

## **Knowing in mobile organisations – trust and knowledge sharing in virtual teams**

**Cathrine Filstad and Petter Gottschalk**

BI Norwegian School of Management

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# **KNOWING IN MOBILE ORGANISATION – TRUST AND KNOWLEDGE SHARING IN VIRTUAL TEAMS**

By

**CATHRINE FILSTAD\***

Associate Professor, Ph.d  
Norwegian School of Management  
Nydalsveien 17, 0442 Oslo  
Norway

Phone: 004746410715, Fax 004746410701  
[cathrine.filstad@bi.no](mailto:cathrine.filstad@bi.no)

**PETTER GOTTSCHALK**

Norwegian School of Management  
Nydalsveien 37  
0442 Oslo  
Norway  
[petter.gottschalk@bi.no](mailto:petter.gottschalk@bi.no)

\*corresponding author

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# KNOWING IN MOBILE ORGANISATION – TRUST AND KNOWLEDGE SHARING IN VIRTUAL TEAMS

## Abstract

We investigate how trust and knowledge sharing affect collaboration in virtual teams, as knowing across boundaries in a mobile organization. Important for collaborative work is sufficient understanding and awareness in situations, and where resources are coordinated between participants to adjust to situations as they arise. This collaboration is dependent upon shared common goals, knowing your colleagues competence and thereby be able to share knowledge in cross-disciplinary collaboration, and finally a shared language facilitated by technological visualization artifacts. The consequences are that through shared language the ability to create collaborating relationships and share knowledge based on trust increases.

Key words: Mobile learning, knowing, knowledge sharing, trust, virtual teams

## Introduction

Globally distributed collaborations and virtual teams have become increasingly more common, as a result of globalization of many industries (Kotlarsky and Oshri, 2005). These teams are geographically and organizationally brought together, relying quite heavily on telecommunication technology (Powell, Piccoli and Ives, 2004). So far the main focus of the IS literature on globally distributed teams has been on technical aspects related to system development projects. Thus, necessary focus on humans and social aspects in global collaborative work is still limited. However, the importance of communication, motivation, trust and social ties has been covered (Ardichvili et al., 2003), recognizing that trust is the foundation but also most difficult to create in knowledge sharing. However, enabling knowledge sharing is essential to innovation and organizational success (Nonaka and Takeuchi, 1995; von Krogh et al., 2000) to ensure necessary collaboration and coordination in virtual teams. Consequently, we experience an emerging knowledge-centered discourse (Nicolini, Gherardi and Yanow, 2003), also when it comes to virtual teams and how developing a shared understanding and shared goals (Beyerlein et. al, 2008; Majchrzak et. al, 2000) contribute to positive outcomes and commitment.

A knowledge-based view demands for continuous exploration of new knowledge and exploitation of existing knowledge (March, 1991), whereas virtual teams benefit from bridging individuals with needed knowledge, skills, and abilities, regardless of location (Blackburn et. al, 2003). Critical to the success of virtual teams is therefore knowledge sharing among physically dispersed members. Understanding knowledge sharing, however, means to unfold a tendency to treat knowledge as an individual property, learned through individual acquisition of knowledge (Sfard, 1998; Elkjaer, 2004), Several researcher recognize that knowledge must be conceived as social and cultural phenomena (Brown and Duguid 1991; Lave and Wenger 1991; Blackler 2004; Tsoukas 2005; Gherardi and Nicolini, 2000), as a question of knowing how to perform and apply

