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Organizational Communication in Telework: Towards Knowledge Management

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Abstract

Smooth communication through Face-to-face communication across hierarchy has been currently recognized as a critical method for organizational knowledge sharing and knowledge creation. However, these previous research findings are not applicable to telework environment which has much limited face-to-face communication compared with the traditional organization. Although knowledge creation researchers always emphasize on face-to-face communication, research in organizational communication in distributed environment such as telework, are very rare in this field. Further, this research has discussed KM in telework, based on only existing literature, and has not done any empirical analysis.

To study knowledge management in telework, we investigate organizational communication in telework. This paper focuses on communication across organizational hierarchy. To achieve the aim of this research, we analyze teleworker's job related communication data that is collected through log-sheets from two telework groups, and then investigate their communication patterns. Finally, based on our findings, we suggest some implications and hypotheses.

Keywords: Knowledge Management, Telework, Face-to-Face communication, Communication media

1.   Introduction

Organizations today face severe competition due to changes in economic paradigm. Knowledge and human resources have become driving forces of the new economy (Drucker, 1992). As a result, Knowledge Management (KM) has become a very critical issue and has been studied in various fields. At the same time, advances in telecommunication and information technologies have made internet and email increasingly popular media in both business world and daily life. These changes have enabled dramatic changes in the way workers are communicating with each other and performing job related activities. These changes have produced a new work style called telework where people work away from the office. The concept of telework has received a great deal of attention around the business world in recent years. It has been widely believed that telework has numerous merits, such as improved worker productivity and cost reduction in business as well as for the society and

region. Thus, many researchers have speculated that the number of teleworker will rapidly increase in near future (Higa, 1997; Spinks, 1998).

However, despite changes in the business world, there have been very few research dealing with the concept of KM in telework. Currently most of research related to KM have been based on two primary concepts, knowledge re-use and knowledge creation (Cohen, 1998). Especially, knowledge creation researchers have suggested that communication process is a critical method for organizational knowledge creation (Inkpen, 1996; Nonaka and Takeuch, 1995). And, face-to-face communication (F-to-F), sharing of the individual experience, and effective and smooth communication across hierarchy has been widely recognized as primary methods for organizational knowledge sharing and knowledge creation in business world as well as KM research. However, these previous research have been based on traditional organizations and traditional work style. Although these previous research have emphasized on F-to-F, the use of electronic media, which is now recognized as general communication tool due to the technological advances, has not been dealt with in this field. Even this communication style and IT have not been sometimes affirmatively evaluated by some of knowledge creation researchers (Cohen, 1998; Nonaka and Takeuch, 1995). Nevertheless, any evidence related to negative effects of the electronic communication have not been empirically tested.

In telework environment where people work away from the office, F-to-F is actually limited. As a result, these existing research become mostly or largely inapplicable to telework. Although organizational communication is a critical issue in KM, research in organizational communication in distributed environment such as telework, are very rare in this field. Further, this research has discussed KM in telework, based on only existing literature, and has not done any empirical analysis. Thus, research in organizational communication in telework has not presented any implication and hypothesis from empirical analysis in KM field.

To study KM and knowledge creation in telework, we investigate organizational communication in telework. In this paper, we focus on communication across organizational hierarchy. To achieve the aim of this research, we analyze teleworker's job related communication data that is collected through log-sheets from two telework groups, and then analyze their communication patterns. And we first verify whether telework environment can lead towards smooth communication across hierarchy. Finally, we present some implications and hypotheses based on our findings.

