

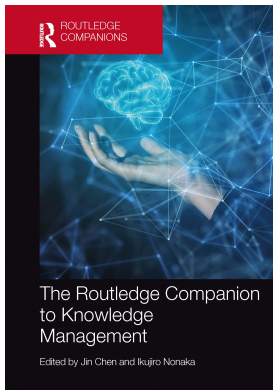
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Expanding the Workplace to Promote Knowledge Creation

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EXPANDING THE WORKPLACE TO PROMOTE KNOWLEDGE CREATION

Dai Senoo and Bach Q. Ho

Introduction

The Importance of Space in Knowledge Creation

In the research field of knowledge management, there are multiple topics such as knowledge acquisition, sharing, utilization, and accumulation. Among these, this chapter focuses its attention on knowledge creation.

Changing of the major trend in how corporates create value can be seen as the transition from “value creation through production” to “value creation through innovation”. The *raison d’être* of a company is to create value for customers, employees, shareholders, and society. This is true regardless of the times that we are in, but the time has come for change in methods of value creation. For commercial capitalism during the Age of Exploration, geographical differences were the source of profits, and for industrial capitalism in the 20th century, the difference between the value of labor and the value of products was the source of profits. However, in the 21st century, where there is a higher degree of homogenization and globalization, such naturally occurring differences are unlikely to happen. Thus, society’s attention is turned toward “knowledge creation”.

Knowledge is the source of innovation. The creation of new knowledge leads to new products, services, organizations, and business models. Traditionally, most of the work in companies was “information processing” and their main task was problem solving. However, creativity is required to derive innovative value in modern times. It is not possible to create new value simply by following manuals and relying on prior experience as before. The knowledge possessed by business owners and employees has become the focus of our attention as a source of innovation. Up to now, it is usually regarded that there are four main management resources that are indispensable for corporate activities: people (labor force), goods (production facilities and raw materials), money (capital), and information. However, as the importance of innovation in economic activities increases, in addition to these four management resources, knowledge possessed by business owners, managers, employees, and customers has come to draw attention as a source of innovation.

In the process of knowledge creation, individual knowledge is transformed through interaction with others to create value. The ideas needed to create new knowledge are not

achieved in an individual's mind, but are realized by mixing disparate knowledge. This is what J. A. Schumpeter calls "innovation" (Neue Kombination), and it is the activity of innovation itself that involves knowledge creation.

Space is necessary for the existence of relationships between people who possess knowledge. Until now, offices in companies have often been designed around information-processing tasks by individuals. However, when aiming to promote knowledge creation, it is necessary to prepare a workplace designed with an emphasis on relationships, that is, with a focus on group work.

Leading companies are already making various changes. For example, many of the newly created workplaces have more space for eating and drinking, and are equipped with table tennis and billiard tables. These can be regarded as welfare benefits aimed at taking a break and improving the health of working individuals, but they can also be regarded as a mechanism for creating new relationships. Innovative ideas do not come up even if you talk formally and seriously. You may notice something while doing an activity which you do not normally do, or you may come up with new ideas while talking to people you do not usually meet. Similarly, talking to people you meet all the time in an outdoor tent compared to talking to them in the same meeting room as you normally do offers a different "Ba" (human-to-human relationship), which may lead to new discoveries.

Changes in Specifications Required for Workplace

The focal point of workplace design is changing from individual work to group work. In order to get new ideas for innovation, it is recommended to improve group work with colleagues and activate communication. Rather than silently creating documents, it is becoming more important to talk to customers and people in the company to whom you have never talked before and to collect information. Work done in collaboration with a team is becoming more important than work done alone.

There are three reasons to emphasize group work: (1) group work creates higher value than individual work; (2) the proportion of knowledge work is increasing; (3) due to the development of information and communications technology (ICT) and cost reduction (and the impact of the spread of the COVID-19 virus), workplaces suitable for individual work has become something which has to be designed by each individual, instead of being homogeneously created by companies.

In the subsequent sections of this chapter, a workplace designed with an emphasis on knowledge creation work by a group will be called a "knowledge creation workplace". The concept of "Ba" is useful for analyzing this kind of workplace. This is because it is more efficient to use the relationship between workers as an unit of analysis than to use each individual worker as an unit of analysis. From a systematic point of view, it means switching the focus of our attention from a node (single element) to a link (relationship).

