

CTO Interview

Evolving Near-future Design

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The Powerfully Revolving Engine of Innovation

— In the previous medium-term management plan “VG2.0,” OMRON set out an overall policy, “innovate through technological evolution to achieve self-driven growth” over the next 10 years. As CTO, what are your thoughts on the results of VG2.0 and how do you see technology management evolving?

OMRON has grown by predicting the future and pioneering solutions to society’s needs. However, following my appointment as the first CTO in 2015, when I asked engineers at the Technology & Intellectual Property HQ “What do you think is the purpose of this research?” I was frequently unable to get a clear answer. Perhaps R&D itself had become the objective, and the key point of addressing society’s needs had been forgotten. That made me determined to build a platform for OMRON-style innovation.

Following thorough discussion, to enable seamless planning and development of business and technology required for innovation, in 2018 we

established two organizations: Innovation Exploring Initiative HQ (IXI) delineating an architecture from a business perspective and OMRON SINIC X Corporation (OSX) responsible for near-future design. Another major achievement of VG2.0 was the establishment of a “business creation process” to create a state in which we can create new businesses one after another.

As a result, new business and R&D themes are openly discussed, and moreover, everyone, from executives to those working on-site, is taking ownership of the objectives and value of those themes. I am convinced that along with the development of this framework, there has been a big change in the mindset of those working at the Technology & Intellectual Property HQ and IXI. They are rising to the challenge of new value creation. Technology development teams, though enthusiastic about their research, previously tended to be somewhat inward-looking. That has changed. Nowadays, they are extracting themes from social issues and engaging with external parties as well. As they accumulate achievements, they will gain confidence and take on greater challenges. They have begun to set new R&D themes themselves, not only from the perspective of existing

businesses, but also from that of near-future customer- and technology-oriented perspectives, and to undertake challenges at a high technical level. The innovation-generating process is becoming second nature to our people who are the key players in that process.

— **In SF2030, OMRON emphasizes “empowering people through automation.” Referring to examples, please explain why you emphasize “empowering people” and the kind of society you are trying to achieve.**

Automation has three phases: “substitution” when people’s work is done by machines, “collaboration” when people and machines work together, and “harmony” when human possibilities are elicited and maximized by machines. There is a shift from cooperation to harmony at cutting-edge production sites, and OMRON is supporting this evolution with “automation to empower people” centering on the factory automation business.

At the same time, there are many fields and industries where not even substitution has been achieved. Think of nursing care. In a world where human skills are so important, “empowering people” is an issue of extraordinary importance. For a start, we have to ascertain what people should do and what should be left to machines. That’s why at OMRON we are tackling the challenge of preventive care so that people can avoid becoming bedridden. Specifically, we are involved in projects supporting elderly care business, with IXI handling commercialization in collaboration with local governments.

It is well understood that if the signs of functional impairment are captured at an early stage before nursing care is required and improvements in exercise and lifestyle habits are encouraged, then healthy life expectancy can be extended. For that to happen, an “assessment” must first be performed to pick up and analyze lifestyle issues, the prospect of improvement, and so on, of the elderly person. However, since this not only takes time but also requires considerable expertise, it has been burdensome. OMRON set out to support assessment, subsequent formulation of a care plan, and so on, by applying AI. Based on the plan, caregivers explain to elderly care-receivers, motivate them, and provide care while communicating with them. Being told by a robot “keep trying” or “good job” without any emotion is unlikely to motivate anyone. To motivate people, human engagement is essential. Ultimately, it’s work of the heart, valuable work that can only be done by people.

Whereas national finances are being strained by mounting social security costs accompanying population aging, there is also an increasingly acute shortage of staff at the medical and care-providing

front lines. In the elderly care business, by organically linking people and machines, support is provided to enable people in need of care to lead self-reliant lives, which will extend healthy life expectancy. The elderly care business, which compensates for staff shortages, is a focus of high expectations from all interested parties, and OMRON concluded a partnership agreement for business verification with Oita Prefecture in July 2020, followed by one with Osaka Prefecture in April 2022.

However, when it comes to scaling up this elderly care business, staff shortages are a bottleneck. People with professional skills are needed to interact with the elderly, helping to keep them motivated, but there just aren’t enough caregivers. So, recognizing that OMRON also needs to support human resources development, we are developing a training system for caregivers.

Of course, what is important is where the line is to be drawn between the role of people and the role of machines. In SINIC Theory too, there are concerns that “as technology evolves, the roles of humans may be marginalized.” Hence, while we will work to design a near-future where people are empowered, we need to find the answers to such questions as: How far can systemization and automation progress before people are pushed to the margins? What should be left for machines to do? Which areas need to be activated by human creativity?

At IXI, a cluster of themes based on such perspectives are advancing to the business verification stage. New business creation cannot be achieved overnight. Neither can it be expected to make a big contribution to corporate financial performance immediately after commercialization. Nevertheless, if there is a chance for business to solve a social issue, we should rise to the challenge. The spirit of our founder is expressed by the “7:3 Principle.” In other words, “if there’s a 70% chance of success, be brave and give it your best shot, but at the same time always think about how to deal with the remaining 30% risk.” In that spirit, we are innovating to create new businesses.