2. Related Literature Review
2.1 Knowledge Management

KM has been currently recognized as critical issue for knowledge society. As a result, KM has been studied in various fields. KM fields include intellectual asset, organizational

memory, IT, cognitive science, organizational learning, organization design, and so on. And many conceptual KM frameworks based on various viewpoints have been also introduced (Holsapple and Joshi, 1999). In Knowledge re-use research, collecting, distributing, re-using, and measuring existing codified knowledge and information are mainly studied (Cohen, 1998). And practitioners often look to IT to capture and distribute this explicit knowledge. On the contrary, knowledge creation researchers have been interested in developing condition that favor the exchange of tacit knowledge between individuals, a social process through which new knowledge will be developed. They emphasize on F-to-F for sharing of individual experience, smooth communication across hierarchy, etc as means for converting individual knowledge into organizational knowledge (Inkpen, 1996; Nonaka and Takeuchi, 1995). That is, research related to knowledge re-use mainly focus on the distribution of explicit knowledge, and knowledge creation research emphasize on establishing conditions that encourage new knowledge creation through the direct social sharing of tacit knowledge. In fact, knowledge is something different from information and is not capable of the sorts of friction-free movement usually attributed to information (Brown and Duguid, 1998). There are two types of knowledge: explicit knowledge and tacit knowledge. Explicit knowledge needs little interpretation and can therefore be communicated quickly and easily in words and numbers (Nonaka and Takeuchi, 1995). Research reports, specifications, simple software codes, and the likes are examples of knowledge that tend to be explicit. In contrast, tacit knowledge is highly personal and hard to formalize making it difficult to share with others. It requires a high degree of interpretation and cannot be communicated quickly and easily. Subjective insights, scientific expertise intuitions, and operational know-how fall into the tacit knowledge category (Leonard and Sensiper, 1998). Therefore, two primary concepts have striking contrast between concepts and methods for KM. Especially, some of knowledge creation researchers have argued that effective F-to-F among human is more necessary than IT for KM (Cohen, 1998). Practical KM framework integrating these two primary concepts have yet to be presented (Holsapple and Joshi, 1999).

2.2 Telework

Telework is a work style that eases both the temporal and spatial restrictions from conventional work style with the help of information and telecommunication technologies (Higa, 1997). The concept of telework has received a great deal of attention in recent years from researchers, practitioners around the world. This arrangement has proven to be an effective way for organizations to meet the challenges of modern world. Many telework's benefits have been citation. According to those reports, telework can improve worker's productivity, reduce office costs to company, and enhance job satisfaction due to flexibility and autonomy of work (Spinks, 1998). It also allows organization to improve competitive

recruitment and retention of the best workers, at same time workers can maintain the balance between the job and family life. Further, telework can be used to broaden employment opportunities for handicapped people, support regional economic development by bringing the work to the workers, and reduce air pollution. Due to these benefits for society and region as well as business organization, the Federal governments have supported and guided adoption of telewok in US. In Japan, Ministry of Posts & Telecommunications and Ministry of Labor also have supported adoption of telework and have made some telework guidelines. Thus, many researchers believe that telework to be the choice of work style in near future (Higa, 1997; Spinks, 1998).

3.   Research Methodology
3.1   *Organization surveyed*

To achieve our research, communication patterns of two telework groups were investigated. In this research, we name them as group A and group B. The main task of both groups is to develop communication software. These groups shared similarities in many aspects. Both groups were involved in similar projects that develop large-scale software. And these groups were similar in number of workers, and personnel composition. There were 24 teleworkers in group A and 22 in group B. These group members were distributed among several local offices (some are separated by more than 1000 km). Teleworkers have depended on communication media in job related communication since all the business operations were distributed among local offices.

Each group had programmers, support personnel, a sub-leader, a group leader and a manager. Manager and leader were in management class, and sub-leader was on borderline between manager and programmer. Support personnel were responsible for maintaining the development environment: network, computer setting, and provision of software tools. The composition of two groups is shown in Table 1.

[Table 1]   Composition of members in each group

Groups / Members	Group A	Group B
Manager	1	1
Leader	4	3
Sub-leader	4	1
Support	1	1
Programmer	14	16
Total	24	22

Communication technology was available for both groups. One telephone was provided for every three or four teleworkers. All teleworkers had a personal computer with an email account. Group A got email facilities 2.5 years before this survey, and group B got email facilities 2 years before. All members in both groups were fully trained in the use of email, and at the time of survey, could use it without problem. Other communication media, such as fax, audio conferencing, video conferencing, were also available for both group A and B.

