

# The Role of ICT in Organizational Knowledge Sharing Processes: An Exploratory Study

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In modern societies knowledge is considered to be an important factor to stimulate organizational development [4,5,7]. Scholars suggest that information and communication technology (ICT) tools such as email and intranet, in which telecommunication and information technology are integrated [1,8,14] support knowledge sharing and thereby enhance organizational development [2,5,7]. However, in several empirical studies, organization managers often complain that the opportunities for knowledge sharing provided by ICT tools are underutilized, or even ignored [3]. Accordingly, the question arises how knowledge sharing processes take place and which role ICT tools have in these processes. The purpose of this study is to examine the role of ICT tools in everyday knowledge sharing processes related to the primary process in organizational teams.

Knowledge sharing is often described as an interaction between individuals in which they mutually exchange knowledge used in their jobs [2,5,11]. This characterization of knowledge sharing implies that a knowledge sharing process consists of both donating and receiving knowledge. Three types of knowledge sharing are discerned: knowledge storage, knowledge retrieval and knowledge exchange [4,5]. In this study, the role of ICT in the sharing of knowledge in (small) teams is examined. We registered and interpreted all communication acts in which we assume knowledge to be shared.

The role of ICT tools in knowledge sharing processes is assumed to be different under various conditions [13]. Based on previous research [6], we expect ICT use to be more prominent in knowledge sharing processes in relatively large, dispersed teams than in relatively small, collocated teams.

## METHODS

In an exploratory case study (study 1) and a comparative study of three cases (study 2), we assessed knowledge sharing processes under varying conditions. Each case represents a project team involved in knowledge intensive work. The

critical project team size was eight to ten persons [12]. Geographical dispersion was measured by the presence of other team members in their environment [10]. All teams were selected from large, knowledge intensive organizations in both profit as well as non-profit branches. As Table 1 shows, we expected ICT use to be more prominent in knowledge sharing processes in relatively large, dispersed teams (case 2) than in smaller, less dispersed teams (other cases). Moreover, we assumed that ICT tools have a more important role in small, dispersed teams (case 3) and medium sized, less dispersed teams (case 4) than in medium sized, collocated teams (case 1).

## STUDY 1: EXPLORATORY STUDY

In study 1 we examined ICT use in knowledge sharing processes by means of diaries in which team members recorded their communication activities during two days ( $n = 12$ ). In addition, we carried out follow-up interviews with project team members ( $n = 5$ ) in order to furnish contextual information about the registered communication acts and to check the representativeness of the registered communication acts in their daily work.

To examine knowledge sharing processes, we observed the topic and persons involved in a communication act. In addition, for the use of ICT tools and other communication channels we looked at the use of communication channels and persons involved in a communication act.

Analysis was focused on describing the nature of knowledge sharing processes. While analyzing the communication acts, we found that different forms and subforms of knowledge sharing could be distinguished. These forms were found by observing the topic and persons involved in a communication act in the context of the other communication acts.

## STUDY 2: COMPARATIVE STUDY

In study 2 we examined whether the forms and subforms of knowledge sharing distinguished in study 1 could be identified in the other cases as well. Data were

Table 1. Conditions of cases and expectations regarding ICT use

	Size (number of members)	Geographical dispersion	Expectations regarding ICT use
Case 1 (exploratory)	12	--	-
Case 2	45	++	++
Case 3	6	+	+
Case 4	12	-	+

Note. Differences in 'geographical dispersion' and 'expectations regarding ICT use' between cases are relative and range from '--' (collocated respectively low on ICT use) to '++' (dispersed respectively high on ICT use).

obtained through diaries (n = 27) and interviews (n = 10) in the same way as in study 1. In order to examine forms of knowledge sharing, communication acts were categorized in clusters, such as communication activities around meetings, or a couple of days of work. Furthermore, in the interviews we presented the team members with a list and asked them to indicate which forms and subforms of knowledge sharing they used. In addition, we asked for a ranking of the prominence of communication channels.

Accordingly, we analyzed the diaries and interviews. Analysis was focused on describing forms of knowledge sharing and the use of ICT tools and other communication channels in clusters of communications activities. Comparisons between cases were made in order to formulate generalizations on the role of ICT tools.

**RESULTS**

**Study 1: Exploratory Study**

Firstly, we discovered that communication activities could be distinguished into three different forms of knowledge sharing: donating, acquiring, and exchanging knowledge. If a communication act carried out in the context of an interaction, knowledge was exchanged, otherwise knowledge was donated or acquired. These forms seemed to be interesting because they shed light on the nature of knowledge sharing processes and stand for ways in which knowledge could be shared. As knowledge sharing is often described as an interaction between individuals, we would expect that knowledge is mainly exchanged in two-sided, mutual interac-

tions. However, one-sided processes could be identified too. Secondly, zooming in on these forms of knowledge sharing, various subforms of knowledge sharing could be discerned. Examples are brainstorming, giving advise, or receiving an answer. Thirdly, ICT tools did not have a prominent role in knowledge sharing processes of the team. They were mainly used in one-sided activities like donating or acquiring knowledge. Face to face communication was the most prominent channel for the exchange of knowledge.

