail and road transportation, manufacturing, and distribution, as well as operational support related to store operations.

Currently, the retail and restaurant industries, including major convenience stores and coffee shops, are facing various social issues, such as the increasing burden of IT equipment management and rising operating costs due to soaring gas and electricity costs, in addition to worsening labor shortages. To resolve these issues, we are working with JMDC on "solutions to achieve optimized operations and energy conservation throughout stores," using data collected from stores.

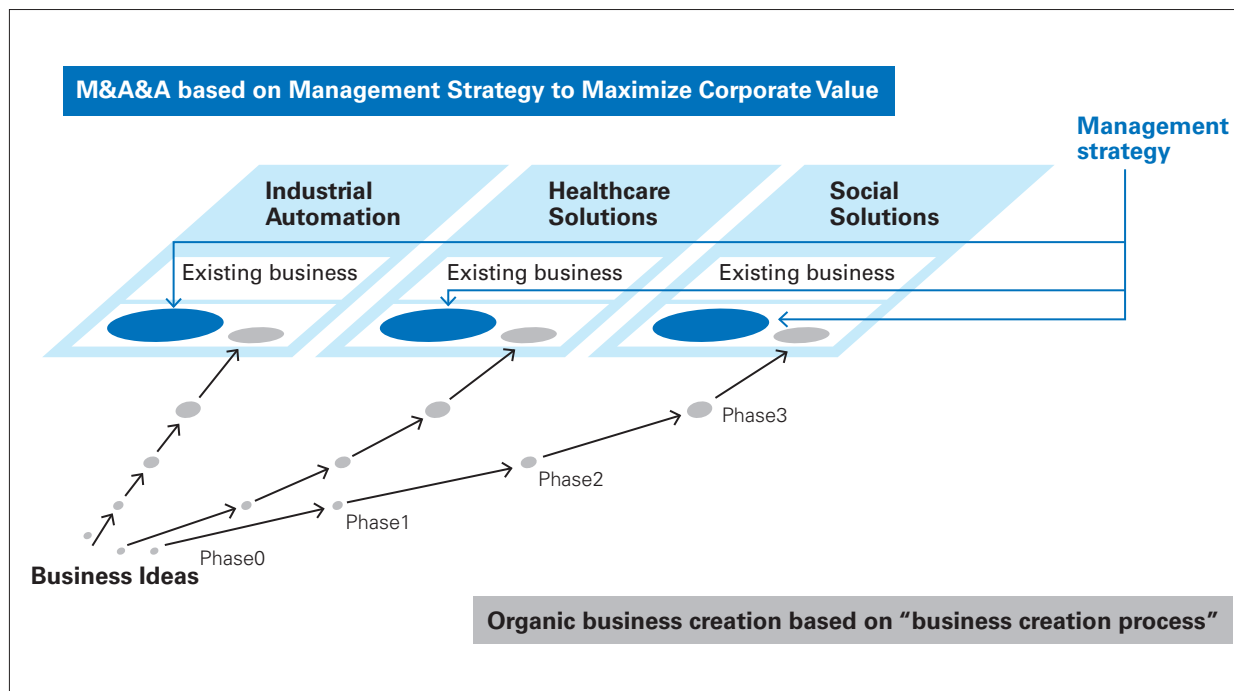
To accelerate solutions through the use of on-site data, we are also working on "one-stop repair and maintenance services." For one-stop services, it is necessary to manage all the repairs as well as all the equipment and facilities of different manufacturers used in commercial facilities across industries. Through integrated management of the equipment and facilities of different manufacturers used in commercial facilities, it will become possible to collect a greater variety of on-site data than ever before. Co-creation with JMDC based on these collected data will enable us to accelerate the development of new data solutions to resolve our customers' issues.

### Toward Creation of Even Greater Results and Evolution of IXI

There are two keys to IXI's further advancement from now on. The first is to strengthen the human resources portfolio and increase the engagement of each employee. The organic approach based on the business creation process and the inorganic approach utilizing M&A&A (alliances) differ greatly in terms of the skills required for business creation and the corresponding jobs. In addition to strengthening the recruitment of diverse human resources with different skills, we will create an environment in which people with high aspirations and strong motivation can maximize their abilities.