The main difference between the two groups was in management support for use of email. In group B, all the members were encouraged to use email by manager and group leader. But, there was no such support from the manager class in group A.

3.2   Survey Design and Data Collection

To achieve the aim of our research, two different surveys were used to analyze communication pattern of telework groups. In first survey, each member in two telework groups was asked to fill out a log-sheet whenever they communicated on their tasks. Filling in the log-sheet was required in both sending and receiving modes. This survey was continued for 5 working days, from Monday through Friday. Items of the log-sheet were included communication mode (sending or receiving), media used (email, telephone, fax, video conferencing, audio conferencing), correspondent's status, type of communication task (reports, inquiries, coordination, and discussion), etc.

The goal of our research is to analyze communication pattern of two telework groups, and then to present some implications of communication across. In KM research area, communication process is required for knowledge exchange as well as simple information exchange, and converting individual knowledge into organizational knowledge. Thus, to achieve the aim of this research, it is necessary to analyze complexity of communication tasks as well as direction of communication based on sender's and receiver's status.

We classify hierarchy of these groups into two classes, manager class and worker class. Manager class included group leader and manager. Programmers, support personnel, and sub-leader belong to worker class. Based on this classification, we identify the direction of communication to be actually conducted among members of each group. We name communication with members of the different classes as Vertical Communication (VC), and communication with member of the same class as Horizontal Communication (HC). VC is included communication to be conducted between manager class (manager and group leader) and worker class (sub-leader, support personnel, and programmer). HC is included communication to be conducted among members of the same class.

Our research uses types of communication tasks to represent their relative task complexity. For this, we adopted the taxonomy of communication tasks used by Nakamura et al. (1995)

and Ide et al. (1996). They had classified communication tasks into different levels of purpose: report, inquiry, work, coordination, discussion, creation, and negotiation ordered from low to high complexity. Reports and inquiries belong to relatively simple information processing tasks because the input, process, and output are determined a priori (Byastorm and Jarvelin,1995). Compared to inquiries, reports may be closer to the automatic information-processing task. On the contrary, coordination, discussions, and negotiations are decision-making related communication. Based on these previous studies, we classify communication to be conducted among members of two groups into two communication tasks: information processing task (reports and inquiries) and decision-making task (coordination and discussion).

To gather additional information, two perception based surveys, interviews and a follow-up survey were conducted. Interviews were conducted to gather information about background of telework groups, management support for media, etc. A follow-up survey included items related to satisfaction and job performance of media used.

4.   Analysis of Results

Overall communication patterns of each group are shown in Figure 1.

[Figure 1]   Overall Communication Patterns of both groups
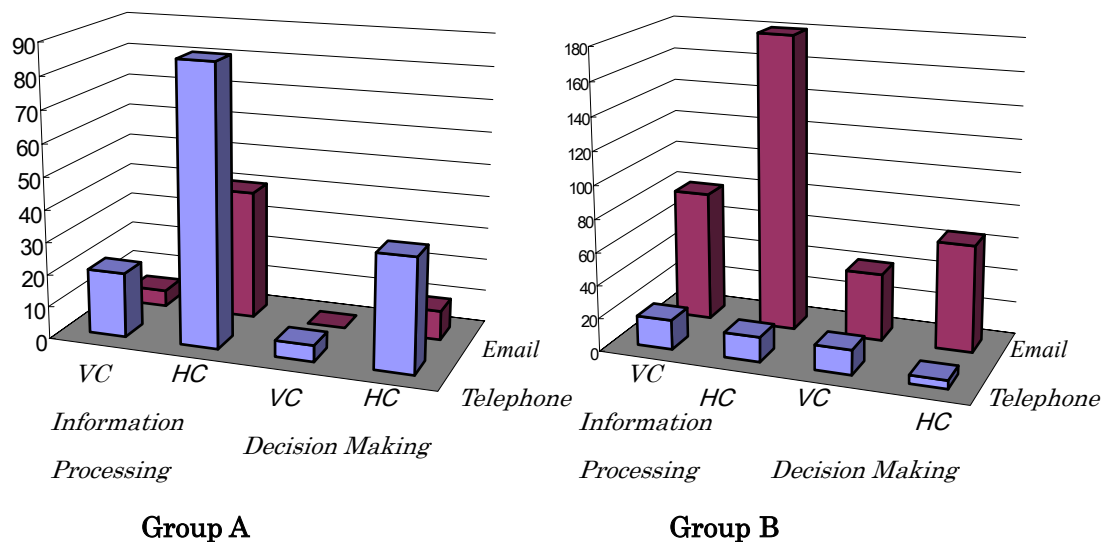
The analysis of data collected through log-sheets shows that both groups used email and telephone to make about 92% of their job related communications. Fax, audio conferencing and video conferencing were used only for 8% of the communications. Therefore, in this paper we analyze patterns of communications using telephone and email which is a primary