Creating a Practical Mechanism for “Job-based Employment”

— **Human resources development is the driving force of innovation. What measures is OMRON implementing in human resources development?**

In pursuit of innovation, we have positioned human resources development at the heart of our mission, alongside transformation of organizations and mechanisms to innovate driven by social needs,

because talented people are indispensable for OMRON's sustainable growth. In recent years, we have made a big effort to foster "architects" capable of drafting comprehensive business plans embodying their expertise concerning markets and frontline business, technology, and intellectual property, as well as "core technology talents" with expertise in AI, robotics, and so on. At IXI, we have adopted "job-based employment" where the jobs required for project execution—those of the architects who construct the business, the specialists with high-level expertise, the team leaders, etc.—are defined and staff are allocated who possess expertise and experience commensurate with the job requirements or who are expected to develop the necessary expertise. Whereas IXI is the platform from which human resources capable of innovation flow, the Technology and Intellectual Property HQ is the platform from which engineers supporting that innovation flow. Here too, we are transitioning to job-based employment.

Although job-based employment tends to be regarded as little more than the drafting of job descriptions, its essence lies in "clarifying roles and skill levels." When applying this approach to technical staff, an inventory must first be taken of each employee's skills. For example, the field of expertise of an electrical engineer can be divided into many different areas—analogue, digital, control, and so forth. After sorting this out, the next step is to evaluate the skill level in each field on a five-point scale, so that skill and job are associated. For example, this is level 1 work, whereas that is level 2 work, and so on. The requirements for each level are clear, so we can see at a glance what should be mastered to upgrade from level 2 to 3. This approach is highly beneficial in terms of employee enthusiasm and commitment.

Clearly, the company must offer educational opportunities so that employees can progress from one level to the next. In other words, you cannot create a personnel system with job-based employment without investing heavily in skills education. That is why SF 1st Stage, which we announced in March, included investment of ¥6.0 billion in human resources development over a three-year period from fiscal 2022, representing a threefold increase from conventional figures. Attempts to introduce job descriptions were made in the past at OMRON, but did not gain traction. In light of that experience, this time we have resolved to create a practical mechanism. For example, by arranging for a team including specialists from outside the company to perform evaluation, we are not only signaling our commitment to making the necessary investment, but also investing time and being thorough in everything we do. Although a CTO who devotes this much attention to the

personnel system may be unusual, it is after all people who will create the revolutionary technology and businesses and the source of innovation will always be human resources. Once we decided to do this, we must create a truly practical mechanism. That is why I have personally devoted a considerable amount of my energy to this issue.

Carbon Neutrality at Production Sites Anticipating Needs

— At OMRON, there's a culture where it plants a flag to declare its goals and expand collaborations by inviting empathy and resonance from within and outside the company. What are some recent examples?

The capital and business alliance with JMDC Inc. announced this February to create a business through the combination of the product value perspective and the essential value perspective in the cause of "extension of healthy life expectancy," is certainly worthy of such a flag.

JMDC has a vast amount of health insurance claims and medical check-up data, and has also accumulated the technology and know-how for analyzing that data so it can be put to effective use. However, it lacks the necessary hardware. In contrast, though OMRON has the hardware and technology to collect individual vital data, we lack knowledge of the data business. This partnership will complement each other's insufficiencies while maximizing their respective strengths in pursuit of "extension of healthy life expectancy."

Moreover, this partnership will show people inside and outside OMRON the trajectory we have in mind for our nascent solution-based business offering essential value. Whereas the abstract notion of the shift from the product value perspective to the essential value perspective is difficult to convey, our partnership with JMDC will make it easier for people to understand what we are endeavoring to do. In fact, the response following the announcement has greatly exceeded our expectations.

— What businesses from the essential value perspective are already up and running?

One example is "i-BELT," a service that makes use of data. It is a solution business in which data harvested at manufacturing sites is utilized to solve customers' issues. However, the content of that business is changing dramatically.

Whereas productivity and quality improvement were previously the principal objectives, now, there is a mounting interest in "making production sites carbon neutral" amid concerns about the impact of soaring energy prices and supply shortages on the

global economy. In these circumstances, visualizing CO₂ emissions at the level of a manufacturing site or a production line is necessary but insufficient. It will surely become normal to visualize CO₂ emissions for each individual product. At our Matsusaka Factory where we produce healthcare products, we are experimentally measuring the CO₂ emissions generated when producing a single blood pressure monitor. Visualization of CO₂ emissions per product is almost certain to be required in the near future in the EU, followed by other markets worldwide. Over and above this, there will of course be huge demand for the reduction of CO₂ emissions. This is a big business opportunity that the entire OMRON Group can address. Digital twin will then come into its own. This is because the use of data from various sites will make it easier for us to predict the near future in cyberspace and improve our operations. OMRON has on-site capabilities centering on the products and knowledge accumulated in the factory automation business; the devices and modules, such as relays and switches, to achieve energy saving; and the technological and idea-proposing capabilities cultivated in the energy solutions business. The addition of data-driven AI and simulation technology will enable comprehensive solutions to various energy-related problems in production. We aim to achieve new value creation through a business from the essential value perspective unique to OMRON.