Another key is to implement through "high cycle management." The essence of high cycle management lies in the hypothesis testing cycle, that is, how quickly the hypothesis can be formulated, tested and pivoted to maximize the value created. Although the value created per cycle may be small, the value is exponentially amplified as the number of cycles run increases. In other words, it is like the power of compound interest. IXI's business creation process is truly a process that enables high cycle management. We will create even greater results through repeated hypothesis testing and continuous "trial and learning."

<M&A&A based on Management Strategy to Maximize Corporate Value>



## Technology and Intellectual Property HQ

### Pioneer in Creating Innovation Driven by Social Needs

Executive Officer, Senior General Manager, Technology and Intellectual Property HQ, OMRON Corporation; President and CEO, OMRON SCINIC X Corporation

#### Masaki Suwa

#### Direction of Evolution of Core Technologies to be Continuously Refined

Our core technologies “Sensing & Control + Think” are the source of our unceasing “innovation driven by social needs.” At the launch of SF2030, we set “Robotics,” “Sensing,” “Power Electronics,” and “AI and Data Analysis” as core technology areas of focus, and are promoting technological development for social implementation based on “near-future design.” Moreover, we have formulated a policy on the direction in which we will seek to advance as we continue to refine and evolve our core technologies in pursuit of technological development. In SF2030, from the “essential value perspective,” we set the direction of evolution of core technologies that we will

continuously refine in order to evolve the business. This involves “On-site edge sensing & local distributed autonomous control technology” and “Data and signal management technology for data analysis,” and close linkage of these two themes.

For example, regarding “extension of healthy life expectancy,” the sensing of diverse vital data of individuals in their daily lives is becoming increasingly important in the healthcare business. This is because vital data in daily life is the key to prevention of disease, including presymptomatic disease. However, opportunities to obtain vital data with medical device-level accuracy are few and infrequent. A major reason for this is that sensors that allow vital data to be easily obtained anytime, anywhere have yet to be fully realized. For example, if a sensor that captures vital data is a wearable, in practice it is difficult to obtain the necessary vital data because they are buried in a flood of information (“noise” in vital data sensing)

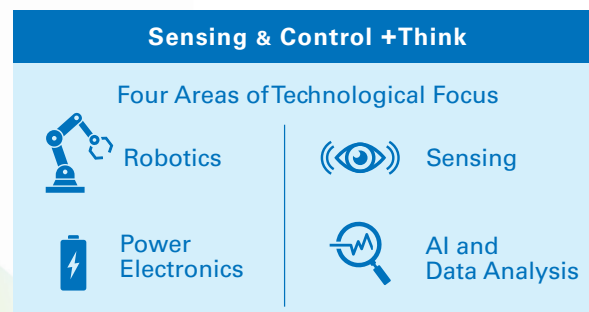
generated by the activities of daily life. Therefore, we are tackling the challenge of developing technology to efficiently extract only necessary vital data from sensor data buried among the noise of daily life by integrating sensing technology with AI and data analysis technology. Evolution of on-site edge sensing technology is the direction in which evolution of core technologies is heading.

However, the ability to obtain large amounts of vital data is in and of itself insufficient to create value. In order to agilely detect changes from diverse and ever-changing data by monitoring indicators linked to expert knowledge and to discover causal structures that human experts would not notice, we need to continue refining our data and signal management technology, including through smarter collection and analysis of data and signals and their translation into customer value. This is the second direction in which core technologies are evolving. By closely linking on-site edge sensing and data and signal management technology, we intend to facilitate innovation driven by social needs to achieve the “extension of healthy life expectancy.”