Technologies in Work Space

In today's world where technology is developing and there is a fusion of the real and virtual worlds, it is important to assume that the process of knowledge creation can include artifacts (man-made objects) when we are considering space. In addition to human-centered analysis of "who and who act in collaboration", it is also fruitful and productive to design a knowledge-creating workplace using the framework of "actor network theory" which

analyzes artifacts such as instruments, machines, and artificial intelligence by treating them in the same way as humans (as far as the research is concerned).

The COVID-19 virus spread worldwide in 2020 and has not stopped spreading as of 2021. To prevent the spread of infections, companies have accelerated teleworking from home, and remote video-conferencing systems such as Zoom and Skype have become widespread overnight. It also has become clear that the real physical office performed a function that video-conferencing systems cannot replace for now.

For example, in a physical office, when an idea comes to mind, it is possible to involve not only the person who is talking with you, but also the person who happened to be there or the person who passed by, and try the idea with them. Some virtual office systems are attempting to enable such “accidental” involvement by having people in the vicinity as well as online meeting attendees reflected in the background, or by making avatars always existent on the screen.

Furthermore, in the physical office, it has become clear that humans are observing each other. While it may seem that humans do not seem to be very conscious of each other when gathered in the same space, the fact is they often closely look at other people. For example, when someone is angry at a meeting, normally it is impossible to tell whether he/she is really angry or just making an angry pose just based on the information you can gather at the scene, somehow you will be able to tell the difference when you have been with him/her in the same space for a couple of months before that. Based on a person’s utterances, it is difficult to understand the true meaning of what he/she is saying without background information and context, and the surrounding environment such as facial expressions, postures, and movements. This is an essential requirement in order to have deep conversations which are necessary for knowledge creation.

The Question of This Chapter

Having established the importance of space in knowledge creation, the expectations that society has for workspace for team-based knowledge creation, and how technology is fusing the real and virtual, we formulate a question for this chapter as follows.

The question is “How can we expand the knowledge creation workplace?” A more detailed way to express this question would be “In what direction should we expand the working space so as to effectively enable the creation and activation of the Ba (relationships) that encourages knowledge creation?” In addressing this question, the authors regard the utilization of the current continuously evolving ICT as a premise.

For readers who wish to read the conclusion first, the answer to this question is the hypothesis that “An effective direction to work towards is the utilization of external knowledge and the ability to provide a improvisational response”. This chapter proposes the use of external knowledge as a policy for geographical expansion, and responding in an improvisational manner as a policy for temporal expansion. The discussions leading up to such proposals will be described below.

The Theory of Ba

Definition of Ba

A “Ba” is a context-sharing relationship for the emergence of knowledge, and the state of such Ba and the degree of connection between Ba influence the organizational knowledge

creation process. Establishing and activating this relationship is a requirement for promoting knowledge creation. Other requirements for promoting knowledge creation include leadership and knowledge assets, but since space is the theme of this chapter, we focus on the Ba here. As mentioned in ‘Changes in Specifications Required for Workplace’, it is convenient to use the concept of Ba when considering the knowledge creation workplace.

Outline of Knowledge Creation Theory

I. Nonaka has advocated “organizational knowledge creation theory”. Knowledge creation refers to the circulatory interaction between tacit knowledge and explicit knowledge, which “makes thoughts into words, words into shapes, shapes into practice, and practice into further thoughts”. The premise of organized knowledge creation theory is the assumption that all knowledge can be reduced to two types: tacit knowledge and explicit knowledge. “Tacit knowledge” is subjective and embodied knowledge that is difficult to express in language or numerical values, and more specifically this includes beliefs, viewpoints, well-honed skills, and know-how. On the other hand, “explicit knowledge” is objective and rational knowledge that can be expressed in languages and numerical values, and more specifically this includes texts, equations, specifications, and manuals.

We will explain the four-mode knowledge creation process called SECI for each mode. Socialization is a mode in which individuals share tacit knowledge through shared experiences. Under the apprenticeship system, which has a policy of “skills are not learned but stolen”, disciples acquire the values and skills of their masters through observation and imitation during shared experiences. An example of socialization is when members from the development team visit the site where a product is used and experience the user’s sense of everyday life and cultural climate when developing a product. This mode requires the full utilization of the five senses in order to acquire non-verbal knowledge.