Bringing the “Autonomous Society” into Sharper Focus through Open Discussion Grounded in SINIC Theory

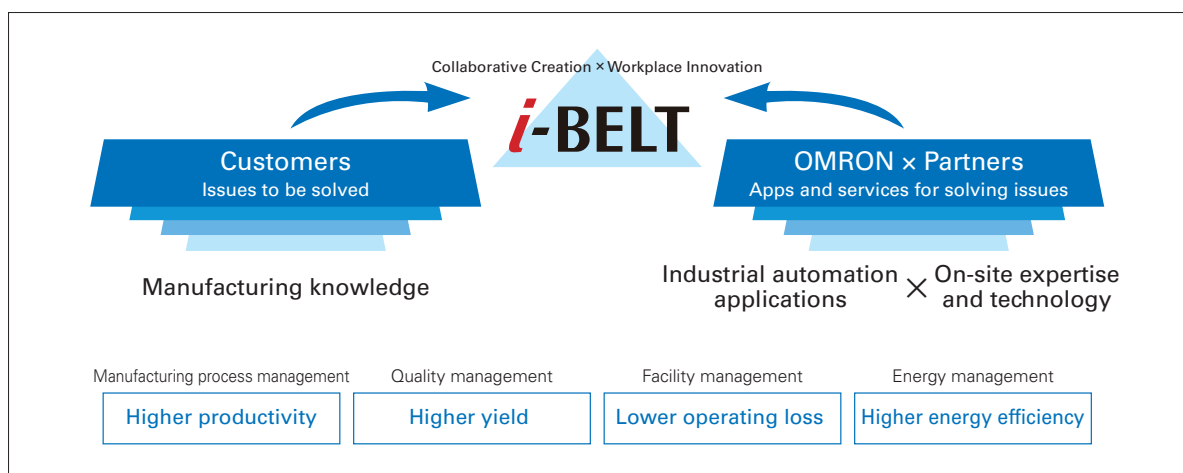
— And finally, according to SINIC Theory, we will be shifting to an “autonomous society.” What will this autonomous society be like, and what do you think lies beyond it?

Our founder Kazuma Tateishi, while maintaining that an individual and society, people and nature, and people and machines would spontaneously harmonize in the coming autonomous society, did not offer any deeper explanation. So, mindful that our task is to dig deeper to bring the autonomous society into sharper focus, we are currently engaged in animated discussion with a view to updating the concept.

In 1970 when SINIC Theory debuted, growth meant raising efficiency and convenience to become more affluent. Therefore, diagrams indicating the structure of SINIC Theory depicted how technology, science, and society would interactively develop with a focus on the human yearning for progress. When reassessing this in today’s terms, I think our orientation as human beings, the trajectory of our ideas and values, should take center stage. The feeling that wells up from the very bottom of the hearts of those of us living in this contemporary world, a symbiosis of humanity and nature, what does it mean? That is the key point.

We’re asking external experts and young people, including those of Generation Z, to take part in the current discussion. In talking about the society of the future, it would be odd not to reflect the values of younger generations, neither are we going to get anywhere if discussion is limited to OMRON. So we see openness as a virtue. We want to cast our net as wide as the world.

I am eager to share with you the results of those discussions soon, fleshing out our vision of the autonomous society. With this as a model, I will strive to involve people within OMRON and beyond in the collaborative endeavor of building a future to which we can all aspire. I believe that in this way we can actually put the OMRON Principles into practice.



i-BELT: Example of a data-driven service that creates value from the essential value perspective

Innovation Exploring Initiative HQ (IXI)

Rising to the Challenge of Creating a Better Society through Innovation

Results during VG2020 Period

The Innovation Exploring Initiative HQ (IXI) is an organization established in 2018 to anticipate 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 four years since its establishment, we have achieved not only the visible result of an enriched and substantial portfolio of themes with new business viability, but also a solid foundation (organization, processes, human resources) for sustainably generating and executing high-potential projects.

Enrichment of Portfolio of Themes Steadily Creating New Avenues for Business Growth

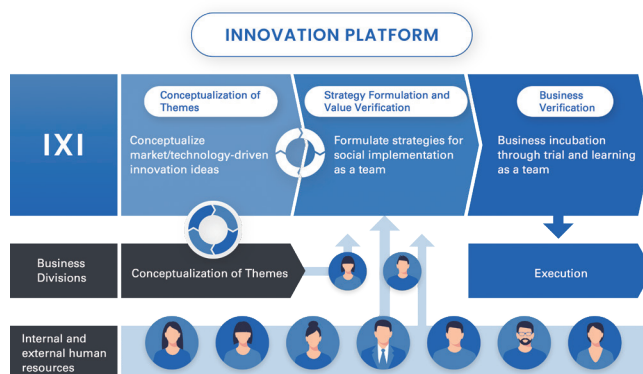
Over the past four years, more than 30 exciting themes have been conceptualized and verified. Currently, three themes, namely “agri-automation business,” “elderly care business,” and “on-site data utilization support business,” have already advanced to the business validation (trial launch) phase, followed closely by several themes in the customer value verification (proof of concept) phase.

Continually Evolving Organization Attracting Enterprising People

IXI aims to become an organization where enterprising people from inside and outside the company aspiring to create innovation driven by social needs with their energy and talent inspire one another to keep solving social issues through business. Organizationally, “OMRON’s group-wide innovation platform” is key to the success of this approach. In line with the establishment of a personnel system for IXI, including open recruiting and voluntary application for transfer to IXI and project-based open recruiting so that personnel participate in projects while holding concurrent positions at other organizations, IXI attracts many people from both OMRON’s business divisions and head office divisions. Moreover, many people from outside OMRON who share IXI’s vision are participating too. We have thus laid the organizational foundation of IXI, which consists of about 100 people with diverse skills and values who are eager to demonstrate their respective strengths and maximize results in a collaborative endeavor.