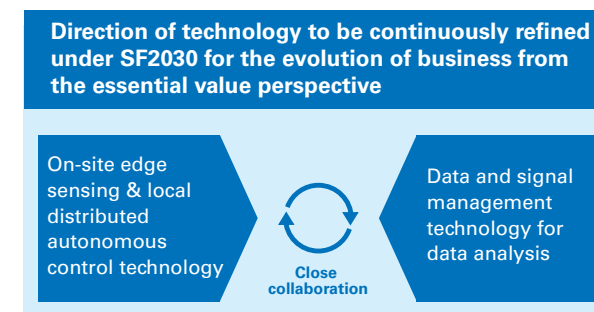
Our initiatives for “realization of a digital society” include the development of a next-generation lab automation system with Chugai Pharmaceutical Co., Ltd. announced in July 2023. The aim is to automate a



<OMRON's Core Technologies and Four Areas of Technological Focus>



<Direction of Evolution of Core Technologies>



series of lab experiments conducted in drug discovery research, thereby freeing up time for researchers to conduct more creative research. In order to automate lab tasks, robots are needed that can flexibly and autonomously perform atypical tasks previously performed by researchers, such as preparing chemicals and operating analytical equipment. Then, based on the data obtained from each successive experiment, data analysis needs to be managed and a plan for the next experiment formulated. Chugai, OMRON, and OMRON SINIC X (OSX) are tackling the great challenge of achieving lab automation through co-creation. The examples introduced here indicate how we are continuing to evolve our core technologies. To address the three social issues as a pioneer in creating innovation driven by social needs, we are working on various themes, including the following.

▶ **“Achievement of carbon neutrality**

- Technology for miniaturization of power conditioners in Vehicle to Home (V2H) that realizes a hybrid energy network
- High efficiency and miniaturization technology for industrial power supplies

▶ **“Realization of a digital society”**

- Lab automation technology to automate drug discovery experiments, etc. through innovation in robotics

- Data analysis technology at development sites and head office divisions that support the OMRON Group’s DX
- ▶ **“Extension of healthy life expectancy”**
- Biometric sensing technology to support personalized healthcare

**Initiatives to Further Evolve Core Technologies**

In order to pioneer the creation of innovation driven by social needs, it is essential to look beyond the boundaries of existing businesses and technological development. Five years have passed since we established OMRON SINIC X Corporation (OSX) as a new approach to “near-future design” from such a broad perspective. OSX is a research subsidiary that develops innovative technologies from a scientific perspective by focusing on society and technology. Since its establishment, OSX has been attracting superior researchers in robotics and AI technologies who empathize with the OMRON Principles and OMRON’s vision of the future. More than 40 papers have been accepted for publication at major international conferences, and OSX has gained recognition both in Japan and internationally as a unique corporate research institute. In 2022, “AI & Robots that Harmonize with Humans to Create Knowledge and Cross Its Borders” (Yoshitaka Ushiku, Project Manager, OSX) was selected as an R&D

project for the Moonshot R&D Program promoted by the Japan Science and Technology Agency (JST). The theme envisages the realization by 2050 of a world where humans (researchers) and machines (AI robots) interact harmoniously to produce Nobel Prize-level research outcomes. Synergy between OSX and technological development at OMRON Corporation is also beginning to emerge. The lab automation theme transpired as result of a challenge at World Robot Challenge (WRC), in which OSX participated, and developed into joint research. Collaboration with the Technology and Intellectual Property HQ is also underway in areas such as autonomous mobility robot technology and AI technology.

