Workplace reformation, active ba and knowledge creation

From a conceptual to a practical framework

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Abstract
Purpose – The purpose of this paper is to propose a practical framework for the design and measure of active ba and assess whether workplace reformation initiatives actively contribute to promoting knowledge creation by activating ba.
Design/methodology/approach – The workplace reformation is first segmented into virtual and physical environments. Then, using the SECI knowledge-creation process, the effects of each environment as well as their mutual interactions on active ba are analyzed. Next, the case studies of two workplace reformations are introduced, the first using a qualitative analysis and the second the results of a questionnaire survey carried out at three different stages of the implementation.
Findings – The effective implementation of workplace reformation in two separate entities enabled the creation of active ba. The influence of the physical and virtual environments on the creation of active ba were significantly different, thus justifying the assumption of the division of such environmental factors. The main factor of active ba generated by a complete workplace reformation was shown to be direct communication.
Research limitations/implications – The two firms studied here belong to the same group of companies, and both departments’ workplace reformations were conducted by the same person, whose widely known track record may be seen as a self-fulfilling prophecy.
Practical implications – Because these two types of workplace reformation reversely impact the emergence of direct communication, and therefore the type of active ba, practitioners could avoid the co-existence of groups organized under different configurations by simultaneously implementing a workplace reformation across both virtual and physical environments.
Originality/value – This research shows how workplace reformation – achieved with the same people, all things being equal, relatively immediately and inexpensively – can raise knowledge productivity.

Keywords Knowledge creation, Workplace, Office layout, Intranets

Paper type Research paper

1. Introduction
1.1 Background
The global economy has shifted from “the age of information”, where the product manufactured at the factory is source of profit, to “the age of knowledge”, where the knowledge of individuals and organizations is the source of greater profit. In such a situation, the role of the white-collar worker should move from the indirect
involvement of information-processing supporting manufacturing to the direct contribution of knowledge creation producing value (Konno and Nonaka, 1995). Therefore, when arguing about the productivity of the white-collar worker, our interest is less on “how to reduce cost as a denominator”, assuming information-processing to be invariable, than on “how to increase value as a numerator”. The problem is not about mere “productivity”, but about “knowledge productivity”.

Davenport and Prusak (1998), focusing on the knowledge productivity of white-collar workers, paid attention to the difference between information and knowledge. Practically thinking, the issue of “how to manage” makes this difference clear; it is possible to manage information directly and uniquely, but it is impossible to manage knowledge like information. Consequently, it is recommended to manage information and knowledge in two different ways, shared as the basic stance of knowledge management research.

The research reported here is of special interest to European companies in particular, and Western companies in general, because as Nonaka and Takeuchi (1995) highlight, Westerners take for granted a view of the organization as a machine for “information processing”. This view of the organization is deeply ingrained in the traditions of Western management from Taylor (1911) to Simon (1957, 1989), and it is aligned with the representationist approach of knowledge (Nisbett and Ross, 1980; Simon, 1989; Newell and Simon, 1972). This approach basically responds to the reality of the so-called Industrial Era, although it seems to be less suitable to face the challenges of the new socioeconomic environment of the Knowledge Era. The old metaphor of the machine is being surpassed by the image or allegory of the organism that can be the gene, the neuron or the cell. The organization is then analyzed as a changing and co-evolutionary process in continuous development (Maturana, 1975; Lewontin, 1998).

Consequently, a new paradigm emerges that defines the organization as a “living” system (De Geus, 1997), proposing that the firm creates knowledge by means of the action and interaction with its environment. This paradigm is mainly based on the autopoietic constructivist approach (Maturana and Varela, 1987; Varela, 1992; Varela et al., 1991). According to this epistemological approach, knowledge is creative since cognition is perceived as an act of producing a subjective world (Maturana and Varela, 1987). It is also context-sensitive, history-dependent, and oriented more towards the definition of subjects (Maturana and Varela, 1987; Varela, 1992; Varela et al., 1991) than towards the mere resolution of problems. In addition it is characterized by being exclusive, since knowledge resides in the agents and is intimately linked to cognitive frameworks and previous experience, so that the agents create the world in ways that are unique. Therefore, knowledge is intimately related to the observations of the environment of these agents. In this sense, there is no “valid” knowledge to be represented, but a way to observe selected data from the environment. From this perspective, managers need to support and enable the knowledge creation process rather than control it (von Krogh et al., 2000). Therefore, knowledge management is not about managing knowledge, but about promoting the process by which knowledge is created. In this regard, it has been shown that some of the key factors promoting the knowledge-creation process are the “creation of active ba” and “leadership” (Toyama and Nonaka, 2000).
This paper focuses on the “creation of active ba” through the process of “workplace reformation” as a major facilitator of knowledge creation, often recognized as an important issue in organizations (Nonaka and Takeuchi, 1995).

1.2 Research objectives

The goal of this paper is to propose a practical framework for the creation of active ba. In this framework, the workplace is divided into a “virtual environment” and a “physical environment”. We consider the effects of each environment on the creation of active ba, the interactions between each environment, and the synergistic and offset effects from both environments on active ba.

