Knowledge Transfer, Knowledge Sharing and Knowledge Barriers – Three Blurry Terms in KM

Dan Paulin and Kaj Suneson
Department of Technology Management and Economics, Chalmers University of Technology, Gothenburg, Sweden
dan.paulin@chalmers.se
suneson@chalmers.se

Abstract: In the knowledge management world there are many different terms flying around. Some are more important and frequently used than others. In this paper, we present and discuss the development and views of three terms: knowledge transfer, knowledge sharing and knowledge barriers. Knowledge transfer and knowledge sharing are sometimes used synonymously or are considered to have overlapping content. Several authors have pointed out this confusion while other authors have attempted to clarify the differences and define the terms. Knowledge barriers as a term seem to have a partly more obvious content although the borders between knowledge barriers and connecting terms, such as 'barriers to knowledge sharing', seem to blur discussions and views. The aim in this paper is to make a contribution in finding appropriate demarcations between these concepts. After reviewing some Knowledge Management literature, it seems that the three terms, knowledge transfer, knowledge sharing and knowledge barriers, are somewhat unclear and has different meanings depending on the authors views. For knowledge transfer and knowledge sharing, the blurriness is linked mainly to the fact that the analytical level each term is related to has come and gone and come back again. For knowledge barriers, the blurriness comes from the development of the term. The mere existence of the many different categorizations of knowledge barriers implies that the concept itself is blurry. The concept seems clear cut and focuses on knowledge although it is also broad and later sources have included much more than knowledge. This paper concludes by highlighting the effects on the terms when two different knowledge perspectives, knowledge as an object (or the K-O view) and knowledge as a subjective contextual construction (or the K-SCC view) are applied. The clarifications are supported by examples from companies in different industries (such as Cargotec and IKEA) and emergency services.

Keywords: knowledge barriers, knowledge management, knowledge sharing, knowledge transfer

1. Introduction

During the last ten years numerous publications dealing with knowledge management-related issues have been published in journals ranging from *Conservation Biology*, *Post-Communist Economies*, *Childhood* and *European History Quarterly* to more business-oriented journals such as *Research Policy*, *Journal of Knowledge Management*, *Harvard Business Review* and *KM World*.

It can be argued that in aiming for efficient Knowledge Management (KM), the search for "correct" choices of methods and steps is crucial. These choices require a well-defined taxonomy with clear concepts and terms. The content and meaning must be clear cut and there should be no ambiguity about the aim when fundamental concepts are used. Although this is undoubtedly a desirable objective, it is hardly the current state of affairs regarding commonly used terminology in KM. In many cases, the authors use central terms interchangeably and without making a distinction between them and sometimes without sufficient explanation of from which perspective the terms are used.

A fundamental part in knowledge management is to spread and make knowledge accessible and usable within or between chosen organizations. When reviewing KM literature, there are some terms that seem more central and fundamental than others. For example, in the view of the knowledge-based firm *creation*, *coordination*, *transfer*, and *integration* of knowledge creates competitive advantages for firms (Ghosal and Moran 1996 (in Sambamurthy and Subramani (2005))). When King (in Schwartz (ed.) 2006) in addition to the statement above, proposes that *knowledge transfer* (KT) is a fundamental process of civilization and that it is central to learning which in turn is critical to development, there is clear support for exploring the term knowledge transfer. KT is sometimes used interchangeably with knowledge sharing (Jonsson 2008), so in order to explore knowledge transfer, knowledge sharing (KS) should not be ignored. Riege (2005; 2007) argues that the barriers affecting KS and KT have received little attention at the same time that they have a negative effect on KM and its possibilities to deliver a positive return on investment.

Another type of barrier in connection to knowledge was presented by Attewell (1992). He discussed the importance of knowledge barriers (KB) to understand interruptions or slow dissemination of innovations and how KB can be passed or lowered. Attewell (1992) presented KB as lack of knowledge about the technology and how this technology can be applied in an organizational setting. This can be interpreted as if KBs consist of two dimensions.. First, that it is hard to use a system if the knowledge of how to control and use it is lacking. This is a type of knowledge that is tightly connected to the system and its features. Second, it is a type of knowledge of how to implement the use of the technology in the processes of the specific organizations. This is a different type of knowledge where the connection between the organization and the system is not always obvious.

In this regard, KB:s are acting as a perceptual stop. Where there is a KB, new information cannot be understood or interpreted. Even if the functions of the system are known it does not matter as long as knowledge about how to implement it in the organization is not there and vice versa.

Here it is assumed that there is a tight connection between the knowledge in an innovation and the KB. By analogy the term KB is also important to discuss when considering dissemination of knowledge in general as well.

The aim in this article is to discuss terms central to the dissemination of knowledge, to contribute to consciousness about the importance of clarity when using the concepts and to find appropriate demarcations between the concepts. KT, KS and KB are central in considering dissemination of knowledge and therefore are the paper focused on these terms.

As will be shown in this paper the terms KT and KS are sometimes used synonymously or have overlapping content. KBs in themselves seem to have a more obvious content in being some sort of "lack of knowledge". When further examined how to overcome this lack of knowledge, the solutions are quite different depending on what is meant by the term knowledge barrier. In some cases the border between KBs and connecting terms, such as "barriers to knowledge sharing" is very close. In other cases it has another meaning which makes discussions and views blurry if this is not thought through and stated carefully.

