Technology Management Centered around our Corporate Philosophy
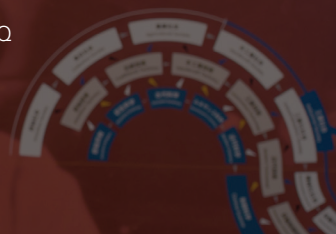
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Architectural Thinking Required in Changing Times

—— We have now been living with the COVID-19 pandemic for one and a half years. From the perspective of a CTO, what changes do you consider COVID-19 brought to society and business?

COVID-19 has resulted in huge, fundamental changes worldwide. People's lives are now different, new values have emerged, and business rules and practices have changed. Taking a broader view of these changes, however, shows that we are being swept along by major trends. This trend is digital transformation (DX), which is fundamentally changing the way in which society and industries function.

All around the world, the internet connects people with people, people with things, and things with things—diverse knowledge and information are generated, distributed, shared, and they are available whenever needed, in the needed formats. What makes this all possible is the exponential evolution of computing power. The pandemic has resulted in dramatic increases in the pace of these changes, and given that operating as we have done before is no longer an option, we need a fundamental rethink of what is really necessary.

For us as well, the pandemic has presented an opportunity to review the core value of science and technology required when confronted by rapid social change, and to envisage a future that we should aspire to. With the imposition of a state of emergency in spring last year, OMRON employees in principle had to work from home. In their efforts to carry out R&D and create new businesses, the Technology & Intellectual Property HQ and the Innovation Exploring Initiative HQ (IXI) also had to rein in some of their collaborative creation activities, especially some with parties outside the company. However, thanks to this, we were able to spend three months discussing in depth the areas that OMRON really needs to work on, the value within those areas, and what should be stopped or changed, without relying on any assumptions that had hitherto been made. Through this, we reaffirmed the importance of our "architecture capacity."

This architecture capacity is the ability to look three to five years hence, precisely define an image of society at that time, and determine what social issues will need to be resolved, and then design and put in place the three architectures— business, technology, and intellectual property— that are needed to solve the problems and create social needs. Our experience in this unprecedented crisis that is the pandemic has made me very aware that this architecture capacity is indispensable in order that we can respond flexibly to change.

—— Have any businesses been spurred to make reforms by the pandemic?

Remote patient monitoring are a good example. In many parts of the world, people hesitate going to hospitals for fear of infection, and even in Japan, the ban on online initial diagnoses of patients has been lifted. However, even if we get past the COVID-19 pandemic, issues such as shortages of medical staff and a skewed distribution of medical services towards urban areas will not fundamentally be resolved, and are likely to worsen. It is here that we expect demand for remote consultation services to grow.

OMRON has invested in U.S. startup AliveCore, Inc. that provides home electrocardiographs, as well as Dutch company Luscii Healthtech B.V. that provides online medical services, and is moving forward with business alliances. Also, through our internal venture capital company OMRON VENTURES CO., LTD. we are investing in British company Patients Know Best Ltd. that is developing a medical data sharing system, and have started collaboration. We have considered the digitization of healthcare an area for strategic investment area for some time, but the COVID-19 pandemic has brought this to the fore.

Organizational Mechanism for Solving Social Issues

—— One of the mechanisms that supports management based on the OMRON Principles is "Technology Management." What is OMRON's Unique Technology Management that the company has been aiming for in VG2020?

Based upon OMRON's Corporate Motto, the idea of discern new, hitherto not perceived social needs, and solve social issues is at the core of what we consider Technology Management. Central to this is the future predictive SINIC theory that acts as a lodestone for OMRON's management, and that was presented by company founder Kazuma Tateishi at the World Futures Studies Federation. This theory was born from his strong conviction that it was necessary to grasp social needs by predicting future society, and to conduct management and business based upon these. The SINIC theory is based upon the idea that science, technology, and society will mutually interact with each other thus leading to a virtuous cycle—from these, OMRON's particular emphasis is upon society. OMRON has a unique approach of predicting how society will change and what issues will arise as a result, and using science and technology to resolve these issues.