1.3 Structure

In section 2, we will introduce the knowledge-creation theory underlying the concept of ba, and present our conceptual framework. In section 3, we will demonstrate how our conceptual framework applies to the effective implementation of workplace reformation using the case study of Company X. In section 4, we report the results of a questionnaire survey with Company Y, which achieved the same type of workplace reformation. Finally, we conclude this paper by describing the findings from these two cases and propose a practical framework intended for practitioners and scholars alike.

2. Existing research and conceptual framework

One of the major factors promoting knowledge creation is “active ba”. In the case of workplace reformation, the creation of ba that enables active knowledge creation is referred to as “active ba”, as opposed to inactive or dormant ba.

2.1 Knowledge creation theory

In the field of business administration, the paradigm in which organizations are regarded as centers of information processing has begun to shift to a paradigm in which organizations are regarded as sources of knowledge creation (Nonaka et al., 1996). The premise of the “knowledge creation theory” based on this paradigm is the supposition that all knowledge can be classified as either “tacit knowledge” (Polanyi, 1966) or “explicit knowledge”. On the one hand, tacit knowledge is cognitive knowledge and is hard to express with language or numbers; for example, beliefs, points of view, technical skills and know-how are all part of tacit knowledge. On the other hand, explicit knowledge is objective and rational knowledge and can be expressed with language or numbers; texts, equations, specifications and manuals are a few examples.

New knowledge is generated by coming and going between tacit and explicit knowledge. The essence of the knowledge creation theory is the model where the process of knowledge creation goes through four different conversion modes, including socialization, externalization, combination and internalization (Nonaka and Takeuchi, 1995). This model is called the “SECI model” (see Figure 1).

Thus, when an organization is considered a source of knowledge creation, the promotion of the knowledge-creation process expressed by the SECI model becomes an important part of the organization’s management.
2.2 Ba as knowledge creation breeding ground

“Ba”, which roughly means “place”, is based on the Japanese term that designates a specific time and place where interactions between individuals take place (Shimizu, 1995). In everyday life, a sports bar or a diner-type restaurant are places enabling easy direct contacts between people interacting while sharing a common time and space. In this regard, ba is commonly qualified as cold or hot, depending of its level of activity.

Ba, defined as “shared context in motion”, generates a space labeled “physical and virtual space” that itself engenders another space called “mental space”. These inclusive spaces enable the creation of a shared context where individual contexts interact and serve as breeding ground for the knowledge-creation process (see Figure 2).

Ba, as promoting factor of the knowledge-creation process, can create contexts such as time, place, relationship with others and situations for the appearance of knowledge (Itami et al., 2000). When ba enables the knowledge-creation process, it is called “active ba”; when it does not, it is called “dormant ba” or “inactive ba”. Leadership is usually found to be an enabler in the direction for the value sought by the knowledge-creating
process and solves issues and contradictions that happen during the organizational knowledge-creation process.

2.3 Conceptual framework

Our conceptual framework consists on the one hand of the workplace reformation and on the other hand of the creation and activation of \( ba \). Workplace reformation is further divided into the reformation of the physical environment and the reformation of the virtual environment. It is assumed that:

- there is an interaction between the two environments;
- each environment has an effect on the creation and activation of \( ba \); and
- synergistic and offset effects on the creation and activation of \( ba \) exist (see Figure 3).

The two hypotheses that we will be testing are as follows:

**H1.** Workplace reformation enables the creation of active \( ba \), and is consistent with our framework.

**H2.** Physical and virtual environments have different influences on the creation and activation of \( ba \).

2.3.1 Physical and virtual environments. The framework assumes that “workplace reformation” influences “the creation and activation of \( ba \)”. Workplace reformation efforts are segmented into the “physical environment” and the “virtual environment”. The former is tangible, mainly represented by the layout of people and objects; the latter is intangible, mainly characterized by the arrangement of information on a computer network.

![Figure 3. Proposed conceptual framework](image-url)
According to Toyama and Nonaka (2000), the “elements which activate ba” are:

- autonomy;
- creative chaos;
- minimum effective diversity;
- redundancy; and
- love, reliance and commitment.

Despite this suggestion, our framework identifies only two enabling factors:
(1) the physical environment; and
(2) the virtual environment.

However, this makes our framework more readily operational and easier to implement. Furthermore, as we will mention later (see section 2.3.3), this framework was rigorously tested with Company X.

2.3.2 Active ba. Ba, as shared context in motion and breeding ground for knowledge creation, is called “active ba” when it successfully enables the creation of knowledge.

In our framework and subsequently based qualitative and quantitative studies, the existence of active ba is measured using four “resulting factors of active ba” (RFAB) that reflect the four conversion modes of the SECI process:

1. overall ba assessment (socialization);
2. direct communication (externalization);
3. information sharing (combination); and
4. self-assessment (internalization) (see Table I).

These four RFABs were constructed from existing knowledge-creation theory like the SECI process, as well as from previous work with Mr Z on an earlier workplace reformation.