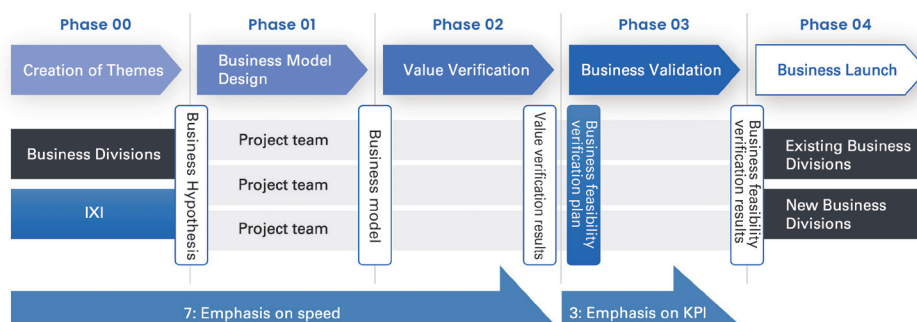


Executive Officer
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Innovation Exploring Initiative HQ
Hidetaka Ishihara



Establishing a New Business Creation Process with High Reproducibility

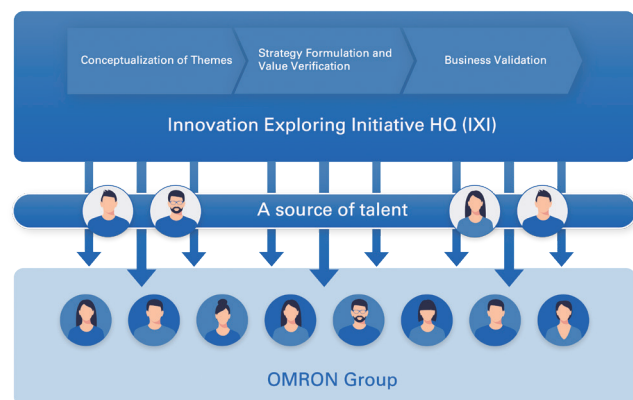
A major impediment to the creation of new business is the difficulty in selecting the right theme. And even once the theme has been decided, it is unclear who is to have the responsibility and authority, and to what



extent, and how to judge the right time to launch the business. Thus, it is difficult to determine the criteria for investment, or in other words to determine which themes should be pursued and which should be canceled, leading to a much slower pace of business creation and declining investment efficiency. It is crucially important that senior executives, managers, and frontline personnel have a shared recognition of the actual difficulties and are able to discuss issues using a common language. Mindful of this, IXI focused on establishing a highly reproducible new business creation process through iterative “trial and learning” applicable to multiple business themes. The “7:3 Principle,” an approach to business creation conceived by OMRON founder Kazuma Tateishi is the linchpin of this process. Essentially, Tateishi’s idea is that “if there is a 70% chance of success, be bold and give it your best shot, but at the same time always think about how to deal with the remaining 30% risk.” The process emphasizes both “speedy on-site execution” and “investment and risk-control in management.” In the phase corresponding to “7,” speed, notably the avoidance of devoting excessive time and investment in identifying possibilities, is emphasized. IXI proposes a new business domain it aims to create, formulates a hypothesis, and sets a theme, and carries out testing of the business model hypothesis and verification of customer value. If the results of the verification indicate a certain degree of probability, then in the phase corresponding to “3,” decisive investment will be made in the carefully examined possibility to grow the business while controlling risk. IXI’s business creation process is eminently practical. It has become the common language in which senior executives, managers, and on-site personnel tackle the issues. It is a powerful tool.

Development of Human Resources to Drive Business Creation and Group-wide Innovation

IXI emphasizes “business creation as a team,” with the team consisting of diverse people with diverse strengths. This is because as the business creation stage progresses from “conceptualization,” and “hypothesis testing” to “business validation,” diverse capabilities and skills are required. With these diverse human resources, our focus is on developing “architects” who repeatedly test hypotheses, identify intrinsic value for customers, and shape a business model. In four years, more than 60 “architects” have refined their skills through promotion and execution of themes and devoted themselves to new business creation. IXI has become a pool of talented people capable of driving innovation. Today, several people who used to work for IXI are engaged in various businesses of the OMRON Group where they are leading innovation.



Further Evolution under SF2030: Maximizing Abilities to Create Innovation Driven by Social Needs

During the period of VG2.0, we have established a firm foundation (organization, processes, human resources) for continuously creating new businesses and sustainably generating and executing exciting themes. Under SF2030, we are committed to further strengthening this foundation as non-financial value of OMRON, and at the same time, creating multiple profit-making businesses to contribute to the next stage of OMRON’s growth.