**Comments from Our Partner**

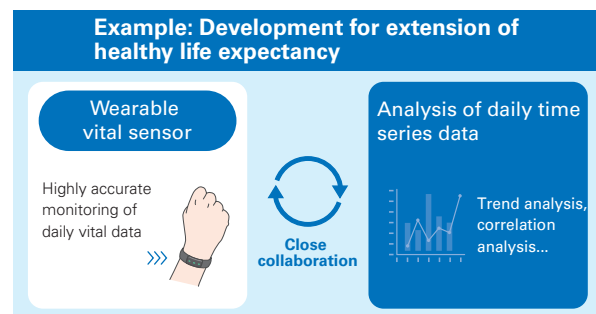
Chugai’s co-creation with OMRON and OSX on the next-generation lab automation system was prompted by an OSX researcher’s presentation on the product assembly challenge at World Robot Challenge held in 2020. We were impressed by OSX’s technology and the concept of developing a robot capable of working flexibly appealed to us and so we developed a relationship with OSX. By automating complex, non-routine tasks previously doable only by humans, and enabling experiments to continue without interruption throughout the night, on holidays, and at other times when researchers are not in the lab, we aim to liberate researchers so that they can enhance their productivity and unleash their creativity. I am pleased that we are able to promote co-creation activities based on empathy for the targeted technological development.

Biological Technology Dept.  
Research Division, Chugai  
Pharmaceutical Co., Ltd.

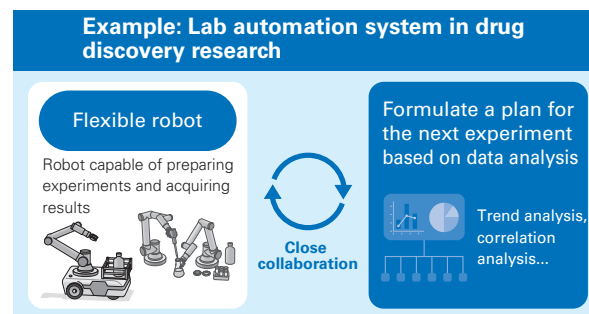
**Shogo Kamikawaji**



<Development for “Extension of Healthy Life Expectancy”>



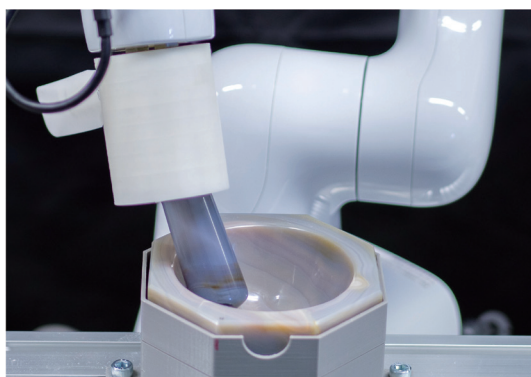
<Development for “Realization of a Digital Society”>



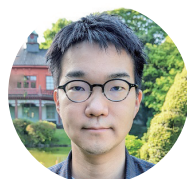
**Case 1** **Realization of a Robot to Automate Experiments in Materials Science**

For materials science experiments, it is typically necessary to grind powder into finer textures, which is a time-consuming process as it is generally performed manually. Therefore, we are developing a robot that can automate the process of grinding powder for experimental use. The robot equipped with a camera recognizes the state of the powder inside the mortar and automatically determines whether to gather the powder or proceed with further grinding. Furthermore, we are developing a robot with a soft jig that can perform powder grinding using simple position control. We are conducting this research in collaboration with Osaka University, and presented a paper at IROS2022\*, a major conference in the field of robotics.

\* IEEE/RSJ International Conference on Intelligent Robots and Systems

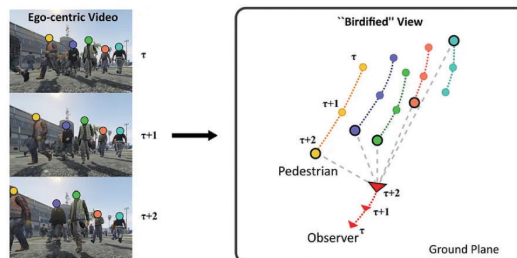


Senior Researcher  
OMRON SINIC X Corporation  
**Masashi Hamaya**



**Case 2** **Realization of an Autonomous Mobility Robot capable of Moving through Crowds**

For robots to move autonomously in environments where people come and go freely, such as airports, train stations, and event venues, they require technology to accurately estimate their own location. With conventional technology, a robot estimates its own position based on surrounding objects such as buildings, but this is difficult in crowded areas because people in the vicinity are also constantly moving. Therefore, we are developing a technology that enables a robot to estimate its own position by converting the robot's viewpoint into a bird's-eye view (view birdification), just like a bird watching from the sky, based on the robot's own movements and the movements of people around it. This development was conducted in collaboration with Kyoto University, and the results have been published in the International Journal of Computer Vision (IJCV), the foremost journal for computer vision.