2.3.3 Framework development. Today’s academic trend recognizing the workplace (Konnno and Nonaka, 1995) as a significant factor for knowledge creation, and the workplace reformation practices developed by Mr Z, have both contributed to the development of this framework.

At one time, managers regarded the workplace as the setting where employees recurrently followed orders as if working in a factory (Heckscher, 1995; Konnno, 2004). Even if the office layout could ease the staff’s work, it was often only considered with the purpose of helping management and supervision. Similarly, even if information systems using computer networks could significantly support the organization’s objectives, it was still only evaluated against management and supervision rationales.

<table>
<thead>
<tr>
<th>SECI process</th>
<th>Resulting factors of active ba</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socialization</td>
<td>Overall ba assessment (OA)</td>
</tr>
<tr>
<td>Externalization</td>
<td>Direct communication (DC)</td>
</tr>
<tr>
<td>Combination</td>
<td>Information sharing (IS)</td>
</tr>
<tr>
<td>Internalization</td>
<td>Self-assessment (SA)</td>
</tr>
</tbody>
</table>

Table I. Resulting factors of active ba (RFAB) and SECI conversions.
But, since the 1990s, research on office layout and information systems as supporting elements, as opposed to controlling elements has become the main trend in the field (Shien Kisoron Kenkyu-kai, 2000; Zelinsky, 1998). Furthermore, workplace research executed around the same time (Ueno and Tamaru, 2002) shows the importance of implementing information systems embedded in the collective activity.

In view of these findings, we have introduced in our framework the distinction between physical and virtual environments.

The central figure in this workplace reformation, Mr Z, was assigned as Director of Sales in Company X in August 2000 (presently Company Y’s Executive Director and CIO). The workplace reformation at Company X stemmed from his experience at Company W, where he had previously conducted a workplace reformation.

In November 1995, Mr Z, then Deputy of Sales for the Kanto Region, provided each of the Sales Department’s 400 staff with a laptop computer and instructed them to build a personal homepage on the intranet. This project was started one month before the introduction of e-mail and two months before internet access was introduced.

One month after the homepages of each section were established, the construction of the personal homepages of Sales Department employees began. At first, these mostly contained a self-introduction and a photograph based on the template that was distributed, but gradually, the homepages were improved; links were created between colleagues, and each person tried to create their own design and content. After three months, Mr. Z added menus to the homepage template: “My Home” for self-introduction; “Second House” for personal expertise, work experience and records of past projects; and “Resort House” for information on personal matters such as interests and hobbies. Furthermore, as the members’ IT skills improved, a category called “My Den” including day-to-day work records was added. As a result, the personal homepage was not only used for self-introduction, but also turned into a place to report daily work and share various data and manuals.

When the personal homepages were gradually completed in the spring of 1996, Mr Z started to take on the task of reforming the office layout. Assigned seating was eliminated and the concept of free-seating was introduced. Nobody had a designated desk, so when an employee arrived in the office, he brought his portable phone and laptop computer from a locker, and chose an available seat. The central part of the office, where the desks were arranged, was named the “Office Zone”. Furthermore, Mr Z transformed the managers’ seats, previously located near windows, into the “Creative Zone”. This area, cornered off by plants, was converted into a conference space. This increased the meeting space tenfold. Managers and general employees alike were now seated in the free-seating seats. Moreover, a “Concentration Zone” was created, where individuals could concentrate and work on recording new ideas. Also, drinking and smoking corners were provided to relieve stress. Sofas, tables and fish tanks located near copy machines promoted conversation and communication in a relaxed environment (Senoo, 2001).

Company W expanded its workplace reformation process, and the number of people affected rose from 400 to 1,600. In 1999, it won the 12th Nikkei New Office Prize. Company X, which will be introduced in the next section, won the same prize in 2002.
3. First implementation: the case of Company X

Company X’s workplace reformation started in the summer 2000, when Mr Z became Executive Director. The two main pillars of this workplace reformation were the workplace layout reformation, named “mobile office”, and the building of the intranet, named “personal homepage”. The process affected around 400 workers. The reformation of the virtual environment was accomplished with the building of the intranet through the systematic digitization of documents, while the reformation of the physical environment was achieved through the elimination of assigned seating and various measures promoting interaction and communication.

In the following paragraphs, a case study of this workplace reformation will be introduced using existing literature, Company X’s internal data, records from an interview with Mr Z, and field notes from observation at Company X’s head office. Then, the case study will be analyzed using the conceptual framework previously introduced.

3.1 Digitization of documents: the virtual environment

First, based on his experience at Company W, Mr Z started first-hand with the digitization of documents. In addition, he focused on increasing the scope of the information shared on the intranet. When someone was copying documents in large numbers, he asked about the documents’ content and sources and said “Why don’t you put the information on the homepage?”. When someone was talking on the phone for a long time or received calls frequently, he asked the purpose of the call and suggested “Isn’t it easier if you put it on the homepage?”. Furthermore, by including the author’s name and update time with the data, people became more responsible for the content and revision of shared information.

Mr Z pushed the employees to publish their homepage as soon as possible. He prepared a template where they could easily fill out the blanks; by doing so, even inexperienced workers could quickly publish their homepage, even incomplete, and update it gradually. Since training employees to create a homepage was expensive, he encouraged them to teach one another and learn by themselves.

