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## The effects of IT revolution on team communication and leader behaviors in a Japanese organization.

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The present study was purposed to reveal the characteristics of the transformations of team communication and managers' leader behaviors after introducing new electric communication system (NECS) into an organization. We analyzed all e-mail logs recorded since the second half of 1995 till 1999 at a Tokyo branch in a Japanese electronics company by means of the content analysis method. The results showed that the leader centered communication network became the main stream gradually year by year, although the increasing tendency for the nonhierarchical communication network could be found in the beginning time. In short, subordinates got to prefer to send reports of their sales activities, results, and market information and to receive directions from their bosses. This style is effective not only to obtain better sales results by constructing a well-coordinated team communication but also to make easygoing conditions for subordinates because they did not have to feel much responsibility for important decision making. Meanwhile, it was revealed that the managers got to receive more information and requests to give directions. Consequently, these results made it clear that utilization of NECS had a potentiality opposite to the anticipated effects like as actualization of nonhierarchical communication network.

**Keywords:** electric communication system, team communication, leader behaviors, nonhierarchical network, leader centered network

IT revolution has brought us new electric communication systems (NECS) that utilize e-mail, mobile computing, web meeting and so on. NECS has led business people to believe that such systems must allow for more effective team communications, like as animated collaboration and creative decision making, than ever. However, are the anticipations of the fruitful effects of IT revolutions on organizational communications right ones?

Many companies concerned with IT business have often demonstrated that NECS must be going not only to make information exchanges more correct and speedy but also to facilitate creative collaboration (Oyama, 1997; Yamazaki, 1997; Aoki, 1999). The grounds for proposing the facilitation of creative collaborations are the expectation of actualization of nonhierarchical flat communication networks and adequate information sharing among work team members.

When we see the rapid expansion and permeation of revolutionary information technologies, these assertions seem to be plausible even if they look like sixth sense anticipations (Kraemer and Pinsonneault, 1990; Delone and McLean, 1992; Harmon, Schmeer and Hoffman, 1995; Barua, Kriebel and Mukhopadhyay, 1995). In fact, a group ware (computer networking system program) called Electric Brainstorming System was developed and proved to be effective to facilitate production of creative ideas (Valacich, Dennis and Nunamaker, 1991; Valacich, Dennis and Connolly, 1991). Then some other group wares called GDSS (Group Decision Support System:

Vogel and Nunamaker, 1990) and gIBIS (Conklin and Begeman, 1988) were also ascertained their credibility. In addition, it is exemplified that electric meeting system could help to make member's speaking opportunities nearly equal and to actualize nonhierarchical flat communication (Kiesler and Sproull, 1992; Ridgway and Walker, 1995).

Contrary to these findings, however, Hollingshead, McGrace and O'Connor (1993) exemplified that electric communication provided little qualitative difference from face-to-face communication. They concluded that qualitative differences between electric communication and face-to-face one would appear depending on the habituation to the system. There are still some studies that had similar conclusions (Harmon, Schmeer and Hoffman, 1995; Laughlin, Chandler, Shupe, Magley and Hulbert, 1995; Yamaguchi, 1999). Besides, the studies examining the effectiveness of NECS in organizations didn't always demonstrate positive aspects (Neo, 1988; Kettinger, Grover, Guha and Segars, 1994; Yamaguchi, 2001).

To put it briefly, there are no consistent or robust findings about the effectiveness of NECS on organizational information processing and decision-making up to the present day. One of the reasons is that people overgeneralize the anticipation of NECS. In other words, we may have dreamed that NECS by IT revolution could resolve any problem in organizational communication and actualize ideal ones, such as accurate information sharing and creative collaborations. But we have to recognize that NECS is just a tool for workers. It must be decent to

say that how to utilize them determines their effectiveness.