Externalization is a mode in which an individual or group transforms tacit knowledge into explicit knowledge through metaphors and dialogues. The verbalization of tacit knowledge which resists such attempts at verbalization, can open up a new possibility where knowledge can spread without being limited to the scope of shared experience. It also opens up the possibility of creating value that goes beyond merely trying to please the customer by keeping an objective distance from reality which facilitates an in-depth and thorough form of conceptualization. Examples of this mode can be seen when trying to capture advanced skills embodied in an individual into a manual, or when a product development team tries to determine the concept of a new product.

Combination is a mode in which the level of abstraction in some explicit knowledge is increased or explicit knowledge is combined with another explicit knowledge to create new explicit knowledge. The typical examples of this mode are when translating the concept of a new product into abstract and context-insensitive product specifications, and when trying to edit multiple articles so as to synthesize an overarching message throughout an entire magazine. In addition, the realization of information sharing that transcends time and space by using a computer network and such can also be seen as instances of this combination mode. It is a mode which is easily supportable from management information systems.

Internalization is a mode that transforms explicit knowledge into tacit knowledge through practice and introspection. To convert explicit knowledge into tacit knowledge, one must not only understand it with the mind, but also internalize it with the body. To maintain a strong belief and to be able to demonstrate the necessary skills at any time, re-experience by practice and repetitive exercise are required.

The dynamic process of the SECI model, as we have seen above, occurs in different layers of ontology. Knowledge transformation between tacit knowledge and explicit knowledge through the above four modes can be regarded as a dynamic process in the dimension of epistemology. This dynamic process takes place in the different ontological layers of individuals, groups, organizations, and societies.

The process by which the knowledge of individuals and organizations is amplified is referred to as the “knowledge spiral”. The starting point of organizational knowledge creation is the tacit knowledge of an individual. The tacit knowledge of an individual (“personal tacit knowledge”) is shared with others by socialization. Although tacit knowledge can be externalized into explicit knowledge by an individual alone, it is more effective and efficient to perform this in a group that shares tacit knowledge. This is because having diverse viewpoints and dialogues accelerates externalization. Combination, which is to combine explicit knowledge, can be performed at the organizational level. This is because explicit knowledge, which is less context-dependent, does not easily change or wear out with the passage of time or separation of space, so it is easy to expand the scope of acquisition of explicit knowledge. Internalization, which transforms explicit knowledge into tacit knowledge, takes place at the individual, group, and organizational levels. Explicit knowledge is embodied in individuals through actual practice and at the same time it is absorbed as tacit knowledge in groups or organizations. Nonaka et al. describe the process of amplifying both individual knowledge and organizational knowledge in this way as a “knowledge spiral”. This expression evokes an image of how knowledge spreads as it rises like a spiral.

However, the process of knowledge creation in an actual organization follows a complicated path, unlike the smooth and simple pathway described above. Activities that connect different layers (booming-up and slipping-down) take place as well as those within each layer of individuals, groups, organizations, and societies (Wu et al., 2010).

Effects of Creating “Ba”

Nonaka argues that dialogue between actors with different contexts is necessary for the formation of new meanings, and regards the “Ba”, which is a context-sharing relationship, as the main element of an organization. “Ba” appears not only within a company but also beyond the boundaries of a company with customers, suppliers, local communities, and so on. It is expected that each department and each individual of an organization will find and

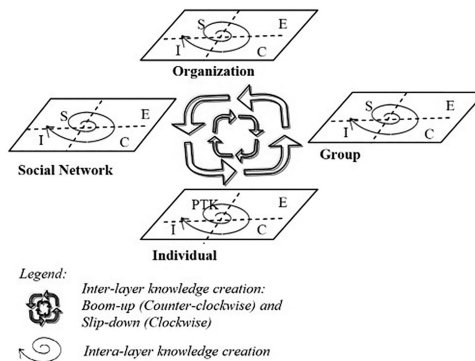


Figure 16.1 Four Layers Model

solve problems through team work that goes beyond corporate boundaries, and will discover new problems when a series of work is completed.

Unlike information-processing organizations, it is said that creating a Ba is more important than monitoring employees in a knowledge-creating organization. Knowledge creation is extremely accidental and cannot be managed or monitored. It does not always happen during work hours in the company, and it is not something that always happens with training or education. The leaders of knowledge-creating organizations are required to go beyond merely managing their subordinates, but also to create new meeting places and opportunities to encourage knowledge-creating activities.