In order to encourage the further development of the published homepage, he often checked and praised the staff’s work: after looking at some of the homepages, he sent e-mails saying “I saw your homepage. Keep up the good work”. The next day, rumours spread that he was actually observing and recognizing the creation of the homepage. He also actively welcomed journalists and TV reporters and promoted his personal homepage program with visitors. Consequently, employees realized that their efforts in developing their homepage was noticed and acknowledged, not only by Mr Z, but also by people outside the company. After the creation of the personal homepages, Mr Z didn’t just let it go; he believed it was important to keep motivating his people.

3.2 Office layout reformation: the physical environment

The basic principle of the office layout reformation followed the free-seating system. Employees could choose their own seat; when leaving the office, they were required to clean their desk and put their belongings back in a locker. During the first two months, Mr Z checked every day to make sure it was done properly. So that could see the whole floor, documents previously piled on desks were stored in lockers located along the walls. Bookshelves used as partitions between departments were removed and
replaced by short foliage plants. “If you see any vacant seat, just sit there”, Mr Z warned them. Moreover, the removal of wheeled file drawers between desks and the replacement of 240 cm width desks with 210 cm ones promoted dialogue, reduced the distance between individuals and enabled workers to look at each other’s computer screens when having a conversation.

These desks, previously arranged in a straight line, were now positioned diagonally. Since employees’ movements became more complicated, they had the opportunity to interact with more people. From an internal evaluation conducted by Mr Z at the time, the number of people who answered “diagonal is better” versus “previous was better” was 50 per cent two weeks after the reformation, but three months later this number had increased to 80 per cent, so it was decided to keep the diagonal arrangement.

Near the office space entrance, a place for interaction was created; it also doubled as a meeting area. This interaction space spanned across four floors and each was given a name:

- “Forest of Knowledge”;
- “Spring of Knowledge”;
- “Plaza of Knowledge”; and
- “Harbour of Knowledge”.

Product samples, demos and art works were exhibited in these spaces, and each member had to take part in the decoration process, using only movable furniture; the foliage plant replacing partitions is one example.

3.3 Changes resulting from workplace reformation

According to Mr Z, the workplace reformation at Company X resulted not only in workers’ improved performance, but also changes in their job-related awareness. These changes, both quantitative and qualitative, are divided into two categories:

(1) intentional changes; and
(2) unintentional changes.

3.3.1 Intentional changes

(1) Cost reduction. The workplace reformation led to various cost reductions. First, thanks to the free-seating system, the number of desks needed decreased to 70 per cent of what was previously required. Expenses for chairs and desks were reduced by 30 per cent, as was the corresponding office space requirement. Second, the digitization of documents triggered a 50 per cent decrease in the utilization of paper, copy machines and bookshelves. Third, by making phones and computers wireless, expenses needed to set up phone lines and computer wiring became unnecessary. According to Mr Z, the whole cost reduction amounted to between 30 and 40 per cent.

(2) Reduction in formal meetings. The layout reformation enabled workers to hold meetings at their desks and exchange information or documents during their daily communication. Since the whole floor was visible, what people were doing and where they were doing it also became visible. Moreover, before a meeting, anyone could now visit the personal homepages of meeting participants and get
updates on the work in progress. Thus, the frequency of formal meetings decreased, and meeting times also shortened.

(3) **Speed up in document writing, increase in number of proposals.** Since everyone had access to information from anywhere through the intranet, meetings became more efficient, and the time needed to write a document shortened. Previously, if some unavailable data was needed during a meeting, the discussion had to be interrupted and postponed. People could now access information in real time during meetings. Moreover, workers could now see each other’s computer screens and write a report while working together. Increases in interactions with workers from other departments and companies had a beneficial influence on creating ideas. As a result, the number of idea proposals rose rapidly.

(4) **Acceleration in human resource development.** The new layout enabled members to share information and skills without difficulty. Highly skilled people became easier for newcomers to find and consult. As a result, project members’ skills improved in a short period of time.

### 3.3.2 Unintentional changes (side-effects)

(1) **Increase in problem awareness.** Choosing a seat meant choosing a person to sit next to. Every day, before coming to the office, one had to think of the day’s tasks and choose which people to sit with in order to complete one’s assignments efficiently. This contributed to make individuals proactive and aware of current issues.

(2) **Stress reduction.** Changing seats enabled employees to change their surroundings if needed. More control gave people a greater sense of responsibility and self-confidence, and prevented stress. Thanks to the transparency of the office layout and the intranet, workers could now accept the evaluation of their work without feeling discriminated. In addition, a person recently transferred could get information about his or her new office, job and colleagues through the intranet beforehand, thus reducing the stress due to the transfer.

(3) **Manager’s popularity and actions.** The free-seating system enabled workers to clearly distinguish which manager was popular to consult with and which one was not. Two types of managers appeared in the case of Company X: one who sits in the middle of a group and one who sits close to windows and looks away from the group. Thus, information networks became visible inside the office.