IXI will tackle five new business fields under SF2030, namely, “data-driven healthcare,” “automation for food production,” “support for achieving carbon neutrality of manufacturing industry,” “support for DX of manufacturing sites,” and “decent work.” These all contribute to resolution of the three social issues addressed by OMRON under SF2030: “achievement of carbon neutrality,” “realization of a digital society,” and “extension of healthy life expectancy.” IXI refers to the overview of business opportunities of each new business field as the “business architecture” and maps business hypotheses for each field onto it. The above-mentioned “agri-automation business,” “elderly care business,” and “on-site data utilization support business” currently in the businessfeasibility verification (trial launch) phase are themes corresponding to the business architecture of “automation for food industry,” “data-driven healthcare,” and “support for DX of manufacturing sites,” respectively. As well as aiming to develop these three business themes into profitable businesses at an early stage, we will also verify other business opportunities mapped onto each business architecture as alternatives and will create groups of businesses of appropriate scale in each of the five new business fields. The nine years covered by SF2030 will be a period of rapid change towards an autonomous society that OMRON envisages. A society in which both economic growth and harmony between the global environment and social structure and will be propelled by cooperation and collaborative creation with many enterprises and stakeholders. We will share what IXI has learned and the organizational ability it has cultivated so far not only inside the OMRON Group but also with parties outside the OMRON Group to create innovation driven by social needs.

How IXI Will Rise to the Challenge of Achieving a Better Society

With respect to the three social issues to be addressed by OMRON under SF2030, namely, “achievement of carbon neutrality,” “realization of a digital society,” and “extension of healthy life expectancy,” IXI will tackle five new business fields: “data-driven healthcare,” “automation of food production,” “support for achieving carbon neutrality of manufacturing industry,” “support for DX of manufacturing sites,” and “decent work.” While deepening and expanding the commercialization themes in these five fields, IXI will continue to enrich and review its portfolio of themes.

● Data-driven Healthcare

In the healthcare field, “extension of healthy life expectancy” and “realization of a sustainable healthcare system” are two goals universally desired. As society becomes more mature, the issues they involve become more pressing and yet the difficulty of achieving both goals simultaneously becomes starkly apparent. In a healthcare ecosystem consisting of various medical and healthcare data, we are accumulating vital data of consumers and patients in their everyday lives. We will combine these data with the medical and healthcare data, such as health insurance claims and health check-up data, which OMRON does not possess, to provide preventive solutions for chronic illness and for worsening conditions so as to achieve value through data-driven healthcare.

(Case of Business Validation)

In collaboration with local governments, the Elderly Care Business Department is promoting business validation of elderly care solutions to offer new value empowering caregivers on the front line and helping the elderly stay healthy and active, thus reducing the need for long-term care. OMRON concluded a partnership agreement with Oita Prefecture in 2020. The demonstration projects, which started in four cities and towns, have expanded to cover 12 cities and towns. Moreover, OMRON started a joint research project with Komatsu City, Ishikawa Prefecture in October 2021, and concluded a business partnership agreement with Osaka Prefecture in April 2022. We aim to achieve social implementation of our solutions for “extension of healthy life expectancy” in collaboration with local governments that are confronting various issues.



● Automation for Food Industry

As people become more affluent, greater food safety and security as well as better taste become more important values for them. Producers of agricultural products, livestock, etc., strive daily to meet these consumer needs for food. However, since food production depends on experience and it takes time to become an expert, and since the price paid for high-value-added products is not adequately distributed to the producers, people working in primary industry are leaving for other industries, resulting in labor shortages. This is a social issue that poses a threat to the sustainability of food production.

We will provide food production with “digital solutions” utilizing automation and data. By increasing the “production” and “management” capabilities of producers, we will transform the production of food into a “profitable” industry creating high added value and contribute to its sustainability.

(Case of Business Validation)

First, the Agri-automation Business Division is offering agricultural cultivation support solutions in the Chinese market. These solutions enable unskilled farmers and farm laborers to achieve agricultural production comparable to that of skilled farmers, focusing on fruit and vegetable crops such as mini-tomatoes and strawberries in organic and low-agrochemical cultivation that requires agricultural technology and is difficult for the unskilled.

Currently, many projects are in progress with several Chinese partner enterprises.



● Support for Achieving Carbon Neutrality of Manufacturing Industry

As a principal climate change countermeasure, “achieving carbon neutrality by 2050” has become a pressing societal goal. Given this context, it is crucially important that companies fulfill their social responsibilities. Manufacturing industry is urged to achieve carbon neutrality by overcoming issues, such as insufficient renewable energy, sharply rising prices, and the cost burden associated with the introduction of a carbon tax, while continuing the pursuit of higher quality and further productivity improvement. To achieve carbon neutrality, not only is management’s strong commitment essential, but also the establishment of an environment where on-site workers autonomously and continuously work toward achievement of the goal. We intend to provide comprehensive solutions to the complex set of issues faced by manufacturing industry. This will involve supporting companies’ autonomous and ongoing efforts to achieve carbon neutrality by leveraging our field knowledge cultivated in the Industrial Automation Business and the energy control technology cultivated in the Energy Solutions Business. We are currently creating core themes capable of capturing diverse needs.

● Support for DX of Manufacturing Sites

Many companies are investing in DX of “management.” However, not only DX of “management,” but also DX of “on-site” will be essential to increase organizational productivity and maximize business output. DX of “workplaces” entails workplace innovation that identifies the powerful triggers for improvement that exist within daily on-site activities by utilizing data and applies those triggers in value creation. On the basis of the vast amount of on-site data, the involvement of all on-site workers in innovation will lead to DX of “management.”