Our founder excelled at quickly perceiving indications of change in the world, creating a very specific vision of the future that no-one else had noticed, and understanding social needs. However, when the company no longer had someone with this particular skill, we were confronted with the problem of who would be able to forecast future social needs, and come up with solutions for these. Accordingly, we have established OMRON SINIC X Corporation (OSX) in 2018 together with IXI, an OMRON Group-wide innovation platform, in order to work systematically on business creation and developing solutions based on SINIC theory. This is nothing less than putting into practice "ambidextrous management"—this simultaneously promotes the deepening of existing businesses together with the quest for and establishment of new businesses.

—— Please tell us about the roles of IXI and OSX, and their performance.

We are creating an image of the near future, and working on the architecture for the strategies needed to make this a reality in terms of technology, intellectual property, and business models. IXI is the organization that promotes this process of backcast-type innovation creation. OSX, however, is a strategic location that is tackling the creation of designs for the near future, based around technological innovation. This is an independent company that adopts a free research and development style not constrained by conventional OMRON systems and rules, and that hires from outside the company top human resources in the fields of cutting-edge technologies. We are working on open innovation with a diverse range of members.

In the three years since IXI and OSX started, we have established the "template" for the OMRON-style innovation that we are pursuing. This is an Integrated Innovation Process that combines new business development with knowledge sharing. This process comprises four phases, namely "Phase 0: Business Ideation," "Phase 1: Strategy Formulation," "Phase 2: Business Verification & Technology Validation," and "Phase 3: Business Development." The most difficult of these is Phase 0. Determining the kinds of seeds to select for innovation, whether these respond to legitimate social needs, and whether these can be scaled up for a business exceeding its capital cost is no easy task.

—— How did you overcome this problem?

This time, we focused on "planting the flag." At OMRON, when employees declare that they have set high goals, we refer to this as "planting the flag," and we have also expanded this flag planting culture for working with business partners. For example, even though ostensibly a robotics business, our making a specific, pointed declaration on this will clarify what types of

technology and management resources will be needed as well as who we should work with, and what is still lacking in order to expand. Another thing we have learned is to not trust too much to on-site judgment. The more we aim for creation of a business that can predict the future and that can at times even reform social systems themselves, the more complex laws and regulations as well as relationships with stakeholders become, posing an onerous responsibility and burden for the sites alone. Therefore, we ventured to introduce a centralized decision-making system. This does not, of course, mean that we only use top-down decisions. Without losing our sense of haste, top management stresses conducting discussions and making rapid decisions with personnel on-site.

As the speed of change accelerates, rather than continuing with cautious discussions into whether something is right or not, the most important thing is to make a decision. If that decision proves to be wrong, then we should learn from that failure, and start over. Documenting this process makes it useful knowledge that can be shared.

——— Are these seeds ever in short supply?

No, they're not. This is because all OMRON employees are provided the opportunity to think of themes, and take it upon themselves to work towards making products or services commercially feasible. IXI is not simply a dedicated organization for creating new business, but rather a platform. This has as its purpose having people aware that new business development is not just something to be done by others, but instead the entire group's ability to create innovation is also something they need to embrace.

The Technology & Intellectual Property HQ has up until now also been considering many new themes. However, there are some areas that are still unclear in the process of selecting themes, so from this year we have streamlined how to select business ideas in Phase 0. Ideas that have been brought in are refined in weekly themed meetings, and discussions are held to determine the next step. Each presentation is limited to 10 minutes and five pages, with plenty of time spent on discussions. I am the organizer of these themed meetings, and as such have attended all of them.

The important thing here as well is to reach conclusions, or put simply, make decisions. I briefly cover and share with everyone involved what we need to do as the next step or whether this is to be halted, and the reasons for this.

I feel strongly that these highly transparent discussions and prompt decision-making processes foster a mindset of innovation within the company.

——— Please tell us about some projects in the works using IXI.

I'll introduce two challenges that aim to create new businesses, from the perspective of creating social needs. One of these is our agri-automation project in China, currently undergoing business verification. This is so-called smart agriculture that utilizes OMRON's strength of "Sensing & Control + Think" core technology. We are verifying an Agricultural Cultivation Support Service that automatically measures sunlight, temperature, humidity, carbon dioxide levels, and other variables, thereby determining optimal conditions for each crop and providing timing for when to open and close windows, irrigate, and similar. A feature of this service is that it is unique in not providing hardware in order for automation or to save manpower—rather it provides information that helps humans in making decisions. Its instructions let even those workers with little farming experience produce high-quality crops both efficiently and stably. At the same time as helping resolve social issues such as shortages of agricultural workers and food safety and security, this will also improve the ability of the algorithms to analyze and provide feedback for the data obtained from the system.

