

COMMUNICATION AND KNOWLEDGE SHARING IN A DECENTRALIZED ORGANIZATION

Eerikki Mäki^a
Eila Järvenpää^b
Kirsi Ziegler^c

^{a,b,c}Department of Industrial Engineering,
Helsinki University of Technology, Finland

^a eerikki.maki@hut.fi

^b eila.jarvenpaa@hut.fi

^c kirsi.ziegler@hut.fi

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Abstract

This study deals with communication and knowledge sharing in a knowledge intensive, decentralized virtual organization that has interrelated operations in several sites. The organization had about 200 employees located in four different sites, in three countries and continents. The data were collected by a questionnaire survey and interviews. This paper explores how the decentralization of an organization and the delocation of its employees affect on communication and knowledge sharing. Our findings indicate that the decentralized and delocated organization is not a very efficient organization model for knowledge intensive work that requires a lot of intensive interaction between different employees in different sites. Instead, to operate efficiently, different sites should have more independent, modular tasks that do not need continuous collaboration with employees in different sites.

Keywords: communication, knowledge sharing, decentralized organization, virtual organization.

Communication and knowledge sharing in a decentralized organization

Eerikki Mäki^a,
Eila Järvenpää^a, and
Kirsi Ziegler^a

^aDepartment of Industrial Engineering
Helsinki University of Technology, Finland
Eerikki.Maki@hut.fi
Eila.Jarvenpaa@hut.fi
Kirsi.Ziegler@hut.fi

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1 Introduction

Decentralized, dispersed and virtual organizations are established to respond to the demands of global competition, for example, need for new innovations and short product development cycles, and employing globally distributed expertise and knowledge sources (Boutellier et al., 1998). Several studies show that management of decentralized knowledge resources and knowledge workers is different and often much more difficult than management of co-located knowledge workers (Moenaert et al., 2000; Cramton, 2001; McDonough et al., 2001). One major drawback in dispersed collaboration is the organization's members' difficulty or inability to create and maintain mutual knowledge and understanding about work-related issues (Cramton, 2001). This may cause misunderstanding, distrust or even frustration among the organization's members.

Decentralization of organizations address challenges in communication and management of information and knowledge flows between different parts of an organization and its interest groups. Separate parts of the decentralized organizations must usually collaborate together, and they need to have access to the common organizational information and knowledge resources. Even in the era of sophisticated information and communication technologies, the coordination of communication and sharing of common knowledge resources may be difficult.

A great number of studies deal with virtual, decentralized organizations. However, the definitions for virtual organizations still vary. Lipnack and Stamps (1997) define a virtual team as “a group of people who interact through interdependent tasks and work across space, time, and organizational boundaries with links strengthened by webs of communication technologies”. This definition was used in this study, as it includes and describes the characteristics of the organization studied. The terms “virtual” and “decentralized” organization are used here interchangeably, and also the term “delocated” organization is relevant in this context. This study has adopted the term “decentralized organization” to illustrate an organization that has several interdependent units in geographically dispersed locations, i.e. delocated sites. Decentralized organization is related here to decentralized decision-making (Simon, 1997) and operations. We focus on interaction between employees in decentralized, virtual, knowledge intensive organization. The most critical interactions in knowledge intensive work are expected to be the communication and knowledge sharing patterns between the members of the organization.

A common image of employees working on innovations and new product development (NPD) is that these heroes resolve almost impossible problems using very unusual methods. As Mohrman et al. (2003) express it: “A challenge for the NPD firm is to design and create an organizational context for the work that makes it more likely that employees will attend to different information, attach new meanings, and try new approaches as they make sense of their technical problems”. Especially in early phases of NPD projects or in problem situations the knowledge workers need to consider their problems from different perspectives (McDermott and O’Connor, 2002.), or to acquire information from multiple sources using their weak ties (Hansen, 1999). However, we take another approach to knowledge intensive NPD, and study the less glorious daily work. We concentrate especially on daily communication and knowledge sharing in decentralized organizations. Communication is a means to share knowledge, create new knowledge and develop new perspectives about work and organizational

related issues among the employees. Despite the fact that information and communication technology (ICT) is efficient for communicating within the organization, relying excessively on ICT and utilization of explicit knowledge resources may not support an organization's ability to innovate (Swan et al., 1999). Utilization of tacit knowledge resources and applying less formalized or standardized tools or practices for communication and knowledge sharing is expensive and time consuming, even if the utilization of tacit knowledge resources may have a great potentiality for innovations. Organizations and their subunits must balance their communication and knowledge sharing practices to correspond the activities that they prioritize at a given moment. Effective virtual teams manage to match their communication patterns to their on-going tasks and activities (Maznevski and Chudoba, 2000).