Why is it necessary to create a Ba when attempting to encourage the knowledge creation process? We will look into the effect of creating a Ba. First, it seems that creating a Ba will help to create a greater consensus in terms of an organization's activity goals (knowledge vision). Each actor participating in an organization's activities has its own context and different desires to meet. Some people consider getting paid as their main objectives, others want to satisfy their needs for a sense of belonging, while others participate for self-fulfillment. The experience they have accumulated and their areas of expertise are also different. It is difficult to agree on a common objective if such diverse contexts are left as they are. Understanding each other's context through the creation of a Ba will facilitate the process of setting goals for an organization's activities. Second, it seems that creating a Ba will strengthen the members' willingness to collaborate. This is because sharing each other's context makes it easier to create cognitive empathy and increases friendship and psychological safety. Third, it seems that creating a Ba will make communication substantial and speed up the knowledge creation process. This is because the shared contexts make it easier to understand the true meaning of the conversation and reduces time wastage due to miscommunication and misunderstandings.

Analysis and Discussion

Revisiting the Question "How to Expand the Knowledge Creation Workplace?"

As mentioned in "The Question of This Chapter", the question for this chapter is "How to Expand the Knowledge Creation Workplace?" A more detailed way to express this question would be, "In what direction should we expand the working space so as to effectively enable the creation and activation of the Ba (relationships) that encourages knowledge creation?" In addressing this question, the authors regard the utilization of the current continuously evolving ICT as a premise.

Framework for Analysis

This section presents the analytical framework of this chapter. The four main concepts used are "space", "field", "knowledge creation activity", and "knowledge creation outcomes". Figure 16.2 shows these four concepts as an analytical framework. Figure 16.2 shows the influence of space on knowledge creation activities through two paths. The indirect influence of the upper part is through the Ba and is the main subject of analysis in this chapter. There is certainly a direct influence at the lower part. For example, introducing a desk with a large top plate, or introducing electronic sticky notes, may streamline individual editing activities. However, such direct effects are not the main subject of analysis in this chapter.

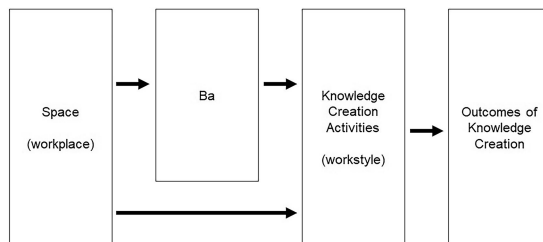


Figure 16.2 Framework for Analysis

Division of the Question by the Concept of “Ba”

A “Ba” is defined as a context-sharing relationship for the emergence of knowledge, also expressed as “shared context in motion” (Nonaka and Toyama, 2015). From the perspective of the three elements of “sharing”, “in motion”, and “context” contained in this expression, we will look at each element individually in order to approach the question of this chapter: “How to expand the knowledge creation workplace?”

In response to this question, we first approach it from the perspective of the element “in motion”. The focal question is: “What does it mean to share context in motion (rather than statically)?”

Let us explore the analytical method for each generation of systems theory. Here, an actor is represented by a node and communication is represented by a link. In (static) “general systems”, which are regarded as the first generation systems in systems theory, nodes and links are already fixed, and context sharing is expressed when a link is activated (i.e., inactive state becomes active state). In the “self-organizing systems”, which are considered to be the second-generation systems, the nodes are fixed, but the links are unfixed. There is a possibility that a new link will be created even where a link is not established. In the “autopoietic systems”, which are considered to be the third generation systems, both nodes and links are unfixed. The system grows when the first node creates the next node. The fact that context is shared “in motion” indicates that context sharing must be understood in a way which assumes second-generation and third generation systems that are highly system-extensible. When designing an expansion of the knowledge creation workplace, you need to keep in mind that relationships can develop in both nodes and links.

Next, we approach from the perspective of the element “shared”. Here, the focal question is: “Who are the actors between which contexts are shared in the knowledge creation workplace?” In ‘Technologies in Work Space’, the authors proposed the use of the framework of actor network theory, which treats and analyzes artifacts in the same way as humans. However, in order not to make the discussion too divergent, we will deliberately limit the discussion here to humans.