knowledge in social practices (Filstad and McManus, forthcoming). Knowledge as a question of knowing enables and enriches our understanding of the concept), where knowing and learning is to be considered as two sides of the same coin (Chiva and Alegre, 2005; Filstad and Blåka, 2007). Thus, being knowledgeable is about being able to frame situations and identify solutions and act accordingly (Eraut, 2000), as knowing through belonging, participating and communication (Catania, 1998). Knowing is dynamic, mediated, provisional, pragmatic and continually reproduced and negotiated in social participation (Nicolini, Gherardi and Yanow, 2003 and Blackler, 2004). Engeström (2007) calls into question our preoccupation with types of knowledge (tacit or explicit) in favour of a closer attention to its use. Drucker (1993) and Tsoukas (2005) regard knowledge as potential that is utilized in processes of knowing, such as learning, thinking or applying knowledge; the process of knowing to transform the knowledge potential in actual performance. This understanding of knowledge as knowing enables us to investigate knowledge sharing more fruitfully, in collaboration, situated in professional work. Knowledge applied as knowing, has a special meaning in solving practical work as knowing emphasizes the context-specific, the unique and different requirements in virtual teams.

In this paper, we address knowledge as a question of knowing through social practices of integrated operations in cross-disciplinary virtual teams onshore and offshore. This means that we take a process perspective, a practice-based approach, talking about knowledge in use as knowing. In doing so, we investigate how trust and knowledge sharing affect collaboration in virtual teams where the main challenge is knowledge sharing across boundaries in mobile organizations.

### **Knowledge sharing as knowing across boundaries**

Challenges of working in virtual teams involves issues of trust, coordination, collaboration, communication, participation and lack of mutual knowledge and/or understanding of each others positions and contributions (Soule and Edmondson, 2002); To ensure and create trust, knowledge sharing is important, but also the other way around, to share knowledge is based upon trust. However, knowledge is embedded in social practices, and therefore knowing does not exist apart from the participants in social practices. On the contrary, their knowledge (including tacit knowledge) is embedded in the stories they tell, in conversations and networking activities (Araujo, 1998; Brown and Duguid, 1991), and through behavior and activities. To share knowledge means allowing participants to talk about their experiences and to exchange their knowledge in problem-solving activities (Ardichvili et al., 2003). That means being able to observe each other, practice together, reflect upon experience and other forms of collaboration through practice at work. In integrated operations, as a virtual community of social practices, its members must be comfortable with participating in a computer-mediated, Internet-based world with little face-to-face communication (Ardichvili et al., 2003). Coming to know who knows what is far more challenging in globally distributed teams, where Faraj and Sproull (2000) suggest that instead of sharing specific knowledge the focus should be upon knowing where expertise is located and needed. Kotlarsky and Oshri (2005) conclude in their studies of globally distributed teams that social ties and knowledge sharing were keys to successful collaboration. Collaboration is here understood as a complex, multi-dimensional process of communication, meaning, relationships, trust and structures where successful collaboration is either product success or desired performance, achieved through group performance.

## Trust in virtual teams

In virtual teams, trust is a challenge due to reduced face-to face interaction, and perceived commitment to team goals can also be reduced since implementation of goals and creating a mutual understanding of these goals is more difficult when members are distributed (Hertel et al., 2004; Malhotra et al., 2007). Trust has been defined as "*the willingness of a party to be vulnerable*" (Abrams et al., 2003, p.65) accepting this vulnerability due to positive expectations of intentions and behaviour of others (Lines, Stensaker and Langley, 2006). Sharing knowledge and sensitive information inherently involves risks and therefore trust is essential to knowledge sharing as it generates solidarity by fostering an atmosphere conducive cooperation and sharing. Expressing an emotional state that makes you vulnerable represents a risk to your position and therefore a culture of trust is important for knowledge sharing (Park et al., 2004). Mayer et al. (1995) believe that trusting in colleague will be determined by the trustor's belief in his colleague having adequate knowledge and ability, benevolence and acting in the best interest of his colleagues and integrity in accordance to a set of compatible values.