Senior Researcher  
OMRON SINIC X Corporation  
**Mai Nishimura**



**Evolution of Intellectual Property/Intangible Assets Initiatives**

In recent years, intellectual property and intangible assets have accounted for an increasing proportion of corporate value and become increasingly important management resources as a source of competitiveness. The governance of intellectual property and intangible assets is overseen by the Intellectual Property Center of the Technology and Intellectual Property HQ, which is responsible for formulating, implementing, and supervising intellectual property strategies for OMRON's technology development, new business creation, and existing businesses. In fiscal 2022, in order to accomplish SF2030, our policy was to promote concretization of business models as a value creation story linked to the utilization of intellectual property and intangible assets, and to execute "ambidextrous IP activities" by combining "monopolistic exclusive type" and "sharing and inclusion type" in an optimal balance.

In execution, we regard IP/intangible assets initiatives as a value driver for enhancing corporate value, and are pursuing IP/intangible assets initiatives whose scope has been widened from conventional IP activities centering on patents to include technological know-how and human resources capabilities. For example, we are adopting the perspective of "advanced technology development efficiency," that is, how efficiently R&D investments are converted into competitive technologies; the perspective of "social implementation rate," that is, to what extent the intellectual property and intangible assets created are linked to OMRON's business growth and business advantages; and the perspective of "human resources capability," that is, to what extent human resources capabilities are improved as a result of development activities. Within the framework of these considerations, the Intellectual Property Center is promoting intellectual property and intangible assets

initiatives as a pioneer in the continuous creation of innovation driven by social needs to achieve sustainable enhancement of corporate value.

**Implementing the Mission and Vision of the Intellectual Property Center**

The Intellectual Property Center has established a mission and vision for the creation and delivery of new value through intellectual property to set OMRON on a path of sustainable growth. Below are examples of IP activities to achieve our mission. Firstly, we have introduced “IP landscaping.”\* Based on “near-future design,” using IP information, we analyze the needs of prospective customers and structure technological issues, formulate business hypotheses, and establish development themes. In this way, we are efficiently running a cycle of hypothesis testing. Moreover, we verify the synergy between IP owned by co-creation partners and IP owned by OMRON and the feasibility of new applications and businesses through citation analysis, etc., and formulate IP strategy from the perspectives of exclusivity and partnering strategies. Furthermore, the perception of value in business is changing from a product value perspective to an essential value

perspective and the base of inventors is expanding. Therefore, we are encouraging not only engineers but also people in non-development divisions, such as planning divisions, to invent essential value businesses capable of resolving customer issues and social issues. Secondly, as the business environment and social environment continue to change, the scope of use of the “OMRON” trademark, the heart of our corporate brand, continues to expand. The Intellectual Property Center, in cooperation with IP departments and local subsidiaries in the U.S., Europe, China, and Asia-Pacific, files applications for the OMRON trademark in various countries around the world, monitors brand infringement by third parties, detects infringement cases early, and implements countermeasures in view of the circumstances, laws, and systems in each country. The cases to be dealt with range from unauthorized use of company names to fake accounts on social media. In particular, there has been a marked increase in the sale of counterfeit products via the Internet, and we are working with e-commerce sites and the customs authorities of various countries to address this issue. We are also implementing a strategy-driven “IP cycle” that seamlessly links application to utilization. We do

not tolerate infringement of IP rights and issue warnings and file lawsuits against companies that infringe our patents and other IP rights, whether in Japan or overseas.

As business divisions propose new solutions to customers, they also communicate that OMRON’s products and services are protected by rights to intellectual property and intangible assets, and work to ensure that customers understand that only OMRON can create greater value added through co-creation with them.