Imaging workplace situation, first of all, workers will examine whether the new business tool like as NECS is useful to their jobs or not. Then after they recognize its usefulness, they will start to use it in order to improve their work qualities or quantities. This means that workers will form an effective communication network to achieve their tasks and goals. If so, flat communication networks will not be always established because the styles of formed communication networks depend upon the job characteristics. For example, in sales teams, it is important that subordinates notify their boss of market information and the results of their activities, while the boss gives the adequate instructions and advices. Such importance of leader-followers communication will force the workers to form the hierarchical (leader centered) communication network. And NECS must be going to boost such force. It can never be overlooked that such processes are closely related with the transformation of leader behaviors, too.

In the real workplaces, the characteristics of the processes occurring after introduction of NECS have not been discovered clearly so far in Japan. Seeing the rapid and broad expansion of IT innovation, it is very important to examine the characteristics of the effects of NECS upon the organizational team communication and leader behaviors not only from the theoretical aspect but also from the applicative viewpoint.

On the basis of discussions above, the present study was intended to reveal the characteristics of the transformations brought by the introduction of NECS in the real business organizations. Particularly, the analyses of transformations in team communication and leader behaviors were focused on. Fortunately, we succeeded in getting great cooperation from a business company. The company has used NECS based upon email and web meeting since 1995. This cooperative company gave us all email logs stored in the database of server machine. Under considerations of such situation, content analysis with longitudinal viewpoint was conducted on the case study approach. The main purposes of this study are as follows.

- (1) To clarify the characteristics of the effects that ECS produces on business team communication (Has NECS actualized the nonhierarchical flat communication network? Has NECS improved the quality of team communication?)
- (2) To examine the features of leader behaviors, especially communication with subordinates, under NECS circumstances (What kinds of information have been exchanged between leaders and subordinates via NECS?).

## METHOD

### Subject

The organization that proffered cooperative research activities was a Tokyo branch of Japanese major electric manufacturing company. This branch has five sales teams. The smallest team had nine members and the largest had sixteen. Each team had a leader. This branch started utilizing NECS from the second half in 1995. The records of communication via NECS in these five teams were analyzed.

The five teams had distinctive characteristics of achievement evaluations, norms, human relationships, team climate, and so on. Considering this aspect, comparative analyses were conducted if necessary.

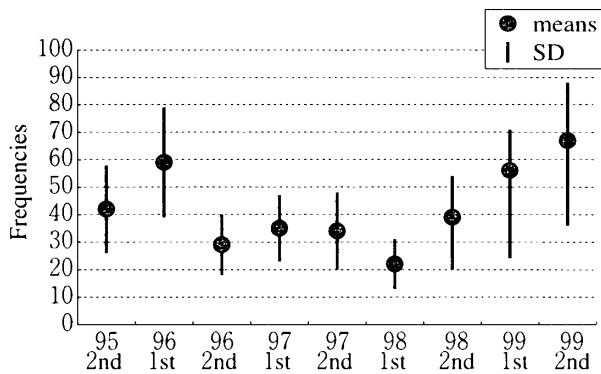
### Sketch of NECS of this company

The sales team's members of this branch were given mobile phone and mobile computer. They can exchange information by means of email anytime and anywhere they want, even when they are on the outwork to New York. Sent emails are not only delivered to the target persons but also shown on the billboard created in the web page in the host computer. And all emails exchanged via this NECS have been stored in the database of host computer since the beginning. Members can send any kind of emails such as question, request for help or advice, proposal, rival company's information, market information, cheering messages, and so on. Besides, members can send email to any members such as president, vice president, manager, team leader, other team's members, and so on. It was supposed that this aspect would generate nonhierarchical flat communication network. These emails have been always stored and posted the web page billboard if the sender or the receiver doesn't perform protective manipulations. So members can see most information exchanged via NECS and know miscellaneous business progress in their branch. It was also supposed that this aspect would bring the establishment of adequate information sharing.

The NECS utilization by workers has been increasing consistently. The transition of frequencies of exchanged emails was shown in Figure 1. It can be seen that NECS has taken root in this organizational communication.

