Section 2
THE UTILIZATION OF DX IN KANSAI AND OSAKA

OSHIMA, Hisanori; SHIMOJO, Shinji

1. The Transformation of Human Processes as the Essence of DX

While digital transformation (hereinafter referred to as "DX") is increasingly permeating our lives, there are still many misconceptions that DX is limited to the ICT domain. It is necessary to understand that the introduction of DX, or digital technologies, is one of the means of promoting transformation and that its essence is the transformation of governance as well as of corporate and organizational management.

The research project on IoT and DX by the Asia Pacific Institute of Research (APIR) has considered that, as a model for the sustainable evolution of urban services through digital technologies and in order to realize people's happiness, "the processes of things" will be optimized, leading to the optimization of "human processes," and vice-versa.

If the contents of the processes of things change due to digitalization, human processes, that is, organizations and operations, will also need to be transformed accordingly.

In this report, we would like to discuss what kind of transformation is required for the human processes associated with DX from the following two perspectives: "changes in business models" and "transformation of the organization, corporate culture, and climate." In doing so, we will refer to the contents of the research group project Comprehensive Digital Transformation in Kansai and Osaka conducted by APIR in FY2021 and the symposium Post-COVID-19 Sustainable Enterprise Design and DX held in March 2022[1].

2. Changes in Business Models: Building Long-term Relationships with Customers

Even without mentioning the COVID-19 pandemic, the business environment is becoming more complex and is changing rapidly. Also, as consumers'

---

1)   For details of the research group project, refer to Asia Pacific Institute of Research (2022a), and for details of the symposium, refer to Asia Pacific Institute of Research (2022b).

preferences are changing "from things to experiences" or "from ownership to experiences," relying solely on a sell-out model will lead to strong fluctuations in business performance due to changes in product life cycles and the number of customers.

Therefore, in addition to acquiring new customers, maintaining and expanding relationships with existing customers, in particular, is one of the trends in business models.

Meanwhile, by accumulating customer service usage data and continuously-collected sensor data, and by using AI to learn and analyze this data, it is becoming easier to change services to achieve higher levels of customer satisfaction.

Thus, we will consider the measures required on the side of human processes to maintain and improve long-term relationships with customers using digital technologies from the two perspectives of the "continuous provision of new values" and the "social implementation of new technologies."

(1) Continuous Provision of New Values

Customer satisfaction can be continuously improved by continuously providing new values to service users. We will explain this point by giving "subscription" as an example.

Subscription is a business model that charges a fixed fee based on the period of use rather than the number of times the product or service is used[2]. Since it is a business model that assumes a long-term contract, if the service does not change for a long time, customers will get bored and stop using it, or they will switch to another company's service that seems better for them. Therefore, subscription providers need to increase the value they provide by reflecting the preferences of individual customers (personalization), providing products and services with higher-level functions (upselling), and expanding their services into other areas (cross-selling). If service usage records are accumulated and analyzed as data, it will be easier to make changes to services.

In addition, how the subscription should be in concrete terms will differ depending on whether the product handled is hardware or software and how

---

2) The definition of the term "subscription" has expanded from the original meaning of "subscription (to magazines, etc.)." The Ministry of Economy, Trade and Industry (METI) (2020a) defines subscription as a "business model that provides services by charging consumers a fixed usage fee on a regular basis" (p. 38). On the other hand, Tzuo (2018) argues that subscription is "to start with the wants and needs of a particular customer base, then create a service that delivers ongoing value to those customers," putting more emphasis on continuity and creativity (p. 1).

Table 3-2-1	Subscription types and examples

Target services	Specific products	Examples
Use of contents	Movies, music, news	Netflix, Amazon, Apple, Nikkei, etc.
Use of software	Business apps, game software	Microsoft, Adobe, Sony, etc.
Use of services	Restaurant, beauty and healthcare	favy, Kirin (Tap Marché), Jocy, Sparty, etc.
	Analysis services for business operators	Neautech, Casio, KYB, Optex, etc.
Home delivery of consumer goods	Foods, flowers, sundries, toys	Oisix ra daichi, Hibiya Kadan, Trana, etc.
Use of durable consumer goods	Automobiles, furniture, home electric appliances, clothing, housing equipment	KINTO, subsclife, Panasonic, Laxus Technologies, airCloset, Daikin Industries, etc.
Use of real estate	Houses, mountains	HafH, XROSS HOUSE, unito, ADDress, MOKKI, etc.