The quality and characteristics of relationship between parties in social practices at work are often built on trust. Trust is more often present in informal social practices than formal. We choose who we want to build informal relationships with and therefore often identify with and trust these colleagues (Filstad and Blåka, 2007). In an informal social practice the willingness to share knowledge and the willingness to use the practice as a source of knowledge apply to its characteristics. The participants will believe that the other party has the ability to handle knowledge that is shared and also believe in their willingness to share knowledge. As one of the respondent from our studies explains:

It depend very much upon the person how difficult it is to get in contact. That again, I recognize that those I know well offshore, those I have travelled out and talked to earlier, that I know have a private boat, a cottage in the mountains, I know the name of their dog, things like that. Then it is much easier to contact them, and I also do that more often then.

There are two dimensions of trust that promote knowledge creation and sharing: benevolence and competence. Benevolence-based trust allows one to query a colleague in depth without fear of damaging self-esteem or one's own reputation. In contrast, competence-based trust, allows the individual to feel confident that a person knows what he or she is talking about and is worth listening to and learning from. Abrams et.al. (2003) have investigated different factors that foster trust in organizations. The most important factor is the establishment of personal connections. They believe that when individuals share information about their personal lives, especially when they compare similarities, the result is a stronger bond and trust is developed. They also find that in relationships outside the organization individuals are more human and themselves, and therefore are considered trustworthy. As a consequence, they see that frequent, close interactions typically lead to positive feelings of caring about each other and an understanding of each other's knowledge and expertise. One way for managers to approach the meaning of trust is to establish shared goals and visions in which individuals identify because individuals who share goals and visions find it easier to form close bonds and to understand each other. Another managerial aspect is that decisions should be fair and transparent and this will lead to more fair and transparent decisions in a trusting environment (Abrams et. al., 2003). It is, however, important to note that even though values and norms can engender trustworthy behaviour that again

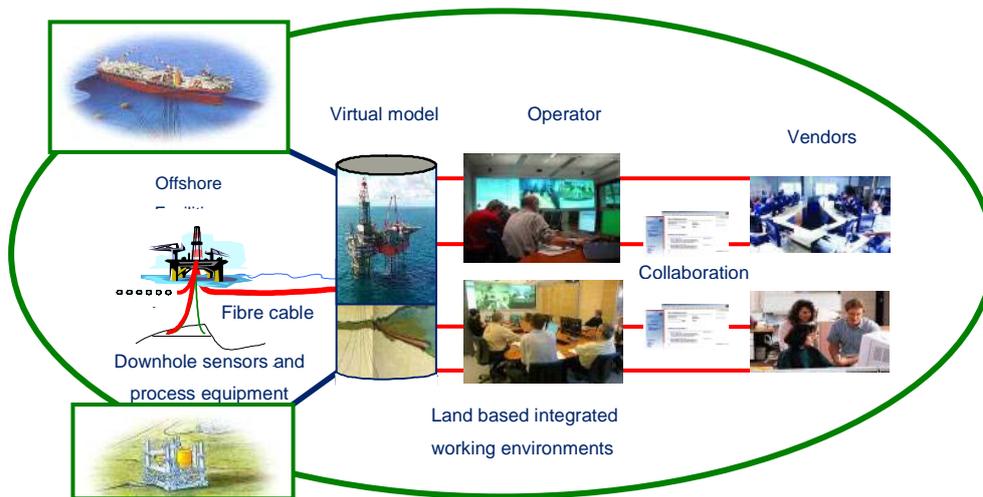
leads to confidence, it is some confusion in the literature about precisely what it is about values and norms that creates trust. Adler (2004) explains: “*We might reasonable distinguish a spectrum running from weaker forms of trust based on the predictability imparted to other actors’ behaviour by their adherence to any stable norm, to stronger forms of trust based on the predicted benevolence of actors with whom we share norms that privilege trustworthiness (p.311)*”. Adler (2004) outlines direct interpersonal connect, reputation and institutional context as most important mechanisms by which trust is generated.