communication media in both groups.

4.1   Communication Patterns of Each Group

Communication patterns of Group A

In group A, the number of all transactions (outgoing messages + incoming messages) that used telephone and email was 232, during the five-day period. Of all transactions, the number of messages of VC was 30(30/232=15.0%), and HC was 170(170/232=85.0%). The number of messages that were sent and received using Distribution Lists (DL) was 32.

1)Use of telephone by Group A: The number of outgoing and incoming telephone messages of group A occupied 62.9%(146/232) of total communication traffics. Telephone communication of Group A is shown in Table 2.

Total message for HC (121) is 4.8 times more than that of VC (25). The number of HC was more than that of VC for incoming messages as well as outgoing messages. 72.6% of total traffic by telephone was used for information processing related tasks. Messages for decision making related tasks through telephone occupied 27.4% of total traffic. In any communication tasks, the frequency of HC was also more than that of VC.

[Table 2]   Telephone Communication of Group A

Group A		Telephone	
		Sent	Received
Information Processing	VC	12	8
	HC	39	47
Decision Making	VC	3	2
	HC	25	10

2) Use of email by Group A: Email communication of Group A is shown in Table 3 and 4. The number of outgoing and incoming email messages of group A occupied 37.1%(86/232) of all communication traffics. In group A, 37.2% of all email messages was sent or received through DL. However, DL in group A was used only for members of worker class (i.e., manager class was not included)

The number of HC (49) was 9.8 times more than that of VC(5).   The number of HC was clearly more than VC for both incoming and outgoing modes (see Table 3). 87.2% of total traffic through email was used for information processing related tasks. Messages for decision making related tasks through email occupied 12.8% of total traffic. In any communication tasks, HC was conducted more frequently than VC. Further, it is interesting to note that no VC were carried out through email in decision making related communications in this group.

[Table 3]　Email Communication of Group A without DL

Group A		Email (non-DL)	
		Sent	Received
Information Processing	VC	3	2
	HC	16	24
Decision Making	VC	0	0
	HC	4	5

[Table 4]　Email Communication of Group A using DL

Group A	Email (DL)	
	Sent	Received
Information Processing	1	29
Decision Making	2	0

Communication patterns of Group B

In group B, the number of all messages that used telephone and email was 652. Of all messages, VC was 153(153/418=36.6%), and HC was 265(265/418=63.4%). The number of messages using Distribution Lists (DL) was 234.

1) Use of telephone by Group B:　all telephone messages occupied 8.1%(53/652) of total communication traffic of group B. Telephone communication pattern of Group B is shown in Table 5.

[Table 5]　Telephone Communication of Group B

Group B		Telephone	
		Sent	Received
Information Processing	VC	9	9
	HC	6	9
Decision Making	VC	7	8
	HC	3	2

VC (33) is 1.7 times more than HC (20). 62.3% of total traffic by telephone was used for information processing related tasks, and communication for decision-making related tasks occupied 37.7% of total traffic.

2) Use of email by Group B:　The number of all email messages of group B occupied

130

91.9%(599/652) of all communication traffics (see Table 6). 39.1% of all email messages was sent or received through DL (see Table 7). In group B, DL was used among members of manager class as well as worker class.