Source: Prepared by the author based on various media reports.

the value is provided (Table 3-2-1). In particular, with respect to servitization in the manufacturing industry that deals with hardware, the following servitization trends are taking place through subscriptions.

One service model is that service providers own things including equipment and operate them on behalf of customers, and they provide the services obtained through it to customers. By operating the equipment and also continuously collecting and analyzing the equipment usage data, service providers can propose new value, including energy conservation and failure prevention. In the case of Daikin Industries, which was taken up in the research group meeting, business operators own air conditioning equipment and provide air conditioning services to customers on a subscription basis.

One more model for hardware-related services is a subscription to the rights to use things. The concept is similar to sharing, where one can use things only when necessary. Here again, the use of digital technologies is effective for analyzing and understanding what kind of hardware is in high demand based on customers' usage records. In the example of Daikin Industries mentioned above, cases were observed where it analyzed the usage status of shared offices and based on this analysis, made changes to the office layouts to increase the usage rate.

In these servitization models, the use of software is suitable for subscriptions as it makes it relatively easy to enhance the value of services by updating the software as needed even without changing the functions of hardware. However, if customer needs are not clearly understood, the creation of new values cannot be completed all at once. Instead of aiming for perfection from the beginning,

it may be more effective to conduct trials of new products and services and to repeatedly modify them. Such a process is called prototyping" and is described later.

(2) Social Implementation of New Technologies

When new technologies are used to provide new services, it is often the case that legal regulations cannot keep up with the new technologies. Therefore, in the absence of laws, it is necessary for service providers themselves to define the rules for dealing with customers. This is discussed below from two perspectives.

1) Accountability for New Technologies

The true value of and risks associated with a service will not be known until the service is actually used. Speaking of digital technologies, such as camera images and AI, customers may have concerns about what kind of technologies they are using and whether there are any risks caused by using such technologies. Therefore, when providing new technologies and services, it is necessary to eliminate information asymmetry and remove these concerns by providing sufficient explanations. Eventually, the accumulation of these efforts will lead to these new technologies being highly evaluated in society.

2) Participation in the Formation of Rules for New Technologies

Even in the R&D phase where services have not been completely formed yet and there are no customers, ethics are necessary, albeit in a different form.

One of the examples discussed by the research group was R&D at Mercari. Mercari formulated and announced its ethical guidelines for R&D by itself to ensure that it conducts R&D activities in an ethically sound manner. This can be seen as an act of building trust with future service recipients from an early stage. Mercari also focuses on actively disseminating information on research results to quickly earn a good reputation in society. Various usages are derived from new technologies, so existing rules cannot cover all of these usages. Therefore, it is possible to make changes by working on existing laws and regulations and social norms from the company side.

For companies that want to be among the first to socially implement a new technology, it is advantageous for them to be able to participate in the rule-making process. In doing so, however, it is difficult to formulate rules without an

Part I

Part II

Part III

Part IV

image of how they can make the world better by spreading the new service[3]. If it is difficult for a company to fully examine a new technology on its own, it may be necessary to discuss it with other companies or universities that are considering the social implementation of a similar technology.

As a common basis for both the accountability and rule formation mentioned above, companies need to have ethical perspectives and imagination. This applies to in-house R&D as well as to the use of external technologies.

3. Transformation of the Organization, Corporate Culture, and Climate: Building Organizations that Continue to Create New Values

At the beginning of this report, we discussed that the essence of DX is the transformation of the management of companies and organizations. Organizational culture is important when conducting trials to create new values. In particular, if an organization has a shared culture, members of the organization naturally head in the same direction, while moving in an autonomous decentralized manner, and vice versa.

Next, we will discuss the culture of organizations that continue to create new values with a focus on the aforementioned prototyping and design thinking.

(1) Prototyping Environment

Prototyping, as described above, refers to the process of creating prototypes repeatedly, comparing them with actual needs, and finding points for modification. The challenge here is how to design an environment for this purpose.