Knowledge intensive NPD work may require participants to be creative and innovative in their work (Leenders et al., 2003), but a great deal of the NPD is pure hard work where organizational work routines have a great impact on how effectively and efficiently the organization operates. This is often neglected in the research about innovations and NPD. The emphasis has been on vivid and salient aspects of innovative work and less attention has been paid to normal, daily work activities. Interesting questions are if work with innovations or NPD must be more chaotic than normal knowledge intensive work, or is it possible to make it more structured and develop routines and practices for conducting the work. O'Sullivan (2003) reports how the good administration, e.g. the organization of knowledge intensive subtasks, increases the efficiency of NPD work.

The number of decentralized NPD projects is increasing (Florida, 1997). Therefore it is important to know if the benefits of decentralized operations can outperform the disadvantages, or is there something vital, and still unknown, that must be taken into account when managing decentralized, delocated and virtual organizations.

The goal of the study was to find out how people in a decentralized and delocated organization communicate with each other and how efficiently work related knowledge is shared between different parts of the organization. The objective of the study was divided into the following research questions.

- How employees use different communication media in communication within the decentralized organization?
- What are the advantages and disadvantages of different communication media in communication and knowledge sharing in the decentralized organization?

- How is information and knowledge available in the decentralized organization?
- What kind of challenges there are in communication and management of knowledge flow in the decentralized, and on the other hand, in the delocated organization?

2 Material and methods

2.1 Case description

In the case organization 208 employees worked in four different decentralized sites in three different continents, though two sites were located in the same country. The number of employees working in the different sites was 68, 74, 62, and 4 respectively (Table 1). Employees collaborated across three different time zones. The employees also communicated and collaborated with one major subcontractor and several minor external and internal suppliers or customers. However, the communication with external and internal partners is excluded from this study.

Table 1. The composition of the case organization

Sites	Continent	Number of employees	Response rate	Time difference (related to sites 1 & 2)
Site 1	Europe	68	25 %	0
Site 2	Europe	74	27 %	0
Site 3	North-America	62	41 %	-10
Site 4	Asia	4	21 %	+6

The case organization developed software products for electronics industry. The work was organized team-based, and the teams were specialized on different tasks, e.g. testing, user-interface, and architecture. Typically, team members located in several sites. They needed to actively, independently and collectively acquire, process, share, and develop information and knowledge with the members of their own team and with the members of other teams either located in their own site or other sites. Accordingly, the work was very knowledge intensive, and complex. Employees represented several nationalities, and different cultural backgrounds. Only a few of them could use their native language in communication with other members of the organization.

2.2 Data and data analysis

The data were collected using a questionnaire survey for the employees of the organization (n=62, total response rate 30 %, response rate by sites are presented in Table 1), and by interviewing management team members (n=10). The survey questionnaire included questions on employees' use of different communication media in communication with other members of the organization, advantages and disadvantages of the communication media used, problems in communication within the case organization, problems related to the availability of information and knowledge resources, and the issues that interfere knowledge flow. The questions about the frequency of using different communication media were structured with the response scale from 1 (no use) to 7 (daily use). All the other questions were open-ended and the respondents were asked to report their own perceptions on communication and knowledge sharing. The interviews dealt with the same issues as the survey questionnaire but they aimed to specify the reasons for efficient and effective communication and knowledge sharing within the case organization.

Most of data collected by the questionnaire survey and interviews were qualitative. The data were first classified into relevant categories and then each category was analyzed more deeply. The aim was to find out and understand phenomena related to the communication and knowledge sharing both within the whole decentralized organization and between the different parts of the organization.

3 Results

3.1 Use of communication media

Employees in the case organization used many different ICT applications. Communication media were used for interactive communication and knowledge sharing between the members of the organization. Furthermore, there were more passive ICT applications that were not used for interactive communication but to share information and knowledge passively. These included Lotus Notes and Intranet, which are discussed more detailed in the section about the availability of information and knowledge (section 3.3).