## **Methods– Integrated operations in cross-disciplinary virtual teams**

Data was conducted in the largest oil-company in Norway through in-depth interviews with employees working in cross-disciplinary virtual teams (as integrated operations) offshore and onshore. We used in-depth interviews with onshore personnel representing Operations West (Oseberg, Brage and Troll) and Operations North (Åsgard and Heidrun) from 2008. All interviews with a total of 15 informants were recorded and transcribed and the data material from this second study was analyzed using open coding technique and the data analysis tool for qualitative research: Nvivo8.

## **What is Integrated Operations?**

When most major oil companies and globally operating service companies address their future way of doing business as oil exploration and operation enabled by information and communication technology there is a certain logic behind this vision: integration of people across geographical, organizational and disciplinary boundaries, integration of processes in terms of business integration and vendor collaboration and finally; integration in relation to technology: data, sensors, protocols, fibre optics, standardization and others (OLF 2005a, OLF 2005b). This vision of integration is seen in a typical definition of an e-field; an instrumented and automated oil and gas field that utilizes people and technology to remotely monitor, model and control processes in a safe and environmentally friendly way in order to maximize the life value of the field. Even though the scope varies among actors in the industry most of the initiatives evolve around planning and implementation of new work processes/practices enabled by the latest real-time information and communication technologies (OLF 2005a). Real time data and information are made available from a remote location, typically the down-hole reservoir/well of an oil and gas asset’s or from a process facility through a high-capacity fibre-optic infrastructure (Hepsø, 2006). Various professionals with multidisciplinary backgrounds onshore-offshore, inside or outside the oil companies/vendors of geographically distributed organizations analyze the data in increasingly virtual collaborative environments and take decisions to support and optimize the production of oil and gas, see Figure 1. This is what is described as *integrated operations* in this paper.



Since the turn of the century Norwegian oil companies and vendors have been developing and implementing integrated operations practices and technologies both in Norway and in a global setting. International oil companies like BP, Conoco/Philips and Shell use Norway to test out integrated operation concepts before they are rolled out globally. As such the NCS has been testing site for future operational concepts, virtual collaboration and provided the setting for substantial knowledge development and learning in this period. The Norwegian Oil industry association (OLF), the Norwegian Petroleum Directorate (NPD 2006) and PeTil (Petroleum Safety Authority Norway) see integrated operations as an opportunity for the Norwegian society (NOU 2005; OLF 2005a; OLF 2006a; OLF 2006b; OLF 2006c); a potential to brand new integrated technologies and work processes in a sophisticated Norwegian style based on the tradition we have related to democratic industry collaboration, that American investors have tagged “enlightened socialism”<sup>1</sup>.

The emerging situation in the oil and gas business in Norway has been described by both the employer organizations (OLF 2005a; OLF 2006a; OLF 2006b; OLF 2006c) and government (NPD 2006, NOU 2005) to have interesting consequences for both learning and knowledge development. Oil companies and service organizations are very competent organizations where the personnel have peak specialist competence not necessarily possessed by managers in the same companies. In most settings egalitarianity and informal employee-employer relations are increasingly seen as a key property in the innovative and knowledge creative organizations of the future in this industry in Norway. There is an increasing development of small and lean assets that are expected to enable operations irrespective of time and place. Increasingly planning and execution of operational tasks are handled as parallel and concurrent tasks enabled through close-continuous communication and shared situation awareness among people where some are located onshore and others offshore. At the same time we see an increasingly demanding work-force that want work challenges and improved learning opportunities. A more “hands-on” offshore/onshore management is expected to spend time and attention in developing the work-force. These are important challenges in knowledge sharing across boundaries where integrated operations are designed to meet these challenges through collaborations onshore and offshore. However, integrated operations can only become successful depended upon how employees use the framework, understand the logic behind the vision and allow for an integration of technology and people.

Different virtual teams and social practices vary when it comes to their experiences with integrated operations and how they work in accordance with its vision. In the

discussions we therefore compare the results related to our research questions on how trust and knowledge sharing affect collaborative virtual teams offshore and onshore.