### Data collecting

After several meetings to reach the concurrence of the research partnership, the company offered all email records stored in NECS database from 1995 July to 1999 December. These email logs can be read with the application software Lotus Note. As the offered data contained meeting records, the con-



**Figure 1** Transitions of NECS using frequencies of each member

tent analysis on this meeting records were also conducted subsidiary. And interviews to team leaders were conducted with an intention to get more detail information about transformation of team communication after introduction of NECS.

## RESULT

### The features of exchanged information via NECS

Two trained research coworkers read all email logs within a team for each and assorted depending on the content characteristics. The assorting categories consisted of four characteristics, namely (a) transmission of formal messages, (b) emotional supports, (c) discussion on sales strategies, and (d) exchange of task oriented information.

Comparisons among teams were so effective to reveal the features of team communication via NECS. The results of con-

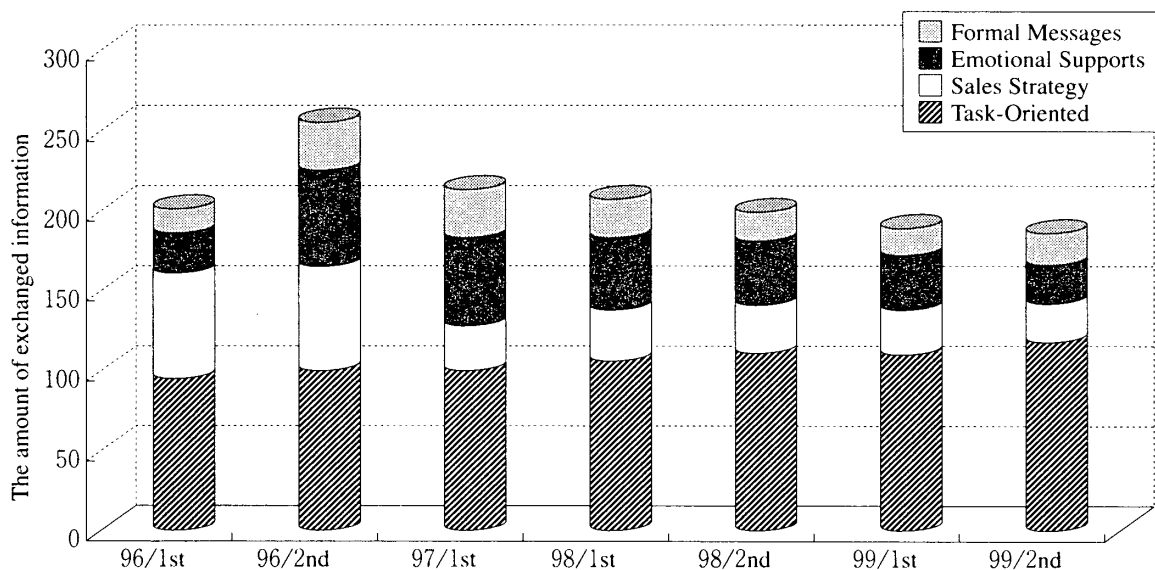
trastive two teams are shown in Figure 2 and 3. Team A presented in Figure 2 was an “excellent achievement and great growing” team. On the other hand, Team B presented in Figure 3 was a “stagnating and struggling” team. As it can be seen in two figures, the emails categorized as task-oriented information and sales strategies occupied the majority in great growing Team A, whereas the emails categorized as emotional supports and formal messages occupied the majority in struggling Team B.

Viewing from another point, it must be paid attention that the effectiveness of using NECS may depend upon the information features exchanged. Team B couldn't achieve better than Team A though Team B used emails more than Team A. It is suggested that the key point for business is how to use the new tool.

### The degree of actualization of nonhierarchical flat communication network

The research coworkers counted the frequencies of email exchanges carried out among subordinates except leaders. Then the ratios of such frequencies to whole frequencies of email exchanges were calculated. These ratios were adopted as the index of the nonhierarchical flat communication. They are named flat communication ratings. The higher ratings indicate that team communication was carried out more nonhierarchical, while the lower ones mean that leader centered hierarchical communication occupied more.