We provide solutions for DX of “workplaces” as well as a mechanism linking “workplaces” and “management.” We support workplace innovation so that everyone at workplaces can easily utilize data, turn data into value, and become a source of innovation.

(Case of Business Validation)

The Sensing Data Trading Market (SDTM) Business Department is carrying out business validation of on-site data utilization support solutions focusing on customers in manufacturing industry. With a view to the future data trading society, we are providing solutions that enable utilization of on-site data, such as data linkage between specific companies and data distribution among numerous unspecified stakeholders. 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.

● Decent Work

Decent work refers to “dignity, equality, a fair income and safe working conditions.”

As people’s values become more diverse along with increasing affluence, they desire more high-quality products to satisfy individual needs. At the same time, many workplaces where these products are made continue to operate on a labor-intensive model, reliant on low-wage workers. Hence, employment-related social issues, such as human rights issues in the supply chain and economic inequality, have come to the fore. If workers are able to tap their own potential and act autonomously, they will be recognized as more than labor; but they will be creators of added value.

We will empower manufacturing workplaces with new capabilities through automation, liberating business enterprises and their workers from the labor-intensive model, thereby contributing to the creation of decent work.

(Example of Collaborative Creation)

We are currently focused on “sewing automation.” We are targeting value creation at manufacturing sites for automotive-related products, such as car seats, air bags, and seat belts, as well as for apparel such sports shoes. During this process, we are carrying out technology and customer value verification. In January 2022, we started joint development of production automation prototype with MATSUYA R&D Corporation to mitigate the effect of labor shortages. We are rising to the challenges of resolving labor shortages and providing decent work for everyone regardless of age or gender.

Technology and Intellectual Property HQ

Challenge to Create Social Needs with Innovative Technologies

Strengthening Core Technologies for “Empowering People through Automation”

In order to resolve various social issues, OMRON has been refining the sensing technology for acquiring on-site data and the control technology for appropriate feedback. As indicated by the addition of “Think,” signifying human wisdom, to the combination of “Sensing & Control” in 2011, we have been continuing to strengthen our core technologies defined as “Sensing & Control + Think.” New technologies OMRON has created in recent years, which will lead to new value creation, include: “3D vision sensors” serving as the eyes of robots performing simple tasks previously performed by humans; “visual inspection equipment” whose ability to detect small scratches or stains on a product, and to make related judgments, is equal to that of skilled workers; and “AI controllers” capable of anomaly detection of production equipment.

During the VG2.0 period, amid accelerating technological development, we enhanced our ability to draw “technological architecture,” an overview of the technologies necessary for social implementation, by backcasting from a near-future where the social issues have been resolved, rather than viewing the near-future as an extension from the past. At the outset of SF2030, we designed a near-future by “empowering people through automation,” started examining “technological architecture” by redefining “relationships between people and machines,” and determined the technological issues to be addressed by OMRON.

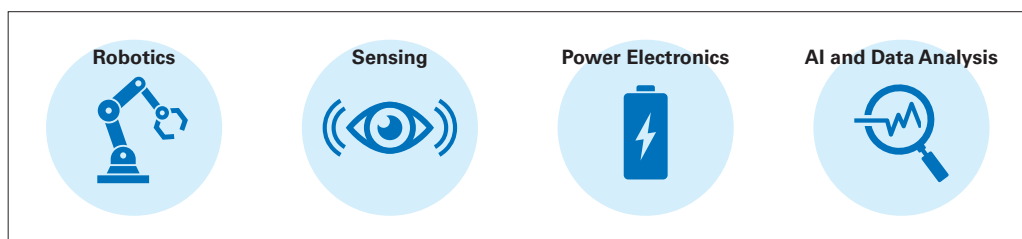
Adopting a panoramic view of the technological issues, we identified four areas of OMRON’s technological focus and reorganized the technological development structure in April 2022. These four areas are: “Robotics” representing the body of a machine, “Sensing” being its five senses, “Power Electronics” being its power source, and “AI and Data Analysis” that are its intelligence.



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

Masaki Suwa

■ Areas of Technological Focus



Taking robotics as an example, the declining birthrate combined with population aging and a shortage of skilled workers are fueling greater utilization of robots. However, at present, utilizing robots requires a high level of expertise, and moreover, the tasks robots can perform are limited, and so people have to work alongside robots. OMRON started by rethinking how robots should be used “to empower people.” Our aim is for robots to perform exhausting and dangerous tasks that currently have to be done by people as well as mechanical repetitive tasks. For this purpose, having overhauled the hardware and software for robots, we are developing new robots. To tackle this new challenge, OMRON SINIC X Corporation is vigorously proceeding with the development of innovative technology through collaborative creation and R&D with universities, business enterprises, and other external parties from the viewpoint of medium- to long-term technological development.

Strengthening Technical Human Resources and Intellectual Property Initiatives

To refine our core technologies and create new value through technological innovation, an important element is of course technical human resources. Amid unceasing technological evolution typified by AI and robotics, in order to foster engineers capable of working effectively both inside and outside OMRON, we clearly defined the technological fields required for OMRON's growth and the types and levels of skills required, as well as roles and responsibilities and started a new initiative for technical human resources development in fiscal 2021. We also support upskilling with respect to various technologies, such as by providing opportunities to learn the latest technologies from the basics.