In recognition of these IP activities, OMRON has been selected as one of the “Top 100 Global Innovators” by Clarivate, which selects the world’s most innovative companies and research institutions, for seven consecutive years.

In this way, the Technology and Intellectual Property HQ will pioneer the creation of innovation driven by social needs based on the areas of technology focus identified for the core technologies, the direction of evolution of core technologies to be continuously refined, and the evolution of IP/intangible assets initiatives.

\* IP landscaping: A method involving analyzing IP information such as patents, non-IP information, and internal information from a bird’s-eye view, utilizing such information as strategic information for management decision-making, and feeding it back to business and technology strategies to promote strategy formulation and execution.

**OMRON Intellectual Property Center Mission**

**We deliver unique value for people around the world by leveraging our core assets of intellectual property.**

**We develop and deepen appealing ideas.**

**We deliver peace of mind and confidence to customers.**

**We enhance our presence to our competitors offensively and defensively.**

**OMRON Intellectual Property Center Vision**

**We bring the IP specialists together from diverse fields and continue to create innovation.**

**We defy stereotypes.**

**We create a new paradigm of connections.**

**We strive to increase the trust from the management team.**



Top 100 Global Innovators award ceremony

# Global Corporate Venturing Office (CVC)

## OMRON's Evolving Corporate Venture Capital Initiatives

Senior General Manager, Global Corporate Venturing Office; CEO, OMRON VENTURES CO., LTD.

### Tomoko Inoue

The vision of the Global Corporate Venturing Office (CVC), which is responsible for OMRON's corporate venturing function, is to "become a 'booster' accelerating the transformation of OMRON and society in the evolution from the Autonomous Society to the Natural Society." Based on this vision, we are working with entrepreneurs and investors around the world who have the power to change the world by accelerating innovation driven by social needs to resolve the social issues that OMRON is addressing, namely, "achievement of carbon neutrality," "realization of a digital society," and "extension of healthy life expectancy."

CVC has invested in three startups through OVC II Investment Limited Partnership (OVC Second Fund), which invests in startups that seek to create value by addressing social issues. CVC's first investment in fiscal 2022 was in Eagle Genomics Ltd., which has developed an AI-augmented knowledge discovery platform for microbiome analysis. This overcomes long-standing challenges in statistical processing and is a major step toward practical application in the healthcare field.
















The second company, Rehab for JAPAN INC., which focuses on automation of rehabilitation in the medical and nursing care field, provides software solutions

that help reduce the on-site burden of caregivers when providing rehabilitation services, thus addressing pressing needs associated with population aging, a phenomenon that continues to accelerate. The third company in which we invested, Ubiden, Inc., aims to "achieve carbon neutrality" with an energy system that balances a safe, secure, and convenient lifestyle with a natural environment. Ubiden and OMRON's Device & Module Solutions Business (DMB) have started co-creation activities to achieve carbon neutrality, including a demonstration experiment of an EV charging service at OMRON's Okayama Office.

CVC has invested in 24 companies to date, in addition to these three companies, expanding its portfolio to help resolve the three social issues that OMRON is addressing.

Moreover, as a new way of utilizing human resources, CVC is working to "establish a mechanism for co-creation between business divisions and startups" and

<Portfolio>

Achievement of Carbon Neutrality	Realization of a Digital Society	Extension of Healthy Life Expectancy
<p>Energy visualization</p> 	<p>Robot control</p> 	<p>Migraine treatment</p> 
<p>Carbon offsetting</p> 	<p>Image processing + AI</p> 	<p>Prevention of dementia</p> 
<p>EV charging service</p> 	<p>Agri-automation</p>  	<p>Medical data</p> 
	<p>Generative AI</p> 	<p>Rehabilitation</p> 
		<p>Microbiome</p> 
		<p>PCR testing</p> 
		<p>Digital coaching</p> 