[Table 6] Email Communication of Group B without DL

Group B		Email (non-DL)	
		Sent	Received
Information Processing	VC	19	60
	HC	35	145
Decision Making	VC	16	25
	HC	35	30

[Table7] Email Communication of Group B using DL

Group A	Email (DL)	
	Sent	Received
Information Processing	33	153
Decision Making	9	39

The number of HC (245) is about 2.0 times more than that of VC(120). That is, approximately one out of three messages was sent or received by member of different class. 74.3% of total traffic by email was used for information processing related tasks. 25.7% of all email messages was used for decision making related tasks

4.2   Comparison of Communication Patterns

Communication Traffics

Group B has 2.1 times more total messages than group A (see Table 8). In any case, communication traffic of group B is heavier than that of group A. In group A, VC occupied only 15.0% of all communication traffics, and this amount of VC of group A   only account for 19.6% of VC of group B. Further, all messages for decision making related tasks that group A conducted through VC is only 5%, which is 8.9% of VC for group B. Especially, number of email messages for VC of group A (5) is significantly less than that of group B (120). From this result, it can be stated that VC of group A is not active as compared with that of group B. Thus, members of group A did not frequently communicated with members of different class than group B.

[Table 8]   Comparison of Communication traffics

Group / Task & Direction		Group A Sent + Received	Group B Sent + Received
Information Process	VC	25	97
	HC	126	195
Decision Making	VC	5	56
	HC	44	70

Media Choice

Table 9 shows media choice behavior of each group.

[Table 9]   Media Choice Behavior of each Group

Group A、(B)		Telephone Sent + Received	Email Sent + Received
Information Process	VC	75.0、(18.6)	25.0、(81.4)
	HC	68.8、(7.7)	31.7、(92.3)
Decision Making	VC	100.0、(26.8)	0.0、(73.2)
	HC	79.5、(7.1)	20.5、(92.9)

Table 9 shows that the two groups have completely different patterns of media choice. In group A, telephone was used more than email for any communication tasks and for any communication directions. Further, in the case of VC for decision-making related task, only telephone was used. On the contrary, in group B, email was mainly used for any case. As communication became more complex, the group A is dependence on main media increased more than that of group B is.

Data analysis can be simply summarized as follows; telephone-oriented group A has much less communication with across status than email-oriented group B, and this difference between groups was mostly due to the difference in their main communication media.

4.3   Results of Follow-up Survey

The result of the follow-up survey is shown in Figure 2. Out of 7 point likert scale, maximum of group A was 4.5, and average of group A was 3.8, which means that email is perceived to

be somehow useful for job performance, but never to be strongly satisfied. On the contrary, average of group B was 4.4, that is, members of group B perceived that email is useful media for their job performance. Further, this results show that group B has more positive responses than group A in most of the items (see Figure 2). In the case of Q5, Q6 that are related to improvement of productivity by using email, the difference in perception between groups was relatively smaller than the other items. On the contrary, at job performance related Q1, Q2, Q3, and Q4, the difference between groups was relatively large. Especially, group A negatively evaluated Q1. This response is consistent with the analysis of the communication logs that email was not much used for communication tasks in group A. And also, this follow-up survey shows that the heavy traffic of group B was not the result of repeated messages (if they had some communication problems, their evaluation on email would have been negative).

[Figure 2]   Questions and Results of Follow-up Survey
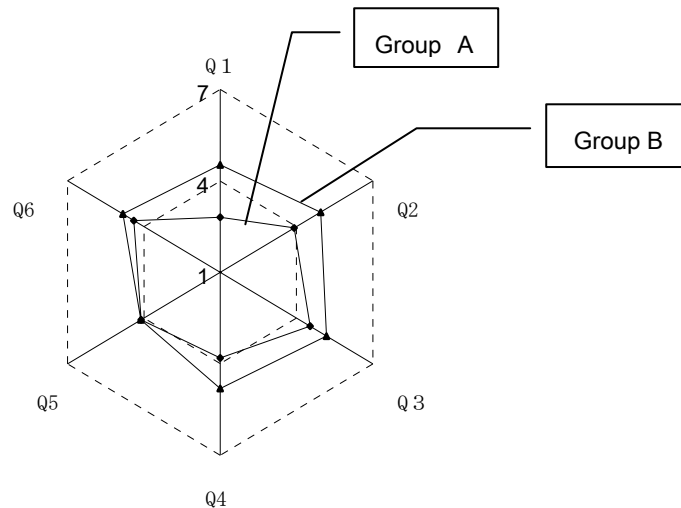
Questionnaire