(4) **Other.** In addition to unintentional changes, the plants used for partitions happened to control the humidity level in the room, so fewer people caught colds in winter because of dry air. Another example is the withdrawn worker who now has a new opportunity to make an appeal.

### 3.4 Findings from the case of Company X

Both intentional and unintentional changes resulting from the workplace reformation are clearly associated with the RFABs, as previously defined in accordance with the SECI process (see section 2.3.2). The four RFABs can all be found in the qualitative analysis of the impact of the workplace reformation on company X’s Sales Department.
Concerning intentional changes (see section 3.3.1), “reduction in formal meetings” relates to direct communication, and “speed-up in document writing” and “acceleration in HR development” relate to information sharing. Concerning unintentional changes (see section 3.3.2), “increase in problem awareness” and “stress reduction” relate to overall ba assessment, and “manager’s popularity and actions” relates to self-assessment (see Table II).

The case of company X’s workplace reformation therefore supports H1, which claims that workplace reformation enables the creation of active ba.

4. Second implementation with questionnaire surveys: the case of Company Y

The workplace reformation at Company Y was gradually implemented over a seven-month-period (from June 2004 to February 2005) and included 64 people overall. The profiles of Company X and Company Y are shown in Table III.

4.1 Outline of survey

The questionnaire survey started in June 2004, when the IT Department of Company Y had just begun its workplace reformation; the IT Department numbered about 70 employees. Table IV shows the schedule of workplace reformation execution for both the physical and virtual environments.

Data were collected from questionnaire surveys, interviews with people involved in the workplace reformation, and observations made on location. Each questionnaire bore the name of its respondent; the panel surveys were conducted at three different stages of the workplace reformation process, in August 2004, November 2004, and January 2005, with 64, 63, and 61 respondents, respectively; the same questionnaire was used on all three occasions (see Table V).

<table>
<thead>
<tr>
<th>Changes</th>
<th>RFAB</th>
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<tbody>
<tr>
<td>Intentional</td>
<td></td>
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<tr>
<td>Reduction in formal meetings</td>
<td>Direct communication</td>
</tr>
<tr>
<td>Speed-up in document writing</td>
<td>Information sharing</td>
</tr>
<tr>
<td>Acceleration in HR development</td>
<td>Information sharing</td>
</tr>
<tr>
<td>Unintentional</td>
<td></td>
</tr>
<tr>
<td>Increase in problem awareness</td>
<td>Self-assessment</td>
</tr>
<tr>
<td>Manager’s popularity and actions</td>
<td>Overall ba assessment</td>
</tr>
<tr>
<td>Stress reduction</td>
<td>Self-assessment</td>
</tr>
</tbody>
</table>

| Table II. Changes from workplace reformation and resulting factors of active ba |

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<tbody>
<tr>
<td>950 billion</td>
<td>5,876</td>
<td>Cellular phone carrier</td>
<td>4,685 billion</td>
<td>Sales Department</td>
<td>Summer 2000</td>
</tr>
</tbody>
</table>

| Table III. Overview of Company X and Company Y |

<table>
<thead>
<tr>
<th>Company X</th>
<th>Company Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital (JP¥)</td>
<td>950 billion</td>
</tr>
<tr>
<td>Employees</td>
<td>5,876 (March 2000)</td>
</tr>
<tr>
<td>Business</td>
<td>Cellular phone carrier</td>
</tr>
<tr>
<td>Sales (JP¥)</td>
<td>4,685 billion (March 2000)</td>
</tr>
<tr>
<td>Department</td>
<td>Sales Department</td>
</tr>
<tr>
<td>Reformation start</td>
<td>Summer 2000</td>
</tr>
</tbody>
</table>
The workplace reformation process affected both physical and virtual environments; nevertheless, while the virtual reformation applied to everybody, only one group of workers underwent the full workplace reformation, as explained below.

People were divided into Group A and Group B; Group A1 was the first to undergo the physical reformation, followed by Group A2 and then Group A3. At the time of the survey, Group B had not undergone the physical reformation process, only the virtual one. The numbers in parentheses in Table V show the size of each sample.

The purpose of the questionnaire survey was to collect data on the creation and activation of BA. The questionnaire was named “Questionnaire on Office Environment” and consisted of four sections reflecting the four RFABs related to the SECI process (see section 2.3.2) and labeled as follows:

- 18 questions on “communication” associated with “direction communication”;
- 11 questions on “information acquisition and sharing” and five questions on “subject and place of work”, both associated with “information sharing”; and
- 20 questions on “evaluation of work”, 19 of which were associated with “self-assessment” and one with “overall ba assessment”.

The questionnaire had 54 questions, from which 22 significant variables were extracted for statistical analysis.