Another challenge currently in the business verification phase is a service using ICT to provide long-term care prevention services for the elderly under a partnership agreement with Oita Prefecture. We know that it is possible to prevent a high percentage of elderly people from progressing to needing nursing care if they can be adequately supported by nursing care specialists at the stage where they need assistance. However, there is a serious shortage of specialists who have the skills and expertise in this field. Accordingly, we have developed software that replicates the procedures and thought processes of nursing care specialists. We first asked the elderly themselves and their families about issues with daily life, and how they'd like these improved. We then analyzed these responses using this software, so we could formulate a plan for life function training. At present, the commonality between these two products, which we are now aiming to commercialize, is not only that they respond to social needs, but the concept of "harmony between humans and machines." Specifically, this is a hybrid system in which technology assists humans in maximizing their own abilities and their motivation.

Changing our Business Style and Seeking Self-driven Growth through Collaborative creation

—— President Yamada is committed to achieving self-driven growth—increasing earnings and growing steadily even under adverse business conditions. As the CTO, how are you supporting him?

There are two main challenges we need to confront. The first is to change our existing business model, or put differently, our business style. Our existing business model will only serve us in the future if the market itself is growing, or if we can acquire more market share from our competitors. For OMRON, the increasingly aging population means that the healthcare market is expanding, and we hold the top market share, so at this point we have some control over the market. However, this may not be the case in the future. We therefore need to change our business style. OMRON's business style up until this point has been to use our technologies and products to solve problems faced by customers. Put differently, we have been providing product value perspective. However, society is in the midst of rapid changes, with issues faced by customers becoming increasingly complex. Solving fundamental issues thus requires of us a business model that not only differentiates between technologies, but that also takes a broader view of social structures. This is why we are working for essential value perspective business expansion centered around IXI. We will evolve our business style into one that selects the optimal form of the social implementation of value, including in areas into which we have not yet forayed.

The other challenge is of collaborative creation. Given the current pace of the times, we cannot hope for innovation if we only pay attention to self-reliance. Furthermore, we will be changing our business style as well as making forays into new business fields, so the key will be who we work with in order that we can quickly acquire new technologies and business models that we do not yet possess. Since I assumed the position of CTO, we have put forth our policy of open innovation, as well as accelerated cooperation with external companies, start-ups, and research institutions. I expect that the know-how and partnerships gained from this will provide support for OMRON's self-driven growth.

—— What is your approach to future technology development not only for new, but also existing businesses?

Within the Technology & Intellectual Property HQ, around 40% of the themes are for technology development requested by our four business divisions, but this is of course not enough. Rather, it is important that we can unearth the multifarious requirements for technology that our business units have not yet picked up on. I would like more of a focus on technical development, which is planting the flag for business with technology as a starting point. Further, building black box technologies and related business models is indispensable if we are to deepen and evolve our existing businesses. Our arsenal includes our unique, difficult-to-reproduce algorithms for data analysis and providing feedback, and the question is how we can further polish these. This is a vital point for our ambidextrous management.

—— The long-term vision for the next period is starting. As the CTO, how will you commit to this?

The COVID-19 pandemic has revealed a raft of vulnerabilities in the current global situation. Based upon the SINIC theory, at OMRON we believe that after achieving an optimized society formed from an integrated balance of humans and machines, we will arrive at an autonomous society in which social issues are resolved from a basis in these new values. However, achieving this requires that the three elements of science, technology, and society mutually stimulate each other and thus develop. Encouraging this synergy will deepen and evolve the very significance of our existence.

Specifically, we see that OMRON's strengths can be demonstrated through points of interface between humans and machines. The more automation progresses not only in medicine and nursing care but also in manufacturing plants, the clearer the role of humans will become. This point of contact between humans and machines is precisely where OMRON excels—I'm proud to say that our capabilities for social implementation can hold their own.

However, it is not so much our technical capabilities that enable this, rather our architecture capacity to discern social needs, commercialize these, and implement them in society. We are actively employing external human resource for architect to further strengthen this capacity. Of course, we have had many heated discussions as to the framework for a specific design for the near future, and how to incorporate this into a specific architecture. We will use these unrestrained discussions to ramp up the speed and quality of our "trial and learning" approach, while putting OMRON's particular style of technology management into practice.