Q1 Using email enabled me to accomplish tasks more quickly

Q2 Using email increased my productivity,

Q3 Using email made it easier to do my job

Q4 Using email improved my job performance,

Q5 I was satisfied with the email communication

Q6 Email was an effective communication tool

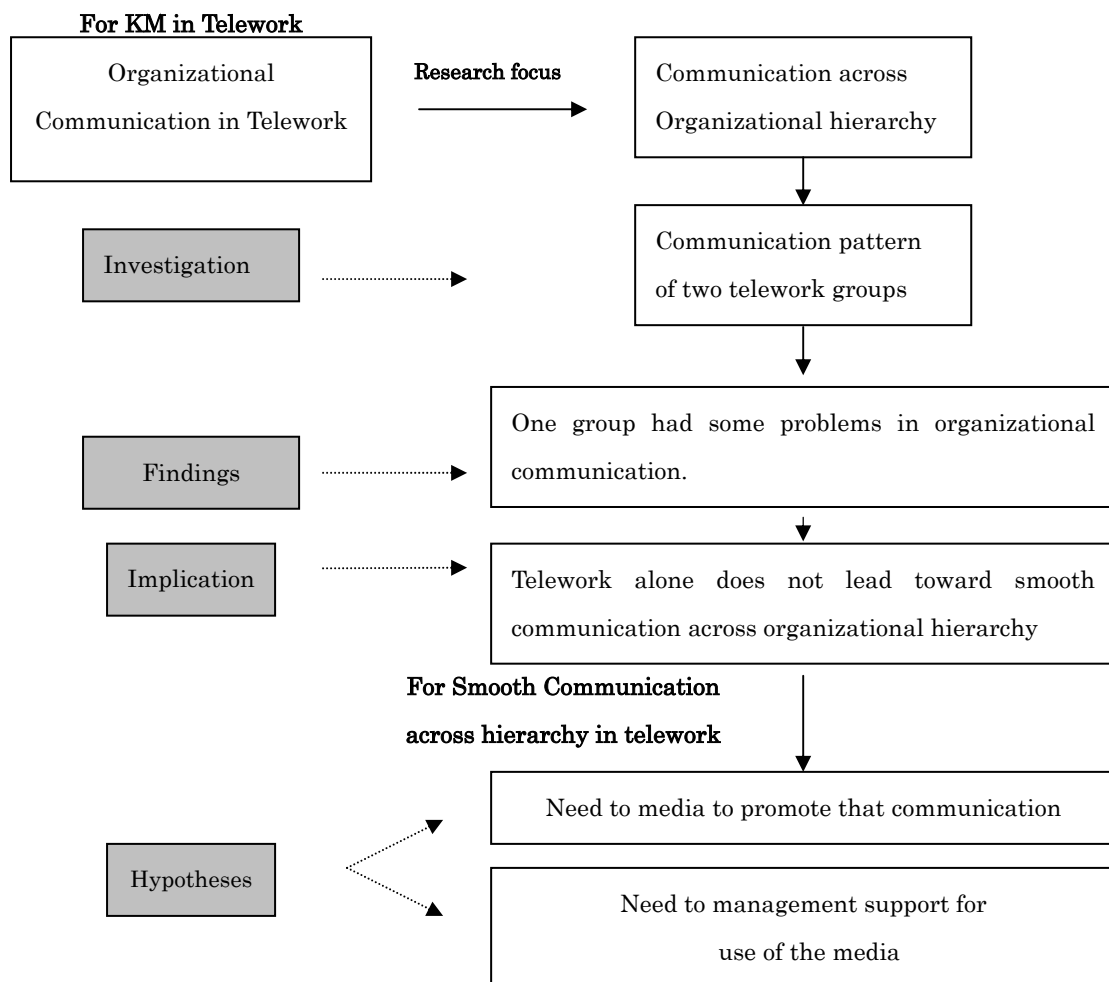(Strongly Disagree 1   2   3   4   5   6   7 Strongly Agree)