The first humans to think of are the individual members of an organization. Specifically, they are the employees who belong to a company that owns a knowledge creation workplace. At the core of the knowledge creation workplace is context sharing among such employees. However, this is not sufficient. Given the potential for relationships to develop on both nodes and links, as discussed in the approach from the perspective of the “in motion” element, we should look not only within the system boundaries at some point, but also outside. When designing an expansion of knowledge creation workplace, it is necessary to consider the actor network that shares their contexts as an open system rather than a closed system.

Lastly, we approach the discussion from the perspective of the element “context”. The focal question is: “What exactly should be considered as the contexts to be shared in a knowledge creation workplace?” If the exchange of words in communication between actors is a “figure”, the meta information that defines from the upper level the premise that each actor has and the communication itself is the “ground”. This context of “ground” has a decisive influence on the sense making. For example, it depends on the context whether the word “goodbye” means “see you tomorrow” or “we will never see each other again”. To give a more extreme example, the word “thank you” can mean “Thank you” or “No, thank you”, and it depends on the context. When designing an expansion of knowledge creation workplace, it is necessary to look not only at the language exchange, but also at the non-verbal context behind it, and consider it in a social constructionist manner. Non-verbal contexts include body language such as facial expressions and gestures, standing position and posture, loudness and tone of voice, intervals between utterances, timing, and premises, assumptions, beliefs, and tendencies of each actor.

Specific Considerations of Expansion of Knowledge Creation Workplace

From the theoretical discussions in “Division of the Question by the Concept of ‘Ba’”, we obtained some insights such as “sharing in an open system” and “non-verbal context”. In this section, we will use these two concepts to consider measures that can be applied to actual sites of corporate management.

When we talk about an “open system”, we often think about the trend of “open innovation”. In the past, innovation focused on activities that can be completed within an organization. However, with advances in information technology, it has become possible to easily and inexpensively access external resources, and it is uneconomical to innovate with internal resources alone.

The situation of workplaces in Japan, which the authors have observed over the years, has changed significantly over the past 15 years or so. In addition to employee satisfaction, work productivity, turnover rate, number of new graduate applicants, etc., “number of customers coming to the place” has become an important indicator as a KPI (Key Performance Indicator) when improving a workplace as a result of relocation or renovation. Companies that used to only focus on making sales outside the workplace are adopting a strategy to increase the number of visitors to the workplace by changing their workplace to an original and attractive design. By changing to a sales model that attracts customers to the company, you can have them see products and services other than those they were looking for at the same time, or you can let the person in charge of another department of the company take over the conversation depending on the content of the talk. In addition to “explicit knowledge” that customers are already aware of, they will be able to create new knowledge by utilizing “tacit knowledge” that customers themselves cannot yet put into words.

“Design thinking” can be regarded as a trend similar to open innovation. Unlike the conventional tendency of “you can sell when you make good products” or “launching a flagship product that has been thoroughly refined by the company through many years”, it is a work movement which takes as its starting point “insights on what customers want” and “how to change the customer’s experience”. Instead of the conventional posture of “please buy this product from us”, we are switching to a posture of collaborative creation, that is, “would you like to create a job together?” In addition to inviting existing customers as visitors, more and more companies have set up co-working spaces near their offices to encourage interactions between other companies’ employees (potential customers or potential partners) and their

own employees. It can be said that the creation of a knowledge creation community that goes beyond boundaries is accelerating.

When expanding the knowledge creation workplace, it is effective to adopt a policy of expanding it geographically by opening it to the outside of its boundary and of utilizing external knowledge. The number of relationships, which previously had an upper limit in a closed environment, increases exponentially by creating a more open environment.

What comes to mind in connection with the other concept, “non-verbal”, is the increase in the area and variety of shared spaces. This has also changed significantly over the past 15 years or so. In the previous era when the focus was on individual work, the emphasis was on creating an environment where people could “work comfortably”, and workers longed for a personal space that will allow them to concentrate on their own individual work. However, nowadays, the emphasis is on team work, and the area of personal space has decreased due to the introduction of the free address (non-territorial) system, etc., and the area of shared space has increased instead. The types of shared spaces used to be disproportionately made up of smoking areas and conference rooms, but have now diversified into eating and drinking spaces, kitchens, entertainment and game corners, meditation rooms, and booths for short meetings and intensive work. In diversified spaces, special non-verbal contexts can be exchanged intensely in each space.