1) Creating an environment where failures are accepted

One of the requirements for prototyping is to create an environment (a so-called sandbox) in which failures are accepted.

Failures are not limited to physical ones, but include social failures such as so-called "blowups" on social media.

In order to avoid major failures in trying out new measures, we need "safe places to blow up," so to speak. Since failures dealt with are not limited to physical ones, the necessary environments are not also limited to physical ones. It is

---

3) Ministry of Economy, Trade and Industry (METI) (2022), which outlines the concept of enhancing corporate value in Society 5.0, also states that a company must develop a management vision and design business models in consideration of "the effects on the company caused by changes in society and competitive environment due to digital technologies" (p. 3).

also necessary to secure human resources, including experts who support trials, people who are comfortable taking new risks like students, and those serving as hubs who can coordinate trials from a neutral standpoint and perspective.

However, it is difficult to prepare such places in a normal corporate setting. There are significant advantages to using external places including universities, and such places are now increasing in number. In addition to the open innovation sites[4] in Kansai introduced in last year's Kansai and the Asia Pacific Economic Outlook, QUINTBRIDGE, opened by NTT West in Kyobashi, Osaka in March 2022, and point0, a consortium operated by Daikin Industries and other companies since 2019, are also being used as sites for trials across corporate boundaries. Rather than covering everything with each company's own resources, these activities should be promoted premised on open collaboration.

2) Accumulation of both seeds and needs

When the needs for a new service are ascertained, if many seeds have already been identified, there are more options to combine them, which makes it easier to start prototyping. It is also important to have a sufficiently broad, even if shallow, knowledge about seeds.

Mr. Nobuaki Nagai of Kobe City Government, one of the panelists at the symposium, cited the importance of being knowledgeable about seeds. In other words, in addition to identifying measures required to achieve the desired result, research must be conducted on the means to achieve it. As an example of the response to the Covid-19 pandemic, when Kobe City supported restaurants to provide takeout services, restaurants that shifted to takeout were required to take stricter measures to prevent food poisoning than ever before, and they needed to seek support from experts at the City Government.

With respect to the collection of needs, the question is whose needs should be picked up. It is necessary to listen to the voices of as diverse a range of stakeholders as possible to respond to challenges, but what is also important is to have as many people as possible, both inside and outside the organization, who you can ask for their advice and opinions on a routine basis.

3) Turning feedback into improvements

According to Mr. Nagai, when Kobe City implemented countermeasures against COVID-19, they promptly delivered measures to the public with particular emphasis on speed, rather than taking time to develop complete measures, and then refined the measures while asking for opinions from the public. This is

---

4) Refer to Asia Pacific Institute of Research (2022c) p. 194.

exactly what prototyping is all about.

Regarding the first measures that emphasized speed, some problems were pointed out on Twitter and other social media, which provided tips for solutions, as well as lessons. Whether or not such negative comments on social media can be used as positive feedback information also depends on the culture of the organization.

(2) Organizational design

Above, we discussed the environment for prototyping, and next, we will discuss the organizational structure that makes prototyping possible.

Design thinking is a concept to practice prototyping[5]. In design thinking, the organization itself is subject to design. Here we will discuss the following two points.

1) Building communities to share challenges

According to Mr. Shunsuke Ishikawa of KESIKI Inc., another panelist at the aforementioned symposium, it is extremely important for those who are the first to explore and create new values to have followers who support them. For this reason, it is effective to build relationships with people who can share challenges and support value creation and to create communities in which people gather who are connected by a shared sense of what the issues are.

However, some people do not participate in measures such as communities, feeling that the hurdles to participation are too high, even if they share the same sense of what the issues are. According to Mr. Ishikawa, the following two points are necessary: how to lower the hurdles for community participation and how to set up easy-to-understand incentives.