Team comparison is also effective in this analysis. The transitions of the flat communication ratings of three teams are shown in Figure4. Team A and Team B are identical to de-



**Figure 2** Contents of exchanged information within great growing team A

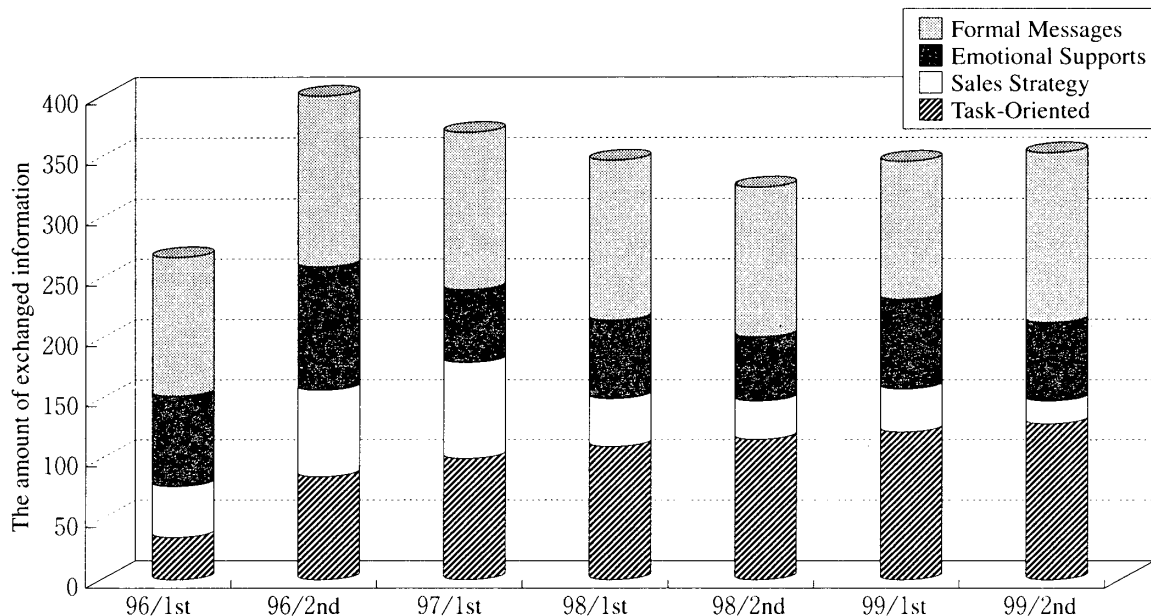


Figure 3 Contents of exchanged information within struggling team B

scribed above. Team C was a “good and stable but leveling off” team. In the early stage of adopting NECS, it can be recognized that Team A and Team C materialized the flat communication thus far. In progress of ECS permeating, however, it can be seen that team communications of both Team A and C were transformed into leader centered hierarchical one. Contrastingly with these two teams, Team B has kept low flat communication ratings since the early stage. This means that Team B members utilized NECS as the information exchanges and consult with their leader mainly.

Content analysis on email messages from subordinates to their leaders

The research coworkers classified email messages from subordinate to their leaders into five categories, namely (a) formal notification, (b) proposals of strategies to accomplish, (c) presentation of subordinate’s own strategies, (d) requests for more information, and (e) providing market information. And they counted the frequencies of messages in each category per half year. Because distinctiveness among teams couldn’t be found clearly, summed frequencies of five teams are shown in Figure 5.