Telephone and email were assumed to be used on a daily basis for regular but unscheduled communication and knowledge sharing, and therefore their use frequencies were not asked in the survey questionnaire. On the other hand, regular and prescheduled communication and knowledge sharing was organized using phone

conferences and netmeetings (connecting the use of a shared screen e.g. slide show and voice).

40% of the respondents reported to use phone conferences weekly or more frequently and 39% of them used netmeetings weekly or more frequently. Videoconferences were used hardly ever, only 7% of the respondents used them. The reasons for the use of different communication media are presented in Table 2. Phone calls were mainly used when complicated issues demanding interactive discussion had to be solved urgently. Especially in these situations the other daily used medium, email was not considered applicable. However, email was considered useful when communication involved a high number of people and/or sending file attachments. Phone conferences and netmeetings were mostly used for the same purposes and therefore these two are here combined. Both of them were used for internal multi-site meetings when face-to-face meetings were not possible.

Table 2. Purpose and reasons for usage of different communication media

Communication media	Purpose / Reason of usage
Telephone	<ul style="list-style-type: none"> - Quick/urgent questions/issues - Complicated issues - When interactive communication/discussion was required (i.e. email not adequate)
Email	<ul style="list-style-type: none"> - Not urgent issues - To involve a large group of people - Need to send file attachments
Phone conference / Netmeeting	<ul style="list-style-type: none"> - Regular and/or prescheduled (multisite) internal meetings

3.2 Advantages and disadvantages of different communication media

Different communication media, telephone, email, phone conference, and netmeeting, were reported to have different advantages and disadvantages (Table 3). Telephone was reported to be a good media when immediate answer was required. However, its applicability might decrease as the complexity of the issues to be communicated increases. Email was found to be appropriate if multiple persons must be reached simultaneously, or time was needed for responding them. Nevertheless, the easiness to send emails also caused problems, e.g. people get too many emails, emails were sent even if the issue would have been much easier to communicate on the phone, or

emails did not reach the right people. Phone conferences and netmeetings reduced the need for traveling, and they were also found to be a rather good media to discuss on complex issues. However, the lack of face-to-face interaction made phone conferences and netmeetings less efficient than normal meetings. Also the time differences between sites made it difficult for all of the necessary people to participate regularly even in phone conferences and netmeetings.

Table 3 Advantages and disadvantages of different communication media

Communication media	Advantages	Disadvantages
Telephone	<ul style="list-style-type: none"> - Fast, immediate answer/feedback 	<ul style="list-style-type: none"> - No records/meeting minutes for later use - Time difference between sites - No face-to-face contact / physical presence - It is not always evident what was agreed - People understand the agreements differently
Email	<ul style="list-style-type: none"> - Archiving, have a written document to refer/return to - Can be read/replied later, gives more time to prepare the response Can reach multiple persons - Better understanding, clear written communication - Does not interrupt working 	<ul style="list-style-type: none"> - Slow or no answers (also because of time difference) - Too many emails, becomes spamming - Target groups were sometimes ill-defined - Time consuming, takes time to write - Not suitable for discussing complicate issues
Phone conference / Netmeeting	<ul style="list-style-type: none"> - No need to travel - Quick and flexible - Sharing of data, pictures and graphs 	<ul style="list-style-type: none"> - Difficult to discuss about complex issues - Difficult to follow conversation, sound quality - No face-to-face contact

3.3 Availability of information and knowledge

Organizational information and knowledge can be accessed through documented knowledge, usually stored in databases, and through knowledgeable co-workers. Almost half of the employees (49 %) reported to have problems in getting information or knowledge relevant for their work. Two main categories of problems were identified. The first one was related to employees' ability to locate and access updated explicit information and knowledge from organization's databases. The case organization used Lotus Notes and Intranet for storing information and knowledge. The roles of and

differences between these two systems were not very clear and it was not always easy for the employees to decide which system to use. Both were used for getting or sharing information, documents and news like meeting minutes and organizational charts. Another drawback was that the databases contained too much information and had inappropriate search functions. Therefore, it was difficult to locate the needed information and knowledge.

The other problem area was more multidimensional and it was linked to the low accessibility of knowledge embedded in employees. The most knowledgeable employees were difficult to reach because they were usually the busiest ones. The vague organizational structure also made it difficult to know, who are the responsible employees for certain specific expertise areas, or who were the ones that could make decisions, or who were the employees to contact in specific problem situations.