**Study 2: Comparative Study**

Firstly, three forms of knowledge sharing distinguished in study 1, donating, acquiring and exchanging knowledge, were recognized in study 2 as well. Secondly, in addition to study 1, six new subforms of knowledge sharing were disclosed, adding up to a total of 23 subforms (see Table 2).

Some of these subforms seem to contribute to the development of knowledge, for instance giving advise or brainstorming. Other subforms seem to deal with information, like giving a remark or spreading information.

Thirdly, we examined how various ICT tools are used in donating, acquiring respectively exchanging knowledge (see Table 3 for summary).

In general, Table 3 shows that email is the most important ICT tool, except for case 4. However, email is not the most prominent tool for exchanging knowledge. Face to face communication plays an important role as well; in case 1 and 3 face to face communication is the most important communication channel.

Table 2. Forms of knowledge sharing

Forms of knowledge sharing		
Donating knowledge	Acquiring knowledge	Exchanging knowledge
<i>making information available</i>	<i>inquiring information</i>	<i>exchanging information</i>
<i>making mentions available</i>	<i>inquiring mentions</i>	<i>fine tuning</i>
<i>spreading information</i>	<i>acquiring information</i>	<i>brainstorm</i>
<i>giving advise</i>	<i>acquiring mentions</i>	<i>evaluation/reflection</i>
<i>giving an answer</i>	<i>acquiring advise</i>	<i>monitoring</i>
<i>making mention of things</i>	<i>receiving an answer</i>	<i>exchanging experiences</i>
<i>giving a remark</i>	<i>receiving a remark</i>	
<i>asking a question</i>	<i>receiving a question</i>	
<i>writing down information</i>		

Table 3. ICT tools and face to face communication channels used in knowledge sharing processes in teams

	Case 1	Case 2	Case 3	Case 4
Forms of knowledge sharing				
Donating	<b>email</b> shared drive virtual work space face to face	<b>email</b> virtual work space	email shared drive intranet face to face	email <b>workflow system</b> face to face
Acquiring	<b>email</b> shared drive virtual work space face to face	<b>email</b> intranet knowledge base virtual work space	<b>email</b> shared drive intranet face to face	email intranet <b>knowledge base</b> <b>workflow system</b> face to face
Exchanging	<b>face to face</b>	<b>email</b> <b>phone</b> conference calls face to face	<b>phone</b> <b>face to face</b>	face to face

Note. Prominent ICT tools and face to face communication channels are in bold.

Regarding the conditions, knowledge exchange through ICT tools could be identified in dispersed teams (case 2 and 3). In collocated teams knowledge exchange through ICT tools was not identified. Furthermore, ICT tools are used in large teams (case 2) in order to exchange knowledge. However in small teams (case 3) the phone is also used in order to exchange knowledge. Accordingly, dispersion seems to be the most important condition for exchanging knowledge by means of ICT tools. Concerning donating and acquiring knowledge the conditions seem not to matter. Knowledge is donated and acquired through ICT tools in all cases.

Furthermore, the results show that in teams high on ICT use (case 2 and 4) different forms of knowledge sharing are dominant. The team's task seems to offer an explanation for this. In teams involved in developing products or services (case 2), exchanging knowledge through ICT tools was dominant, whereas in teams applying rules (case 4) donating and acquiring knowledge was dominant. In development teams low on ICT use (case 1 and 3), ICT tools are used for donating and acquiring separately.

## DISCUSSION

In this study, different forms and subforms of knowledge sharing were empirically derived from organisational teams that differed according to size and geographical dispersion. As knowledge sharing is often described in terms of an interaction between individuals [2,5,11], we would expect that knowledge is mainly exchanged in two-sided, mutual interactions. However, one-sided processes, i.e. donating and acquiring knowledge, could be identified too. Accordingly, in addition to the characteristics mentioned in literature [2,5,11], knowledge sharing is not only characterized by two-sided interactions, but one-sided processes as well.

The starting-point of this study was to empirically examine knowledge sharing processes through observing communication activities. Accordingly, we registered and interpreted all communication acts in which we assume knowledge to be shared and focussed on the process of knowledge sharing. However, there are indications that knowledge is not shared in all communication activities. Some subforms seem to deal with knowledge, whereas other subforms seem to deal with information. With regard to the types of knowledge sharing discerned in literature [4, 5], subforms dealing with information seem to be related to knowledge storage and knowledge retrieval, whereas subforms dealing with knowledge are related to knowledge exchange. We will further investigate when knowledge is shared in communication activities.

Moreover, regarding the subforms, we have to mention that they are not mutually exclusive. Further research into the distinctions between subforms is needed.

With regard to ICT tools, in previous research [6], ICT use seemed to play a more dominant role in relatively large, dispersed teams. Since in our study relatively small teams had a high score on ICT use too, size seems not always to be a critical condition for ICT use. Moreover, in literature it is assumed that ICT could play a

dominant role in knowledge sharing [9]. However, this study shows that face to face communication seems most important.

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