“implement an acceleration program for the portfolio” to strengthen the corporate venturing function. In order to realize the long-term vision SF2030, it is necessary to promote high cycle co-creation. Co-creation between OMRON’s business divisions, which have in-depth industry knowledge and diverse business assets, and startups, which rapidly give shape to innovative ideas, is a form of open innovation which is essential for the Optimization Society where its competitive environment changes at a dizzying pace. Therefore, CVC launched a new initiative with the Industrial Automation Business (IAB) in fiscal 2022. In this project, IAB’s development engineers seconded to CVC search for startups and serve as a bridge between IAB and startups, evaluating their technology with a view to investment and co-creation. We also aim to contribute to our portfolio companies by utilizing our human resources in the acceleration program for them. OMRON, with a wide variety of business assets and a system for recruiting people to work on the side, reserves missing pieces that startups need to acquire. To make the most of these business assets and the expertise of our employees, we send members of CVC to the startups in which we invest to accelerate their business growth. Activities undertaken in fiscal 2022 included the improvement of clinical trial protocols and regulatory development to expand the cognitive testing business. OMRON’s acceleration activities not only aim to grow the businesses of the companies in which it invests, but also to provide opportunities for dispatched employees to develop their capabilities and deepen their business insight. Through these initiatives, CVC will continue not only to support startups that have the power to potentially change the world but to develop human resources who will contribute to the realization of the Autonomous Society.

**Case 1** **Establishing a mechanism for co-creation between business divisions and startups**

The bottleneck for business companies in promoting co-creation with startups is often the difference in the speed of communication and the processes for responding to change in the environment. Therefore, people at CVC who understand the needs of both business divisions and startups view events from the perspectives of the two parties. They intervene in communication to accelerate co-creation by facilitating open innovation to promote growth of both parties’ businesses. Masayoshi Tsukikawa, a robotics engineer developing AI in IAB, is engaged in such co-creation activities. Based on his own experience as an engineer, he became interested in open innovation with startups as a means of business creation. He volunteered to participate in a project which members were recruited within IAB. Regarding his participation in the project, Tsukikawa says, “Just as I expected, it has been a challenging and rewarding learning experience every day. By looking at IAB from the external perspective of a startup, I am able to recognize the breadth of its business fields and the fast pace of the robotics industry. Each day, I am inspired by memorable experiences and encounters with people that I would never have had if I had simply concentrated on developing products and technologies.”

CVC is enhancing the mechanism for co-creation between business divisions and startups, and Tsukikawa, as a core member of this project, continues to search for startups that have the potential to create synergy with IAB’s business assets.

Global Corporate Venturing Office  
(Original affiliation: Technology Department 1, Technology Development Division HQ, Industrial Automation Company)  
**Masayoshi Tsukikawa**



**Case 2** **Implementing an acceleration program that develops both employees and portfolio companies**

Yasuyo Kotake, a member of CVC and a distinguished specialist of technology at OMRON, has planned and implemented new acceleration activities. Kotake provided business support to CogSmart Co., Ltd., a startup in which OMRON has been a lead investor since fiscal 2021. With its vision, “creating a society where everyone can live a healthy and enriched life forever with the power of brain medicine and technology,” CogSmart is developing solutions for prevention of dementia. From fiscal 2022, as part of the support activities, Kotake worked within CogSmart to conduct acceleration activities, utilizing her skills in bioengineering, her field of expertise. Looking back on the time when she started providing support to CogSmart, Kotake says, “I gained a lot of insights through discussions and friendly rivalry with the people at CogSmart in order to resolve the issues that CogSmart was then facing. Not only were the speed and execution capabilities of CogSmart astounding, but I was also inspired by their strong determination to resolve social issues at all costs.” After completing her mission, Kotake returned to CVC and is now supporting another startup, capitalizing on her experience with CogSmart. She has enhanced her capabilities as a bridge between OMRON and startups and moreover as a person who takes the initiative in creating innovation driven by social needs.

Co-Creation Strategy Center,  
Global Corporate Venturing Office  
and OMRON VENTURES CO., LTD.  
**Yasuyo Kotake**