2) Ensuring psychological safety

Another important point that Mr. Ishikawa pointed out is being able to handle the "ambiguity" that accompanies exploring new values with a sense of ease, or in other words, to secure "psychological safety." This is a prerequisite for the

---

5) Citing the words of Tom Kelley, a leading expert in design thinking, the Ministry of Economy, Trade and Industry (METI) (2020b) defines design thinking as "to apply the toolsets and mindsets that designers have developed through their work not only to design products, but also to design services and systems involving more complex problems" (p. 4). Nomura Research Institute (2014) states that "design should be incorporated into corporate activities, recognizing that design is relevant to all corporate activities, including marketing, planning, advertising, and branding in the development of products and services" (p. 3). Both discuss the application of design techniques to corporate management and solving social issues.

spread of prototyping.

For example, the point is whether we can present unfinished ideas to others without anxiety. We need to actively share our "hypotheses," even if they are incomplete and full of inaccuracies, with others to bring them closer to perfection while receiving feedback. We will be unsure whether the ideas meet the actual needs until they are shared. If we have a mindset of "I cannot share any idea unless it is perfect," we will not be able to proceed with anything.

Another point is whether we can "solve complex and ambiguous problems without forcibly simplifying or quantifying them, while allowing for some ambiguity." Simplifying a problem makes it easier to solve, but various aspects of the issue may be left out, making it impossible to reach a fulfilling solution. It is desirable to resolve problems through the participation of various experts, while intentionally leaving ambiguity.

Regarding ambiguity, Mr. Nagai also pointed out that it is important to have the right sense of discomfort, such as a sense that "Something is weird" or that "The theory is correct, but I feel something is wrong." It is difficult but important to break down and verbalize this sense of discomfort. It is important to stop whenever you feel any discomfort, rather than just turning a deaf ear to the calls of SOS from customers who are facing challenges.

We need a psychologically safe organization that allows us to feel, and even share, any of the anxieties, ambiguity, and discomfort mentioned above.

(3) The Understanding of Organizational Leaders

Since prototyping takes time until the final form takes shape and does not directly lead to immediate profits, the understanding of management is essential for the implementation of prototyping and design thinking[6]. Here I would like to provide some examples of points to keep in mind when prototyping.

1) Prototyping as branding

According to Mr. Ishikawa, who was mentioned earlier, whether a company has a culture of prototyping or not directly leads to employees' intention to stay in that company and their motivation, and a company with highly motivated employees

---

6) Improving companies' competitiveness by bringing design thinking into management is also promoted by government agencies, as seen in the case study of Osaka Prefecture (2021) and the Kansai Design Driven Management Project by the Kansai Bureau of Economy, Trade and Industry (METI Kansai).

directly relates to corporate sales performance[7]. The ability to create the next market by gaining insights from customers through prototyping will make a difference in the medium to long term. If a company positions prototyping as a means to pursue its missions, prototyping itself may become its brand. Branding in this context is not mass marketing, but something that evokes empathy corresponding to individual customers' perspectives. The use of data will also make it possible to identify what responses can be expected from which recipients.

2) Media exposure of "stories"

There is a way to communicate a mission in the form of stories (storytelling) to make individuals empathize with the mission of the company. It is preferable to assume that the stories communicated will be taken up by the media. The aforementioned Mr. Nagai said that when launching a new measure in Kobe City, he considers the ripple effects of the media as well as how he wants the media to cover it.

3) Unity of will within the organization

The larger the organization and the more fragmented the roles of individuals and the more difficult it will be to spread a culture of prototyping. Especially when prototyping across departments, it is necessary to spend time interacting to share the intentions and goals of measures. In the case of JR West (West Japan Railway Company), which was discussed in the research group meeting, the department responsible for DX promotion and the railway management department had very different views on trials, so they promoted inter-departmental exchanges and mutual understanding when promoting DX.

In the case of local governments, while Kobe City was successful in rapid prototyping even amidst the COVID-19 pandemic, it would be difficult for Osaka City, for example, to conduct prototyping in the same way due to their different scales. How to proceed with these measures will be a very difficult challenge as governmental bodies become larger in scale, from cities, to prefectures, and to the national government.