The activities carried out in the workplace are also diversifying. In the past, work was defined by place and time, such as “activities occurring in the office from 9am to 5pm”. Now, workplaces can be at satellite offices and at home, while working time has also become flexible, and it is no longer possible to define work using time and place. The future is going to be one where individuals work autonomously. The increase in “slash careers” and side businesses is a sign of this trend. This diversification of activities increases the relative value of activities that have yet to be verbalized or documented. In other words, rather than performing “uniform and steady activities that are likely to create existing value” which have already been verbalized and documented, it is expected that we will instead focus on “diverse and uncertain activities that are likely to create new value” and observing people performing such activities and discovering potential value in the process. As a reaction, the phenomenon where activities that currently seem to be only hobbies or entertainment may generate great value in the future, the notion of “art thinking” has garnered attention in the study of business administration, and an increasing number of companies are inviting artists and activists to live on their premises.

When expanding knowledge creation workplace, from the perspective of time, it will be effective to adopt a policy of expansion which incorporates the changing environment of the present and future as a resource instead of being restricted by plans from the past, and to respond to these changes in an improvisational manner. This will prevent isomorphism that happens in the process of planning and institutionalization, and prevent stagnation due to the loss of creative conflicts.

Summary of This Section

In response to the question which this chapter sets out to answer, which is “In what direction should we expand the working space so as to effectively enable the creation and activation of the Ba (relationship) that encourages knowledge creation?”, we would like to present a tentative hypothetical answer from the above discussion.

Hypothesis 1: In order to create a Ba for sharing in an open system, an effective way is to expand the working space geographically in the direction of “utilization of external knowledge”.

Hypothesis 2: In order to create a Ba for the sharing of non-verbal contexts, an effective way is to expand the working space temporally in the direction of “improvisational response”.

Case Study

This section introduces case studies of companies that skillfully utilize ICT to encourage knowledge creation. There are two successful cases related to the geographical expansion of Hypothesis 1 shown in the previous section, and two successful cases related to the temporal expansion of Hypothesis 2, with a total of four cases.

Cases of Successful Geographical Expansion

LEGO (platform using Internet, proposals of new product from the user community)

LEGO is a toy maker founded in Denmark in 1932, and its main product is assembly blocks. Until the 1980s, they were steadily increasing their sales by selling a wide variety of products. However, in addition to the rise of video games, many cheap imitation products have become available in the market due to the expiration of patents, and sales have fallen since the 1990s.

Therefore, LEGO reviewed its corporate culture through interviews with other companies and analysis of its own business. They found that customers have many creative ideas that lead to innovation, and that customers value not only the process of purchasing products but also the process of creating products together. This led LEGO to launch a website called LEGO IDEAS to commercialize customer ideas. After that, LEGO recovered its sales and has become the world’s number one toy maker in 2014, surpassing Google in the brand ranking to become the number one in the world.

LEGO was able to recover its business performance because it utilized ICT to incorporate external knowledge and realized the geographical expansion of knowledge creation. They humbly learned from other companies and built a platform to actively incorporate customer knowledge by reviewing its corporate culture. As a result, the product-oriented values transformed to emphasize the process instead. Innovation cannot be realized from geographical expansion just by introducing the latest ICT. It is also important to foster a corporate culture that actively utilizes external knowledge.

avatarin (Virtual Space, Making Artifacts as Actors)

avatarin is a startup company launched by the airline ANA in 2020, aiming to make avatars a social infrastructure by providing popular-type communication avatars. Customers can go anywhere in the world by logging in to their alter ego, avatar, from a website or app. Development has been underway since around 2016 with the aim of teleporting consciousness so that anyone can do whatever they want when they want. It seems ironic that an airline company whose mission is to transport people starts a new business that requires people to move less, but the outbreak of the new coronavirus from 2020 has expanded its demand. This is a case where technological development and changes in social environment are well matched.

For example, by placing an avatar in a retail store, customers can walk around the store real-time with a clerk to find products that meet their needs. As a result, even rural stores that do not have an EC site have become able to expand their sales. It has also begun to be

used for remote working. Conversations through avatars convey more information to the other party than online meetings using Zoom, etc., and serendipity is more likely to occur.

avatarin sees its business as a social infrastructure business rather than an avatar sales business. By placing avatars throughout the world as social infrastructure, customers can access various regions and explore new knowledge. In addition, avatars are fusing real and virtual knowledge creation spaces. Cameras on avatars show not only the dialogue partner but also the background environment in which the partner's avatar is. The interposition of avatars creates authentic physical sensations that are not limited to digital information, and it is likely to bring diversity and spontaneity that are effective for knowledge creation.