<table>
<thead>
<tr>
<th></th>
<th>Physical reformation</th>
<th>Virtual reformation</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 2004</td>
<td>Laptop computers and free seating</td>
<td>Personal homepages with pictures and archives in sequential order</td>
</tr>
<tr>
<td>July 2004</td>
<td>Utilization of unused large computer displays (for personal homepage exposure)</td>
<td>Members’ list with pictures on the homepage of each department</td>
</tr>
<tr>
<td>August 2004</td>
<td>Free seating for managers</td>
<td>Webpage visitor counter</td>
</tr>
<tr>
<td></td>
<td>Additional row of fixed seats is changed to free seats</td>
<td>Bulletin board system</td>
</tr>
<tr>
<td>September/October 2004</td>
<td>Additional laptops</td>
<td>Intercommunication of different establishments using web cameras</td>
</tr>
<tr>
<td>November 2004</td>
<td>Removal of side cabinets</td>
<td></td>
</tr>
<tr>
<td>December 2004</td>
<td>About half the seats are now free seats</td>
<td></td>
</tr>
<tr>
<td>January 2005</td>
<td>Nameplates on desks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sharing of stationery (both are self-generated)</td>
<td></td>
</tr>
</tbody>
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<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A1</td>
<td>○ (2)</td>
<td>○ (3)</td>
<td>○ (3)</td>
</tr>
<tr>
<td>Group A2</td>
<td>× (6)</td>
<td>○ (6)</td>
<td>○ (12)</td>
</tr>
<tr>
<td>Group A3</td>
<td>× (3)</td>
<td>× (6)</td>
<td>○ (4)</td>
</tr>
<tr>
<td>Group B</td>
<td>× (53)</td>
<td>× (48)</td>
<td>× (42)</td>
</tr>
<tr>
<td>Total (respondents)</td>
<td>64</td>
<td>63</td>
<td>61</td>
</tr>
</tbody>
</table>

**Table IV.** Workplace reformation execution schedule

**Table V.** Sample distribution for physical reformation
4.2 Overall ba assessment

The last question of the questionnaire compiled with Company Y rated the workers’ overall ba assessment. Even if this variable was not statistically significant, it gives a good trend regarding the workers’ opinion on the effect of the workplace reformation. According to the collected data, the workplace reformation positively impacted the satisfaction of those experiencing such reformation, as long as it was undergone under both virtual (intranet) and physical (free-seating) environments (see Figures 4 and 5).

4.2.1 Overall ba assessment rating for Groups A and B (Figure 4). Group A represents people who have been through the physical reformation process, either in the first, second or third wave, while coexisting with other Groups (A2, A3 and B, then A3 and B, and finally only B) still arranged under the “old” fixed seating system. The graph clearly shows that, as the reformation was gradually implemented, their overall ba assessment rating of the workplace went up.

Group B represents people who had not experience the physical reformation at the time that the survey was conducted. As the workplace reformation continued, they...
only underwent the virtual changes (intranet) without the associated benefits of the physical changes (free seating). As a result, since more and more people experienced the reformation, Group B started to feel a divide in work practices and atmosphere since it was not given the same autonomy. This disparity in work style progressively eroded their expectation in the new system. Also, they may have felt left out of the whole initiative.

The general graph (“All” in Figure 4) shows that overall, the level of satisfaction decreased over time. This is easily explained by the graphs of overall ratings for Groups A and B and the size of their associated samples. Group B always remained a majority compared to Group A. At the time of the first survey, there were 11 people in Group A and 53 in Group B; during the second survey, 15 and 48, respectively; and during the third survey, 19 and 42, respectively (see Figure 6).

4.2.2 Overall assessment rating for Group A (Figure 5). Group A1 can be qualified as the first movers; after the implementation of the workplace reformation, their satisfaction slightly decreased before subsequently increasing above the original level. This may be explained by the sudden change in their physical work environment or the time needed to adapt to such new conditions; also as first movers, even after the second wave (A1 + A2) of reformation, very few seating options (nine people concerned) meant that the perceived value of the physical reformation may have been first difficult to grasp.

Group A2’s satisfaction sharply rose after the reformation occurred; however, satisfaction decreased later. We may hypothesize that in the midst of change, this group needed some time to adapt to its new work environment and work style, and as for Group A1, its satisfaction level may rise once it becomes settled.

Group A3, similarly to Group B, experienced a sharp drop in satisfaction following the workplace reformation of Groups A1 and A2. This may have been caused by the subsequent gap in work styles coming from two co-existing work environments, comparable to Group B. Its satisfaction level eventually rose after it underwent its own physical reformation process. Similarly to Group B, as the workplace reformation
continued, they only underwent the virtual changes (intranet) without the associated benefits of the physical changes (free seating).

4.3 What is the influence of the change in virtual environment?

From the three questionnaires conducted with group B, the significant variables \( p < 0.10 \) resulting from the virtual environment reformation were identified and are presented in Table IV, along with the corresponding RFABs.

Because each of these 16 variables is a direct measure of one of the three major RFABs – i.e. direct communication (DC), information sharing (IS), and self-assessment (SA) – we can conclude that changes in the virtual environment had a direct impact on the creation and activation of ba. Of those 16 significant variables, nine increased over the administration of the three surveys, and seven of them decreased (see Table VI).