Moreover, intellectual property, which is one of our non-financial values, is becoming ever more important in the context of our ongoing efforts to create new value. At OMRON, "using intellectual property to continue creating new value leading to sustainable growth" is the policy informing all our IP initiatives, which are undertaken based on a clearly defined mission and vision. In addition to obtaining rights for our company's unique technology and strengthening the exercise of rights to utilize that technology, we draw up multiple scenarios to realize our near-future design as "intellectual property architecture" and file applications in advance for innovation driven by social needs. In doing so, we are strengthening IP initiatives to deliver unique OMRON value.



Patent application training

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.

During the VG2020 period, we provided education on patent applications to all the engineers in the OMRON Group and strengthened our ability to create patents. As a result, the number of patents in OMRON's possession in fiscal 2021 was 12,061, more than double the 5,959 in fiscal 2011. OMRON has been publishing a journal of technical papers entitled "OMRON TECHNICS" since 1961. The purpose is to contribute to a better society by providing the public with access to the R&D outcomes of the OMRON Group engineers for resolving social issues. OMRON has been selected by Clarivate as one of the Top 100 Global Innovators for the sixth consecutive year. We view this as recognition of our IP initiatives in terms of the volume of patent applications and breadth of technologies.

We got off to a great start under SF2030 by enhancing non-financial value in two key respects: strengthening our technological development abilities to link new value to social implementation and strengthening human resources development and IP initiatives. To create value to resolve social issues by "empowering people through automation," we will further strengthen and refine our core technologies of "Sensing & Control + Think." <https://www.omron.com/global/en/technology/#>

Case

Development of People-centric Flexible Robot that Adapts to People

As the working population continues to shrink due to a declining birthrate and population aging, we are emphasizing development of robots for empowering people. OMRON SINIC X Corporation, which is in charge of R&D based on backcasting from a near-future design, is conducting advanced research from a medium- to long-term perspective, utilizing collaborative creation with universities.

Case: Realizing Robot Operations Instigated by Verbal Instruction

Until now, for robots to operate in various on-site settings, specialist knowledge for handling the robots is essential. As a way to enable anyone to easily handle a robot, technology enabling operations of a robot by verbal instructions is a focus of rising expectations. Using the technology that we are working on, people would only need to give verbal instructions to a robot and the robot would understand the action to be taken automatically and perform the task. With a view to realizing this technology, OMRON commenced a joint research project with Kyoto University, Tokyo Institute of Technology, and Nara Institute of Science and Technology, in fiscal 2021. In connection with this research, our paper was accepted and presented at "ACM* Multimedia 2021," a major international conference in the multimedia field.

*ACM: Association for Computing Machinery

Global Corporate Venturing Office (CVC)

Co-creation with World's Venture Businesses to Create New World and New Value

In pursuit of “a future designed through collaborative creation with the world’s startups,” OMRON VENTURES CO., LTD. (OVC) has been developing collaborative creation activities for new market creation and business innovation, taking advantage of its network encompassing entrepreneurs and investors worldwide. As a result, OVC has invested in 21 startups so far, including four that it newly invested in during fiscal 2021. Under SF2030, with a view to “maximizing the capability to create innovation driven by social needs,” which is one of the material sustainability issues, we will expand investment in startups that are promising for collaborative creation with OMRON’s four core businesses and in those tackling the three social issues addressed by OMRON under SF2030. To ensure the effectiveness of investment, OMRON established the Global Corporate Venturing Office (CVC Office), which supervises OVC, in April 2022, as an organization directly reporting to OMRON’s president. With the aim of maximizing the social impact, the CVC Office will strengthen opportunities for collaborative creation between OMRON and startups via OVC and seek to enhance strategic and financial returns.



Senior General Manager, Global Corporate Venturing Office;
President and CEO, Omron Ventures Co., Ltd.

Tomoko Inoue

Resolve Social Issues through Investment in Startups

In January 2022, OVC established OVC II Investment Limited Partnership (OVC Second Fund). The OVC Second Fund invests in startups that aspire to create value by addressing the social issues targeted by OMRON.

As the first investment, the OVC Second Fund chose Visby Medical, Inc., the U.S. firm that develops and sells the world’s first disposable, portable PCR testing devices. PCR tests have garnered attention recently in the context of the COVID-19 pandemic. They allow high-precision test results to be obtained from extremely small samples and thus are used in testing for many different infectious diseases. However, the number of medical institutions that can perform accurate PCR tests is limited, and factors such as difficulties in purchasing expensive testing devices drive most institutions to outsource their clinical testing to private sector labs. This means they can face delays in receiving test results. Meanwhile, the COVID-19 pandemic continues. To tackle these problems, Visby Medical has developed a portable PCR device offering accuracy of 95% or above, which is equivalent to lab-based testing. Achieving lower costs and shorter waiting time for test results will revolutionize the infectious disease testing process and contribute to resolution of social issues. Through its investment in startups such as Visby Medical whose innovation has the potential to be transformative in an industry, OMRON will pursue accelerated resolution of social issues.