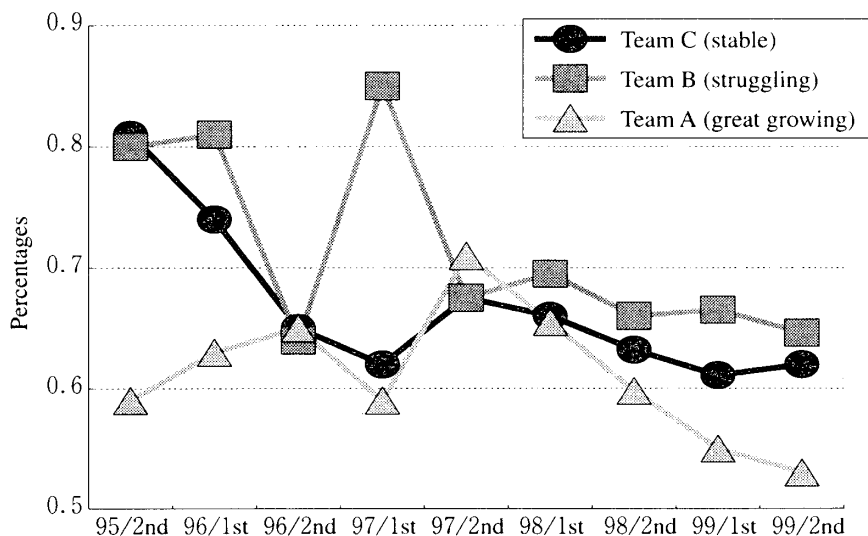


Figure 4 The degree of flattening of team communication (the rates of e-mail exchanges among subordinates per all exchanges)

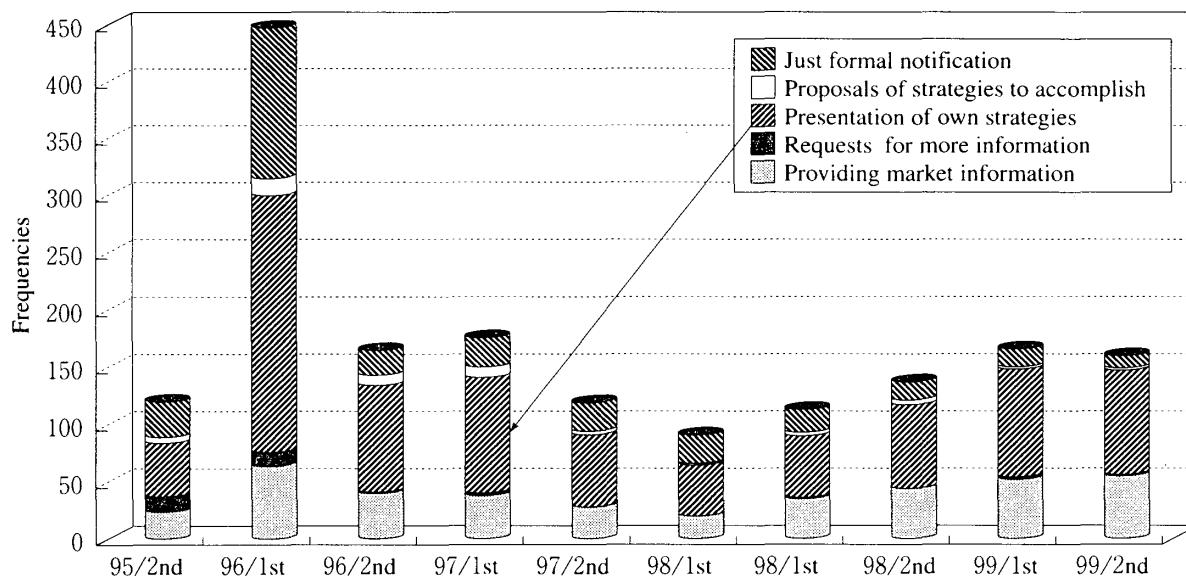


Figure 5 Contents of e-mails from subordinates to their leaders

The messages of the presentation of subordinate's own strategies occupied more proportion than other categories. The messages of providing market information and that of formal notification occupied the second major proportions. It is possible to say that these messages are reflections of typical subordinate's rolls.