3.4 Challenges in communication and management of the knowledge sharing

All in all, the employees reported that the communication and knowledge sharing was rather open in their organization. However, 40% of the employees reported problems in communication within the case organization. These problems were discussed more detailed in sections 3.1-3.3. The greatest challenges were due to the decentralization of the organization, the delocation of the employees, and to a certain amount to cultural differences.

Decentralization of the organization resulted unclear roles and responsibilities. It also made it more difficult to know the employees' areas of expertise or responsibilities, which had negative effects on decision-making and employees' ability to decide with whom to communicate. Due to different management structures in different countries, different sites also had different communication hierarchies. In some sites communication took place through managers and in some sites through experts. The results show that employees of the European sites communicated more directly, whereas communication of employees of the American and Asian sites was more mediated through managers. The decentralization made it difficult to find and access information and knowledge embedded to knowledgeable coworkers, and thus decreased the availability of knowledge.

44 % of the respondents reported communication problems that were related to delocation of employees, and 31% of them communication problems related to cultural differences.

The problems and challenges related to the delocation of the organization included slowness of knowledge flow due to working in different time zones. Time differences between sites forged very long response times for emails and required employees to work over normal working hours when telephone conferences were organized. Delocation also reduced the pace and the quality of communication and knowledge flow within an organization. Other problems related to delocation were lack of incidental and organized face-to-face meetings and opportunities to share knowledge, and lack of chances to learn about ways of working in different cultures. Few opportunities to meet co-workers may also result low priority for people that are not familiar.

The challenges in communication with employees having different cultural backgrounds included misunderstandings due to the language problems, misunderstandings with the meanings of agreements, e.g. how soon is “as soon as possible”, and uncertainty with the correct communication style, e.g. how polite you need to be. Some of the respondents emphasized the importance of empathy in communication situations, because of the unwritten rules for communication in different cultures.

Different sites and professional groups used their own jargon, talking about the same issue using different words or vice versa, which was found to affect negative effects on the quality of information. In addition, different parties might have dissimilar background knowledge or understanding, which reduced the efficiency of the communication.

4 Discussion

Some of the communication and knowledge sharing problems found in this study are typical in all kinds of organizations. However, some of these problems may become more salient in virtual decentralized organizations. Two main reasons for communication and knowledge sharing problems were identified: decentralization and delocation. Also Boutellier et al. (1998) have discussed the loss of efficiency in decentralized R&D work. The two reasons are at least partly overlapping. Problems associated with decentralization included unclear roles and responsibilities, which in our case caused challenges in decision making and in locating and accessing knowledgeable co-workers.

Delocation of the employees caused mismatch between communication content and chosen communication media, difficulty to find and access information and knowledge on databases or embedded to knowledgeable coworkers, and misunderstandings associated with different cultural backgrounds of the organization's members. Because different sites located in different time zones, the working hours did not match, which

delayed the knowledge flow. Delocation also reduced opportunities to informal and formal face-to-face interaction to get information about the others expertise. The most knowledgeable employees were difficult to reach. Therefore, this knowledge should be available from other sources.

Decentralization and delocation resulted different inefficiencies on knowledge utilization within the decentralized organization. Some of the problems in communication and knowledge sharing made the knowledge flow slower and some of them decreased the quality of knowledge that was communicated between different sites. All in all, it seems that multisite organization is not a very efficient organization model if interaction and communication is needed frequently.

The use of different kinds of ICT applications reduced employees' need to travel between different sites and made sharing of information and knowledge faster and easier, which were reported to be the greatest advantages. The members located in different countries and sites had regular phone conferences and netmeetings. However, it seems that they could not totally substitute face-to-face meetings. The employees acknowledged the importance of face-to-face interaction in situations where they needed to share complex knowledge. Face-to-face interaction was also important in getting to know and understand each others working methods. Decentralization of organizational activities caused some coordination problems in communication and knowledge flow, e.g. some employees or operations were involved too late or the necessary information was transferred insufficiently between different sites. Results indicate that the collaboration and necessary on-line communication between the employees in different sites was to a certain extent disturbed because the sites were located on different time zones.

Information and communication technologies can be applied to improve and promote communication and knowledge sharing in a decentralized organization. However, the quality of communication and efficiency of knowledge sharing are not same as in face-to-face interaction. The information in ICT based communication tools is presented in a coded, standardized form, whereas in face-to-face interaction tacit knowledge can be shared. Informal and formal social interaction is also needed to help employees to know and learn about each other's ways of working.