When examining the RFABs involved in the change in virtual environment, DC accounts for five of the 16 significant variables, IS for six of them (questions 28 and 29

<table>
<thead>
<tr>
<th>Question: significant variables for Group B</th>
<th>Percentage</th>
<th>RFAB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 How many colleagues from the same department do you usually greet in one day?</td>
<td>( \checkmark )</td>
<td>DC</td>
</tr>
<tr>
<td>2 How many colleagues from a different department do you usually greet in one day?</td>
<td>( \checkmark )</td>
<td>DC</td>
</tr>
<tr>
<td>3 How many persons from other companies do you usually greet in one day?</td>
<td>( \checkmark )</td>
<td>DC</td>
</tr>
<tr>
<td>6 How many persons from other companies do you usually speak with in one day?</td>
<td>( \checkmark )</td>
<td>DC</td>
</tr>
<tr>
<td>7 How many times a week do you usually have lunch with your colleagues to have a conversation?</td>
<td>( \checkmark )</td>
<td>DC</td>
</tr>
<tr>
<td>20 How many times did you check personal homepages on the intranet last week?</td>
<td>( \checkmark )</td>
<td>IS</td>
</tr>
<tr>
<td>21 How many people’s personal homepages did you check for work on the intranet last week?</td>
<td>( \checkmark )</td>
<td>IS</td>
</tr>
<tr>
<td>22 How many times did you check personal homepages for work on the intranet last week?</td>
<td>( \checkmark )</td>
<td>IS</td>
</tr>
<tr>
<td>28 Do you prepare handouts for each person at meetings?</td>
<td>( \checkmark )</td>
<td>IS</td>
</tr>
<tr>
<td>29 Do you use a PC or a big screen display at meetings?</td>
<td>( \checkmark )</td>
<td>IS</td>
</tr>
<tr>
<td>32 How many times did you have to wait for other people to finish their tasks in order to start your own?</td>
<td>( \checkmark )</td>
<td>IS</td>
</tr>
<tr>
<td>37 Do you try new things even if it may be risky?</td>
<td>( \checkmark )</td>
<td>SA</td>
</tr>
<tr>
<td>39 Do you cooperate with your colleagues, from a holistic perspective, to maximize the benefits of your entire group?</td>
<td>( \checkmark )</td>
<td>SA</td>
</tr>
<tr>
<td>41 Do you always accumulate knowledge by getting knowledge from outside in order to improve your business skills?</td>
<td>( \checkmark )</td>
<td>SA</td>
</tr>
<tr>
<td>43 Are you satisfied with the way you communicate with colleagues from the same department?</td>
<td>( \checkmark )</td>
<td>SA</td>
</tr>
<tr>
<td>49 Are you satisfied with the instructions and directions in your work?</td>
<td>( \checkmark )</td>
<td>SA</td>
</tr>
</tbody>
</table>

Table VI. Significant variables for Group B, evolution and associated RFABs
are correlated; people using a large display no longer distribute hand-outs to their colleagues but still participate in IS, and SA for the remaining five.

Moreover, IS emerges as the only consistent RFAB involved, as it increased in all its occurrences. Consequently, information sharing appears to be the only reliable consequence of the partial (virtual only) workplace reformation, as supported by the data from Group B.

4.4 What is the influence of the change in physical environment and synergistic effects? From the questionnaires conducted with Group A, the significant variables ($p < 0.10$) from the reformation of both physical and virtual environments and synergistic effects were identified and are presented in Table VII, along with the corresponding RFABs.

Because each of these six variables is a direct measure of one of the three major RFABs – i.e. DC, IS, and SA – we can conclude that changes in both physical and virtual environments had a direct impact on the creation and activation of $ba$. Of those six significant variables, all increased over the administration of the panel surveys.

When examining the RFABs involved in the change in both virtual and physical environments, DC accounts for four of the six significant variables, and IS and SA for one each. Since all the variables involved are consistent (ascending) but the frequency of DC is much greater, direct communication emerges as the only reliable RFAB; the complete reformation (both virtual and physical) directly increases the direct communication factor, as supported by the data from Group A.

We now focus on these four significant variables that are common to Group A and Group B – in other words, those common to both partial (virtual-only) and complete (physical and virtual) workplace reformations.

In the case of group GB, variables 1, 2, 7 and 28 decrease over the three stages of the survey, while at the same time these same variables increase in the case of Group A. Therefore, direct communication is weakened by the partial (virtual only) workplace reformation in Group B, while it is strengthened by the complete (virtual and physical) workplace reformation in Group A.

For that reason, it appears that partial (virtual only) and complete (virtual and physical) workplace reformations have significantly different effects on the creation

<table>
<thead>
<tr>
<th>Question: significant variables for Group A</th>
<th>Percentage</th>
<th>RFAB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  How many colleagues from the same department do you usually greet in one day?</td>
<td>✓</td>
<td>DC</td>
</tr>
<tr>
<td>2  How many colleagues from a different department do you usually greet in one day?</td>
<td>✓</td>
<td>DC</td>
</tr>
<tr>
<td>7  How many times a week do you usually have lunch with your colleagues to have a conversation?</td>
<td>✓</td>
<td>DC</td>
</tr>
<tr>
<td>11 How many colleagues can you speak with to solve even small problems in the same department?</td>
<td>✓</td>
<td>DC</td>
</tr>
<tr>
<td>28 Do you prepare handouts for each person at meetings?</td>
<td>✓</td>
<td>IS</td>
</tr>
<tr>
<td>53 Are you satisfied with the explanations given about workplace reformation?</td>
<td>✓</td>
<td>SA</td>
</tr>
</tbody>
</table>

Table VII. Significant variables for Group A, evolution and associated RFABs
and activation of ba. Concerning the “direct communication” factor, they even have opposite effects.