#### Content analysis on email messages from the leaders to subordinates

The analysis on the email messages from the leaders to subordinates was conducted in the same way as described above. The coworkers classified them into seven categories, namely (a) formal notification, (b) emotional critical comments, (c) emotional supports, (d) suggesting of strategies to accomplish, (e) descriptions of acting strategies, (f) claims for more information, and (g) providing business information. The result is shown in Figure 6.

The leaders sent the suggestions (sometimes directions, maybe) of strategies to accomplish the most frequently. The messages of the request for more information occupied the second major proportion. This result can be seen as the reflection of typical leader rolls.

#### Contents of interviews to the leaders

In order to examine the characteristics of the transformation of team communication and leader behaviors after adoption of NECS from more diverse viewpoints, constructive interviews to the leaders were conducted, too. The major questions were (1) how they recognized business circumstances (trends of market and customers behaviors), (2) what changes

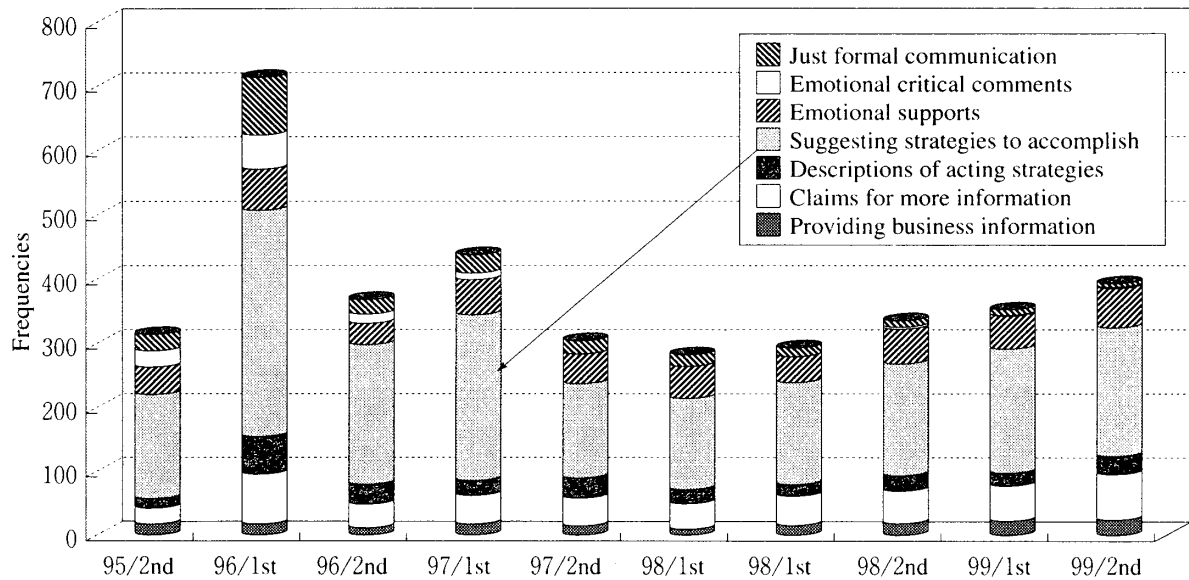
they felt occurred in their teams since adoption of NECS, (3) whether their teams became familiar with NECS or not, and (4) what aspects they thought NECS was useful to.

The leaders gave the high evaluation to the effectiveness of NECS generally, though some criticized the complicated procedures with new devices (they felt that telephone or writing was more speedy and easier) and other some showed invariable adherences to traditional ways of team communication. The details of the contents of interviews are as below.

- (i) The NECS seemed to have struck through the communication barriers existed among positional differences (actualization of flat communication).
- (ii) The NECS seemed to have struck through the communication barriers among work rolls such as lines and staffs.
- (iii) The NECS made the meeting more concise and shorter because it enables team members to know and share information exchanged within their team routinely.
- (iv) In the personnel transfer season, the NECS made deviations of business information more accurate.
- (v) Team members became to be able to find the gap among their recognitions of ongoing business affairs through NECS communication more often and easily.
- (vi) Members' summarizing abilities of business reports seemed to become better gradually.