Cases of Successful Temporal Expansion

KOMTRAX (Global Positioning System, from Theft Prevention to Maintenance Services)

KOMTRAX is a machine operation management system that was installed on construction machinery as standard equipment by KOMATSU, in 2001. Originally, it started with attaching GPS devices on large machines to prevent theft. At that time, there were many cases of bank ATMs being destroyed using hydraulic excavators. The idea arose that a feature to verify the location of the excavator can prevent such cases from happening, and such devices began to be installed as standard equipment. As a result, theft cases were drastically reduced by the tracking system and the remote engine stop function.

By being able to remotely verify not only information about the location but also the engine operating status and power mode usage status, it has become possible to provide new customer services such as offering consultation and guidance to the operator, and suggesting when to replace parts, which greatly contributed to differentiation from other companies. In many other parts of the world, irregular events that rarely occur in Japan sometimes occur frequently, and this system can contribute to the prevention of such events. For example, it is possible to prevent fuel theft by tracking information about the level of remaining fuel, and to remotely lock a machine when the buyer continues to delay its installment payments.

By monitoring the status of public works projects using data collected from construction machinery around the world, KOMATSU managers can also accurately estimate future economic trends. This is an example of a pioneer in the big data business in the sense that they turned non-verbal information that had not been put to use until then into information that can be utilized by collecting and aggregating remote data from sensors. Similar trends have been observed in many other businesses in the world that combine mobile phone movement data and automobile driving data with various services.

ClipLine (Short Video Technology, Started Off as a Method of New Employee Education for Chain Stores before Moving to Other Businesses)

ClipLine is a Japanese start-up company founded in 2013, and its core resource is a system for creating and distributing short videos. Since its establishment, it has provided value by reducing educational costs and maximizing educational effects with a system that uses short videos (clips) of about 20 seconds for companies that develop multi-store businesses such as restaurant chains.

The founder was inspired by how athletes improve their skills by recording their own movements and comparing them with demonstration videos. This training method was

found to be effective, and he adapted it to employee training such as how employees are expected to provide customer service. Employees can check the demonstration videos on a tablet, record their own physical movements (such as how they greet customers, bow, and cook food products), and play the self-video and the model video side by side for objective comparison. Since it is a cloud-based service, you can verify the usage status while looking at data such as the number of button clicks, the number of recordings taken, and the number of views. This technology is patented as an “autonomous learning system”.

This system is now used by client companies in unique ways which were unexpected. Not only is it used as a support tool for new employee training, it is also used like a social media platform for communication between multi-site employees using videos (stress relief at one-man operation sites), used for monitoring by taking videos and checking store cleanliness, and used for personnel management, such as measuring the retention rate of part-timers at each store and how good their team work is. By referring to the innovations which are demanded by the customers, ClipLine is going ahead with the creation of additional system functions and new business development. This is an example of turning non-verbal contexts such as various know-hows generated in workplaces into explicit knowledge as video clips, distributing and accumulating them within customer organizations and also within the ClipLine organization, and continuing to develop its business model while responding improvisationally to changes.

Conclusion

This chapter considers the expansion of working space to promote knowledge creation. The question for this chapter is “How can we expand the knowledge creation workplace?” A more detailed way to express this question would be “In what direction should we expand the working space so as to effectively enable the creation and activation of the Ba (relationships) that encourages knowledge creation?”

In addressing this question, we used the concept of “Ba” in knowledge creation theory. We approached the question from the perspective of three elements, i.e., “sharing”, “in motion”, and “context” included in the definition of the Ba, and obtained the insights of “sharing in an open system” and “non-verbal context”. After further specific consideration, we extracted “external knowledge utilization” from “open system sharing” and “improvisational response” from “non-verbal context” as policies for expansion of space, and proposed two hypotheses. We also introduced four successful case studies of excellent utilization of ICT. Although there is a need for further study, the tentative conclusions as of 2021 are as follows:

Conclusion 1: There can be greater use of ICT while considering how to geographically expand space to utilize external knowledge.

Conclusion 2: There can be greater use of ICT while considering how to temporally expand space to allow for improvisational responses.

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