The case of Company Y’s workplace reformation therefore supports H2, which states that physical and virtual environments have different influences on the creation and activation of ba.

Furthermore, the results of the panel survey with Company Y yielded some unexpected findings. In partial (virtual only) and complete (virtual and physical) workplace reformations, the resulting factors of active ba that enable the knowledge-creation process are significantly different: in the former the RFAB is information sharing, while in the latter, it is direct communication.

5. Conclusion and limitations

5.1 Conclusion

The cases of Company X and Company Y both support our first hypothesis (H1) asserting that the workplace reformation process enabled the creation and activation of ba, consistent with our framework. Also, since the workplace reformations at Company X and Company Y were executed in different departments, namely the Sales Department in Company X and the IT Department in Company Y, we can show that the success of such workplace reformation does not depend on the specific nature of the activity concerned with the change in environment.

The case of Company Y supports our second hypothesis (H2), which states that the influence of the physical and virtual environments on the creation and activation of ba are different, thus justifying our assumption of the division of such environmental factors in our framework.

Furthermore, our data unexpectedly showed that the type of workplace reformation, whether partial (virtual only) or complete (virtual and physical), has an influence on the resulting factors of ba, and thus on the knowledge creation process itself. In this regard, the virtual-only workplace reformation contributed to an increase in information sharing, while the dual virtual and physical workplace reformation resulted in more direct communication.

This additional result led us to reformulate our model into a more practical framework (see Figure 7). This practical framework shows the differentiated influence

![Figure 7](image-url)
of the partial and complete workplace reformation onto the activation of ba and the subsequent creation of knowledge through the SECI process.

For example, in the case of partial (virtual only) workplace reformation, information sharing corresponds to the “combination” mode of the SECI process, which emphasizes the conversion of explicit knowledge from an individual into explicit knowledge in another individual (“editing”). Similarly, in the case of complete (virtual and physical) workplace reformation, direct communication follows the “externalization” mode of the SECI process, which gives importance to the conversion of tacit knowledge from an individual into explicit knowledge in another individual (“dialogue”).

This discovery is useful for practitioners as the type of workplace reformation can contribute to an increase in a specific resulting factor of active ba. For example, in the event that the organization wishes to increase direct communication over information sharing, a physical reformation may yield positive results, as most companies have already invested in an intranet.

Also, it is important to stress that these two types of simultaneously executed workplace reformations, i.e. virtual only and both physical and virtual, have opposite effects on the resulting factors that they share. In other words, they reversely impact the emergence of direct communication and, therefore, the type of active ba being created. This finding should be useful for practitioners and should encourage them to implement workplace reformation across both virtual and physical environments simultaneously, avoiding the co-existence of groups organized under different configurations. This alignment between the virtual and physical environments seems to be one of the keys to better overall assessment by the workers affected and more consistent resulting effects.

Also, it is important to note that the workplace reformation process is a straightforward and efficient measure. Our goal was to raise knowledge productivity, which, in this case, was achieved with the same people, all things being equal, limiting the cost to a bare minimum. In the “age of knowledge”, this workplace reformation enables the organization to make the most of the existing workforce without having to suffer the financial and organizational expenses of firing and hiring and their associated (de)motivating consequences (O’Reilly and Pfeffer, 2000).

The main conclusions reported here are of particular interest to European firms. According to Nonaka and Takeuchi (1995), Western managers have been more accustomed to dealing with explicit knowledge. Nevertheless, Japanese companies have a very different understanding of knowledge, recognizing that knowledge expressed in words and numbers represents only the tip of the iceberg. They view knowledge as being primarily tacit, in both its technical and cognitive dimensions. This work may help Western managers to “unlearn” the old view of the organization as an information machine and advance towards the conceptualization of the firm as a living organism that creates knowledge, where it becomes crucial to promote the right contexts for enabling and fostering the knowledge creation process.

5.2 Limitations
It should be noted that Company X and Company Y belonged to the same group of companies; however, under the same leadership, they seemed to be willing to fight bureaucracy in order to cope with rapid environmental changes.
Group A and B’s coexistence during the study of Company Y may have created a perception gap about the benefits and limitations of the workplace reformation process. In order to assess the potential dependence between these two groups, the survey should be replicated with a homogenous sample undergoing a consistent virtual and physical workplace reformation.

In both cases, Mr Z demonstrated strong leadership. As the overall performance of Company X was widely known among the group of companies, employees may have believed from the beginning that the workplace reformation would be successful, creating the conditions of a self-fulfilling prophecy. In this case, Company Y may be more representative of general organizations.

References


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Further reading


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