The physical distance and time differences between different sites evidently reduced the efficiency and effectiveness of the decentralized organization and had negative effects on knowledge flow between different sites. In the light of this study, it seems that multisite decentralized organization is not a very efficient organization model if

there is a need for intensive and frequent interaction, communication and knowledge sharing. This study enlightened some problems in communication and knowledge sharing in the decentralized knowledge intensive organization.

Lack of mutual or common knowledge as described by Cramton (2001) didn't seem to cause problems. Instead, employees reported to have problems in accessing to common knowledge sources, not problems in understanding or interpreting it. This is a common problem in organizations today, since the organizational information and knowledge archives are becoming more and more complex.

Almost half of the employees reported to have problems in getting information and knowledge relevant to their work. This finding can be interpreted as both negative and positive. As such the lack of relevant knowledge may disturb or hinder completing the tasks. However, extensive awareness of need for relevant knowledge may also be positive, and may indicate the employees' expertise and motivation for conducting their tasks.

The limitations of the study were that only one organization was studied, and the rather low response rate. It is possible that phenomena related to communication and knowledge sharing differ across organizations, even if their organizational structures are similar. Management practices and the industry may provide different communication and knowledge sharing practices and even rules and procedures for communication and knowledge sharing. However, the characteristics of our case organization were typical to virtual organizations defined by Lipnack and Stamps (1997). Despite of the low response rate, employees from all sites responded. Thus perceptions of employees from different allocations, countries and continents were included in the study.

Future research should be addressed to find out more precisely how communication and knowledge sharing should be arranged in the decentralized organizations. Moreover, interesting research questions are what is the level of decentralization that does not deteriorate knowledge flow, what kind of decentralization may promote communication and knowledge sharing, and what kind of organizations and industries will benefit from decentralization.

References

Boutellier, R., Gassman, O., Macho, H., & Roux, M. (1998). Management of Dispersed Product Development Teams: The Role of Information Technologies. *R&D Management*, 28 (1), 13-25.

Cramton, C. (2001). The Mutual Knowledge Problem and Its Consequences for Dispersed Collaboration. *Organization Science*, 12 (3), 346-371.

Florida, R. (1997). The globalization of R&D: Results of a survey of foreign-affiliated R&D laboratories in the USA. *Research Policy*, 26, 85-103.

Hansen, M. (1999). The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge Across Organizational Subunits. *Administrative Science Quarterly*, 44 (1), 82-111.

Leenders, R., van Engelen, J., & Kratzer, J. (2003). Virtuality, communication, and new product team creativity: a social network perspective. *Journal of Engineering and Technology Management*, 20, 69-92.

Lipnack, J., & Stamps, J. (1997). *Virtual teams – reaching across space, time and organizations with technology*. New York: John Wiley & Sons.

Maznevski, M., & Chudoba, K. (2000). Bridging Space Over Time: Global Virtual Team Dynamics and Effectiveness. *Organization Science*, 11 (5), 473-492.

McDermott, C., & O'Connor, G. (2002). Managing Radical Innovation: an Overview of Emergent Strategy Issues. *The Journal of Product Innovation Management*, 19, 424-438.

McDonough, E., Kahn, K., & Barczak, G. (2001). An investigation of the use of global, virtual, and colocated new product development teams. *The Journal of Product Innovation Management*, 18, 110-120.

Moenaert, R., Caeldries, F., Lievens, A., & Wauters, E. (2000). Communication Flows in International Product Innovation Teams. *The Journal of Product Innovation Management*, 17, 360-377.

Mohrman, S., Finegold, D., & Mohrman, A. (2003). An empirical model of the organization knowledge system in new product development firms, *Journal of Engineering and Technology Management*, 20, 7-38.

O'Sullivan, A. (2003). Dispersed collaboration in a multi-firm, multi-team product-development project. *Journal of Engineering and Technology Management*, 20, 93-116.

Simon, H. (1997). *Administrative behavior. A study of decision-making processes in administrative organizations*. 4th edition. New York: The Free Press.

Swan, J., Newell, S., Scarbrough, H., & Hislop, D. (1999). Knowledge Management and Innovation: Networks and Networking. *Journal of Knowledge Management*, 3 (4), 262-275.

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