4. Conclusion

In this paper, we discussed that the essence of DX is the transformation of

---

7) The Ministry of Economy, Trade and Industry (METI) and the Japan Patent Office (JPO) (2018) found that introducing design into management has a positive effect on sales, profits, stock prices, etc., according to the results of surveys in Europe and the U.S. (p. 5).

organizational governance. We also discussed innovation in "human processes" that accompanies innovation in "the processes of things" through digital technologies, citing as examples the subscription model from the perspective of "building long-term relationships with customers" and prototyping and design thinking from the perspective of "building organizations that continue to create new values." Building long-term relationships with customers and ensuring transparency for this purpose is now a global trend, which is now regarded as an ESG investment target.

Once these human processes have been transformed and made more efficient, the next step is to seek innovation in digital technologies as the processes of things. Even if the flow is not uniform as it depends on the industry and initiative, both things and humans will need to continue to evolve alongside each other in order to achieve the optimal combination of processes. The goal is "people's happiness," and transformation requires both ethics and imagination.

References

Asia Pacific Institute of Research (2022a), "Research Project: Comprehensive digital transformation in Kansai and Osaka" Research Group Report" (Japanese title: *Kenkyu Purojekuto: Kansai, Osaka ni Okeru Toshi Gurumi, Toshi Reberu no DX*) (FY2021)

(https://www.apir.or.jp/wp/wp-content/uploads/2021_apir_research_report_DX.pdf, Last viewed on August 3, 2022)

Asia Pacific Institute of Research (2022b), "Post-Covid-19 Sustainable Enterprise Design and DX" (Japanese title: *Korona go no Jizoku Kano na Kigyo no Dezain to DX*), APIR NOW, No. 31, p. 12.

(https://www.apir.or.jp/wp/wp-content/uploads/ apir_now_no31.pdf, Last viewed on August 3, 2022)

Asia Pacific Institute of Research (2022c), "Kansai and the Asia Pacific: Economic Outlook 2021–22"

Ministry of Economy, Trade and Industry (METI) and Japan Patent Office (2018) "Design Driven Management Declaration" (Japanese title: *Dezain Keiei Sengen*)

(https://www.meti.go.jp/report/whitepaper/data/pdf/20180523001_01.pdf, Last viewed on August 3, 2022)

Ministry of Economy, Trade and Industry (METI) (2020a), "Results of the FY2020 Industrial Economic Research Commissioned Project (E-Commerce Market Survey)" (https://www.meti.go.jp/policy/it_policy/statistics/outlook/210730_new_hokokusho.pdf, Last viewed on August 3, 2022)

Ministry of Economy, Trade and Industry (METI) (2020b), "Handbook on

'Design-Driven Management' for Business Persons with Unclear Visions of Designs"
(https://www.meti.go.jp/press/2019/03/20200323002/20200323002-1.pdf, Last viewed on August 3, 2022)

Ministry of Economy, Trade and Industry (METI) (2022) "Digital Governance Code" (https://www.meti.go.jp/shingikai/mono_info_service/dgs5/pdf/20201109_01.pdf, Last viewed on August 3, 2022)

Nomura Research Institute (2014) "Report on the Survey of Management Practices Using Design Thinking to Strengthen International Competitiveness" (Japanese title: *Kokusai Kyosoryoku Kyoka no Tame no Dezain Shiko o Katsuyo Sita Keiei Jittai Chosa Hokokusho*" Website of the National Diet Library (http://warp.da.ndl.go.jp/info:ndljp/pid/10217941/www.meti.go.jp/policy/mono_info_service/mono/creative/design_thinking_report.pdf, Last viewed on August 3, 2022)

Osaka Prefecture (2021) "Improving the Competitiveness of Small and Medium Enterprises from the Perspective of Design Driven Management" (Japanese title: *Dezain Keiei Shiten deno Chusho Kigyo no Kyosoryoku Kojo ni Tsuite*) Osaka Prefecture Material No. 186.

Tzuo, T. (2018), *Subscribed: Why the Subscription Model Will Be Your Company's Future – and What to Do About it*, Portfolio Penguin.

Website of the Kansai Bureau of Economy, Trade and Industry (METI Kansai), "Kansai Design Driven Management Project" (Japanese title: *Kansai Dezain Keiei Purojekuto*), (https://www.kansai.meti.go.jp/2tokkyo/ 10design_keiei/design_top.html, Last viewed on August 3)