## DISCUSSION

The present study was intended to reveal the features of the effects of NECS adoption on team communication and leader behaviors. The results indicated very important aspects



**Figure 6** Contents of sending e-mail from leaders to subordinates

of the transformations that NECS brought to organizations.

First of all, I am going to examine the adequacy of the argument that the efficiency of NECS depends on how to use it. As far as seeing Figure 2 and 3, each team has inherent features of team communication via NECS. It must be admissible to think that every team establishes a comfortable network to use NECS for them. The focal point is what aspect was given the priority in team communication. As seen in Figure 2 and 3, excellent Team A exchanged task-oriented emails the most while struggled Team B exchanged formal messages and emotional supports mainly. Of course, it is too premature to conclude that the appliance like as team A is always more efficient than that like as Team B. It is possible, however, to say that such appliance by Team B couldn't help to solve their team problems at least. On the other hand, it is also possible to see that Team A could build the suitable communication formation to accomplish team tasks efficiently. The findings of this study are valid enough to advocate the argument that the efficiency of NECS depends on how to use it, although the results is limited in generalization because of the case study.

The second point was about actualization of nonhierarchical flat communication. The content analysis on email logs didn't confirm the effects of NECS on generating flat communication, whereas the result of interviews to leaders supported the validity of the anticipation that NECS would help to build flat communication network. The results of interviews were based upon subjective cognitions, and besides, of only leaders except subordinates. In this respect, it is acceptable to consider that it is not realistic or profitable for business team

like as sales teams to build a nonhierarchical flat communication network. As referred above, it must be right to assume that teams will generate comfortable communication formations for them along with their goals, norms, characters, and so on. The task features will be the most important factor to decide the configurations of team communication. This also means that NECS has considerable possibilities to build nonhierarchical flat communication comparatively easily in some kinds of business teams. Project team for new products or research teams will need flexible information exchanges and have to build flat communication networks. It should be the essential for us to recognize again that NECS is just a tool, never an omnipotent one for communication. Certainly NECS has rich potentials to improve organizational communication powerfully. But it must be pointed out that the degrees of exerting its potentials depend on how to use it.

The final point of argument was the effects of NECS adoption on leader behaviors. What is anticipated to NECS should be flat, flexible, active communication among team members without apprehension for hierarchical power differences. But, along with permeating of NECS, every team became to weight the leader centered hierarchical communication in favor of members' work rolls. Then leader came to bear more responsibilities. The frequencies of emails from subordinates have increased gradually. And besides, the main contents of subordinates' email were kinds of notifications. It is possible to see that subordinates make contacts with their leaders more frequently to entrust making important decisions to their leaders. This means that NECS generated the schema that subordinates

sent reports and market information while leaders understood the situations precisely, considered the efficient tactics well, made accurate decisions, and sent specific directions. It is tougher for leaders and managers than ever. Conjoint communication among leaders and subordinates enabled by NECS may generate the more leader-centralized situation as far as such situation is advantageous to achieve team goals. On the other hand, in business teams with such aspects, the time when the abilities of leaders to understand, judge, consider, and decide determine most part of team performance may come actually. Leader-centralized communication will reduce diverse information exchanges and restrain the chances to generate creative ideas and collaborations. The results of this study suggest that IT revolution should have opposite effects against general anticipations.

This study was conducted on the basis of case study approach. The results are acquired from single business organization in Japan. So it must be careful not to generalize these results simply. But the findings are essential to reveal the characteristics of the effects of NECS. It should be a certain contribution to prove that current general anticipations for NECS are not always adequate. What way to use NECS can enables the anticipation to actualize? The next research task is the investigation to discover them with larger samples.

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