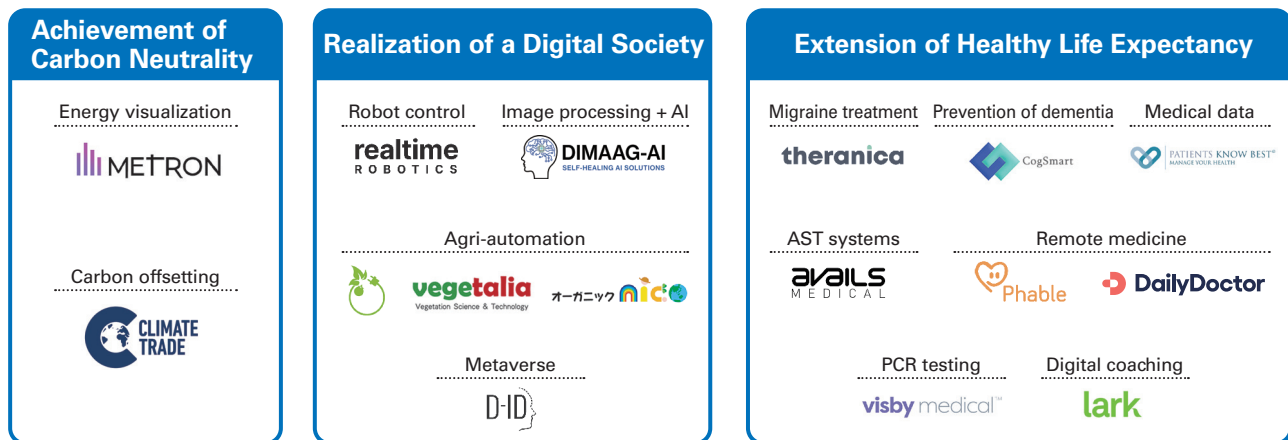
Maximizing Strategic Returns through Acceleration

In fiscal 2022, the CVC Office has begun a new initiative, “acceleration,” to speed up the business growth of startups. In this initiative, OMRON gathers people with the expertise required for business growth as well as other experts and has them directly participate in management of the startups to enhance their business value. Moreover, in terms of human resources development, the CVC Office aims to foster innovative individuals capable of creating new globally competitive businesses by seizing opportunities for collaborative creation with the world’s entrepreneurs and experts.

CogSmart Co., Ltd. in which we invested in fiscal 2021 is a good example. CogSmart is a Japanese company developing a unique solution for slowing the onset of dementia. A solution that “prevents the worsening of dementia,” which is the focus of CogSmart’s efforts, would be in great demand in Japan where population aging is progressing and is attracting attention worldwide, too. To help CogSmart increase its business value, the CVC Office has assigned OMRON personnel to CogSmart who have knowledge of the medical field gained through OMRON’s existing business in addition to external human resources with expertise of a high caliber. At the same time, OMRON personnel will be given an opportunity to learn through collaborative creation with the startup’s management so as to maximize strategic returns.

OVC's Investment Portfolio

OVC has invested in startups tackling the three social issues addressed by OMRON under SF2030: "achievement of carbon neutrality"; "realization of a digital society"; and "extension of healthy life expectancy."



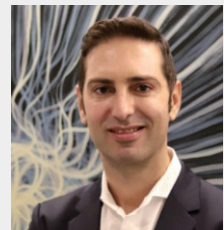
Contribution to Carbon Neutrality

Amid the worldwide efforts to achieve zero greenhouse gas emissions by 2050, there are various challenges concerning social implementation of alternative energy technology. Carbon offsetting using credit trading is one of the methods to promote CO₂ reduction. However, the lack of transparency of the credit information, such as who generated the credits and how they were generated, makes reliability an issue in credit trading. ClimateTrade, S.L. in which OVC invested in January 2022 is a Spanish startup providing a blockchain-based marketplace for carbon offsetting credits with high traceability and transparency of trading. Through investment in ClimateTrade, which is helping companies achieve their decarbonization goals, OMRON is contributing to resolution of social issues.

With "decarbonization and climate change mitigation" as its mission, ClimateTrade is endeavoring to propose scalable innovation by grasping market needs. OMRON VENTURES understands our mission and is supporting us. OMRON's support has been instrumental in helping us achieve our goals for planning new products and expanding the global reach of our products.



CEO Francisco Benedito



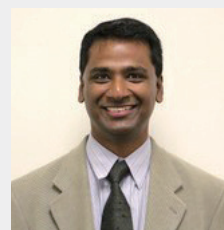
Cultivating Corporate Culture of CVC Activities

OVC invested in DIMAAG-AI, Inc., an American provider of an advanced AI platform, in March 2021. DIMAAG-AI and OMRON's Industrial Automation Business have launched a project for collaborative creation in technology development. The CVC Office holds technology exchange meetings between OMRON engineers working on new technology developments in its core businesses and the startup's managers, in order to spread the synergy of collaborative creation throughout the OMRON Group. We will continue to hold exchange meetings with startups in order to nurture a corporate culture conducive to promoting new collaborative business creation.

With a strong presence in the U.S., Japan and India, DIMAAG-AI provides AI components, hardware, robotics, and other solutions tailored to customer needs. Based on our conviction that AI technology will transcend industries and business formats, we have developed AI solutions in many fields. We look forward to continuing to provide OMRON with intelligent products and solutions as we work together on the project.



Technology exchange meeting with the startup



Founder and CEO Satish Padmanabhan