4.4

Discus

sion

Based on our findings, implications and hypotheses are shown in Figure 3. Based on these results, it can be stated that group A does not have smooth communication across hierarchy. Consequently, from example of group A, we found that telework itself can't lead towards the smooth communication across hierarchy. Especially, from data analysis, we suspect that group A may have problem in complex communication for knowledge exchange. That is, telework alone can't lead the smooth communication across hierarchy. It will be possible to make a flat communication environment by teleworking with some communication policies such as management support for use of media that can promote that communication. But, in order to verify this, additional analysis and studies are needed.

[Figure 3]   Summary of Findings and Hypotheses

For KM in Telework

| Organizational Communication in Telework | **Research focus** → | Communication across Organizational hierarchy |

Investigation ┄┄┄┄► Communication pattern of two telework groups

Findings ┄┄┄┄► One group had some problems in organizational communication.

Implication ┄┄┄┄► Telework alone does not lead toward smooth communication across organizational hierarchy

For Smooth Communication across hierarchy in telework

Hypotheses ┄┄► Need to media to promote that communication

┄┄► Need to management support for use of the media

Some results of data analysis showed that group B had a tendency to communicate frequently with members of different class as well as the same class regardless of the complexity of the

communication tasks. Further, members of group B perceived higher reliability level of email, and email was mainly used for job related communications than telephone, that is richer media than email. From these results, we suggest that communication across organizational hierarchy can be promoted by extensive use of email.

In relation to the extensive use of email, all members of group B were encouraged to use email by the manager and the group leader. But, there was no such support from the management in group A. Thus, we suggest that encouragement and support for the use of email can leads to greater adoption of email. That is, we consider that management support for email can contribute to a change the perception of the richness of email as communication means. This is similar to previous research by Markus (1994).

5.   Conclusion

Today's business environment requires a knowledge network or a combination of knowledge to face sever competition. This forces organizations to have a more systematic approach to have knowledge sharing in order to quickly leverage, grow, and expand. Organizations with telework arrangement are not an exception to this. In general, teleworkers and potential teleworkers are white-collar workers, not blue- collar workers. In other words, all of them are knowledge workers, and performance of a telework arrangement depends largely on the knowledge of the workers. Nevertheless, there have been very few research dealing with KM in telework environment. Especially, although organizational communication through F-to-F have been recognized as a critical method for KM, organizational communication in telework environment, where social interaction and vital F-to-F is limited, have yet to be studied.

To study KM in telework, we investigated organizational communication in teleworking groups. From data analysis, we first found that telework itself can't lead towards smooth communication across hierarchy. Therefore, based on our findings, we suggested that it is necessary to make a flat communication environment by teleworking with using media which can promote that communication, and communication policies, such as management support for use of the media.

Our research has some limitations. First, the data gathered during a relatively short period might not be sufficient to provide an external validity of analysis. And we recognize that our findings are limited to the domain of telework groups that have a well-defined group boundary and reasonable size. And, for more generalization of our findings should be made using different organization and adopting a longitudinal research. Finally, as it is very difficult to get direction of email through DL, we did not include that into log-sheet. Therefore, for data analysis, direction of communication through DL was not considered. Even if we had used DL for communication direction analysis, effect from that on results would have been minimal. On the other hand, if we had used DL, we could have done more

detail analysis. Verification of our suggested hypotheses and evaluation of the effect of using DL on communication pattern remain as our future research.

Our research focused on organizational communication that is a critical method for KM, and presented some implications and hypotheses. However, research focus on organizational communication can never efficiently lead towards KM in telework. Our research is merely one part of KM in telework. Thus, for telework environment, there still remains many KM research, such as KM framework, method for soving lack of F-to-F, IT, and so on.

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