## **Results and Discussions**

Distributed teams rely heavily on knowledge sharing and knowledge development, shared situational awareness and trust, both in the competence of employees offshore and onshore, but also trust in the technology and its uses. To investigate creation of necessary knowing through collaborative work in virtual teams, we concentrate our discussion around what we consider to be the two most important findings in our studies. First, how moving from data and information as knowledge sources to recognizing that data, information and knowledge only indicate chunk of reality, context-free, and therefore without meaning (Baets, 2006). Second, by recognizing that data, information and knowledge find its relevance and meaning in social participation among colleagues as situated (Filstad and Blåka, 2007). Thus, how knowledge is a question of knowing find its relevance to understand mobil learning in virtual teams and the importance of trust to obtain necessary knowledge sharing and mutual understanding among personell offshore and onshore.

### **Knowing through collaboration in virtual teams**

There are at least three technological drivers that stand out as the main forces for integrated operations. First, is the continuous development and increase of transfer networks, the movement from low bandwidth satellite onshore-offshore communication to fibre-optic networks that transfer Giga and Terra bits of real-time data (video, audio, data control and steering, monitoring data and 3D pictures/models) to move over long distances. In conjunction with this trend the evolution of the Internet has provided new opportunities for information sharing and collaboration for teams across technical, organizational and geographical borders. Individuals in different locations, working for different companies can access and/or manipulate the same data at the same time, See Figure 1. The second driver for integrated operations is standardization of telecommunication software/hardware platforms and data exchange formats as that based on XML-schemes (WITSML, PRODML, OPC UA) that has eased the integration of data (OLF 2005b). The final contributor is the ongoing convergence between computing and telecommunications, and the development of collaboration tools/software, like video-conferencing, Net-meeting, Smart boards, instant messaging, and 3D visualization that has made communication across distance easier. These three drivers form the backbone infrastructure for integrated operations.

However, these drivers are the important enablers for integrated operations, nothing more. An important feature is actually to be aware of the difference between data, information, knowledge and knowing. Data are signs that are indicating a chunk of reality. They represent observations, measurements or facts that are context-free, and therefore data alone is therefore without direct meaning. For data to become useful as information it must be placed and understood in a meaningful context. Virtual collaboration requires shared access to data and information but a main issue is the sensitivity the organization has concerning the treatment of knowledge. That is, necessary focus on the interpretation and mutual understanding of information in relation to practical situations where people work together. Because knowledge is only knowledge if it represents action and creation. Otherwise we can only speak of information (Baets, 2006).

Knowledge is anchored in the commitment and beliefs of its holder arisen through participation in social practices at work. A shift from knowledge as a substance to knowing as a process, knowledge not only emergent from practices, but itself a practice that is a situated activity creating linkages to action (Gherardi, 2006). Practicing becomes a knowledgeable activity, as knowing-in-practice (Soule and Emondson, 2002). Knowing, as being able to frame the situation, therefore includes the exercise of judgment, the capacity to make interpretations, critical assessment of data/information and ability to transfer information to knowledge and knowing. Thus, it is a continuous exercise of professional judgment in the effort to solve ongoing problems. Knowing is a continuous emergent process where meaning is achieved through its continual relation to context referred to as situation awareness. Shared situation awareness in this virtual setting is the ongoing interpretation of representations, ie. of human activity and artifacts, enabled through, ie. common availability to incoming data and information (loudspeakers and widescreens), or through people providing information about their action by talking to themselves or others. Bringing together various representations enabled by integrated operations is more than search and retrieval of documents, making data commonly available or give access to a shared model. It also involves activities like validation, double-checking, comparing and contrasting the different representations in order to make them useful (Rolland et al., 2006). Knowing is based on representations but not reducible to knowledge representations conveyed as data or information through the communication channels that integrated operations provide. Various team members can have different information resources that must be combined and coordinated to develop a shared understanding. The meaning of information embodied in these artifacts is not always clear and must be interpreted and negotiated between team members. A shared situation awareness that develops in a virtual collaboration of this kind is a practical accomplishment which arises in and through social action and activity (Hepsø, 2009). Some of the respondents explain:

One of the most important factors is that the continuity actually lies onshore and not offshore. They are working offshore for two weeks and then have four weeks vacation. So of course, they don't represent the history and a total overview of the history. They do not know what happened the week before....so if they are suppose to make decisions then often that will be based on limited background. That is why they need us to assist them. And additionally, they do not have engineer competence offshore. So it is important to get that competence integrated with those working offshore, so that they have that aspect as well.

It is easy to sit onshore and say that "ok, you managed this much last night, then you have to manage at least as much today as well". Earlier then, they explained, if you push this bottom then the compression will work like this. Actually we have not been able to understand exactly what they have been talking about, but we have improved that it sound reasonable, without really knowing where they are in the processes and what they mean. But know we can just pick up the same curve and look at precisely the same things as those offshore.

It depend very much upon the person how difficult it is to get in contact. That again, I recognize that those I know well offshore, those I have travelled out and talked to earlier, that I know have a private boat, a cottage in the mountains, I know the name of their dog, things like that. Then it is much easier to contact them, and I also do that more often then.

The most important condition for knowledge sharing is trust, whereas these citations give an impression that there sometimes is a lack of trust between people offshore and

onshore. Important is the fact that when they have build a relationship based on direct social interaction, face-to-face, then it is easier to make contact through the technology later on. Then they know the person and identify him as for instance Peter, instead of just those “offshore”. And also, some of the respondents are also much aware that you need to earn trust. Two of them explain:

You have to show that you know what they are talking about. For example when you come to a meeting you know for a fact that a circumstance is real and not just something you have been told.

Meeting people is important, especially when it is people you are suppose to work with...it have to do with knowing who you work with..knowing a person creates trust...

So things are improving, many of the respondents claim. Being organized in distributed teams they express a better understanding of different roles and responsibilities, leading to a better base for collaboration. One explains:

I think it is a much better understanding today about the different duties and operations people do, and based on this we get a much better basis for collaboration than it was before.

And also, shared language is recognized as important while during daily interaction meetings they report using a more simple language without to many abbreviations, in contrast to when two engineers work together using technical terms. Several respondents indicated that it used to be a challenge before, but know they have managed to develop a common language even though representing different disciplines.

## **Conclusion**

In this paper, we have addressed knowledge as a question of knowing when investigating how trust and knowledge sharing affect collaboration in virtual teams in mobile organizations. Integrated operations among offshore and onshore personnel, means integration of people across geographical organizational and disciplinary boundaries, integration of process in terms of business integration and vendor collaboration and integration in relation to technology, sensors, protocols and others. Or in other words, integrated operations basically mean integration of people and technology in a mobile organization.

We find that collaborations in virtual teams are depended upon a mutual understanding and shared goals and visions. The challenges is not the new and advanced technology itself, but the organizational aspect, thus shared goals and visions, but also trust and the willingness to share knowledge. Knowing throughout the virtual team results in knowing your colleagues competence and thereby be able to share knowledge in cross-disciplinary processes. Team members adjusted their language depending upon social context as knowing what language to use. Also, when members get together in a collaborative environment, a shared language is used facilitated by artifacts such as technological visualization tools. Through a shared language the ability to create relationships based on trust increases. The main purpose of integrated operation is virtual contact between offshore and onshore, with technology used to facilitate the possibility of “being in the same room”, for collaboration that result in better decision making and mutual in-depth knowing of the same problems and situations, and thus create a shared situational awareness. Collaboration and trust as the driver for knowledge sharing between offshore and onshore personnel is crucial. Lack of shared

understanding is subsequently generating different goals, less trust and poor collaboration. Integrated operations means that onshore and offshore are connected through assignments. Instead, virtual teams tend to divide between onshore and offshore.

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