The paper is structured in the following way. First, examples from literature are shown to illustrate how this blurriness might be seen. Secondly, the development/change in the use of the terms is shown by presenting findings in literature, related to research in the KM area. Thirdly, key similarities and differences between uses of the terms are presented and discussed. Here, different views of knowledge are introduced using real-life examples since it is fundamental to the interpretation of these terms. Finally, the effects of the different views are discussed.

2. Problem definition

The starting point for the argument is to present examples of articles that state this blurriness, authors that use the terms without any clear distinction, books that use different (and overlapping) definitions in different parts of the text and authors who have different interpretations of these three terms.

2.1 KT and KS

In an article published in 2008, Anna Jonson points out this blurriness by stating: "Within the frame of reference both 'knowledge sharing' and 'knowledge transfer' are used and discussed interchangeably. As it is not clear if there is a difference, both terms will be used." (Jonsson, 2008: 39). Another example is "… many authors and researchers have failed to provide a clear-cut definition for knowledge transfer and, at times, it has been discussed together with the term "knowledge sharing"" (Liyanage*, et al.,* 2009: 122).

There are authors that use both terms when discussing the same concept. For example, one author identifies over three dozen knowledge-*sharing* barriers in one article (Riege, 2005). In a more recent article, the same author uses the term knowledge *transfer* when suggesting actions to overcome the same and similar barriers (Riege, 2007). He even refers to his own research in the following way: "Indeed, organizations wishing to make their knowledge management strategy a success need to pay attention to a potentially more than three dozen human, organizational and technological obstacles to transferring knowledge (Riege, 2005)" (Riege, 2007: 50).

A third clear example of the blurriness is taken from The Encyclopedia of Knowledge Management (Schwartz, 2006) in which several definitions of knowledge sharing, knowledge transfer and knowledge sharing barriers are presented. All of the following quotations are taken from this encyclopedia.

Knowledge sharing is defined, for example, as:

- "The exchange of knowledge between and among individuals, and within and among teams, organizational units, and organizations. This exchange may be focused or unfocused, but it usually does not have a clear a priori objective."
- "An exchange of knowledge between two individuals: one who communicates knowledge and one who assimilates it. In knowledge sharing, the focus is on human capital and the interaction of individuals. Strictly speaking, knowledge can never be shared. Because it exists in a context; the receiver interprets it in the light of his or her own background."

The differences between the definitions of knowledge transfer are perhaps even clearer.

- "Includes a variety of interactions between individuals and groups; within, between, and across groups; and from groups to the organization."
- "The focused, unidirectional communication of knowledge between individuals, groups, or organizations such that the recipient of knowledge (a) has a cognitive understanding, (b) has the ability to apply the knowledge, or (c) applies the knowledge."

Contradictions and discrepancies between the definitions can be found on several levels:

- Sharing taking place between individuals only versus between individuals, teams, units or organizations
- Focused or unfocused versus clearly focused
- A transaction versus saying that knowledge can never be shared
- Unidirectional versus multidirectional

2.2 KBs

One author that made the concept of knowledge barriers known was Attewell (1992) when he referred to knowledge barriers as 'lack of knowledge' about a new technology and how it should be used in organizations. The concept was then used to explain why a specific technology (in that case business computers) did not spread. The "lack of knowledge" element in KBs seems to be rather consistent in literature but what that really means seems to differ somewhat.

In literature, knowledge barriers seem to have been applied from at least three different views:

1. Lack of knowledge about something depending on barriers for knowledge sharing or transfer.

2. Not enough knowledge depending on level of education in a certain area or about a particular topic.

3. The perceptual system in a specific human or group of humans does not contain enough contact points, or does not fit incoming information to utilize it and convert the information to knowledge.

These views are not always easy to distinguish between and sometimes they can be seen more as a scale than being fixed categories with clear boundaries. Depending on which view that is applied, important factors of how to "solve" knowledge barriers are implied.

An example of the first view is when Bundred (2006) exemplifies that knowledge barriers is created when senior staff is reluctant to share knowledge with junior staff in the public sector. In the article the knowledge barrier is only discussed as information not shared between silos. The suggested solutions are primarily aimed at overcoming information sharing boundaries (or knowledge sharing boundaries as transporting the knowledge from one place to another) of different kinds.

Szulanski (2003) uses the concept "knowledge barriers" to describe a set of factors that explains why knowledge might not transfer. This makes it easy to believe that there is a tight and immediate connection between a company's efforts to reach knowledge transfer and the concept of "knowledge

barriers". Although he focuses on transfer these barriers are exemplified with the recipients' level of knowledge prior to the transfer, how well the transferred practice is understood in the organization, and the ability to unlearn. In an earlier paper, Szulanski (1996) refers to three constructs as knowledge barriers, namely the absorptive capacity of the recipient, casual ambiguity and an arduous relationship between source and the recipient. One interpretation of the descriptions of KB:s is, in Szulanski's view, something that disappears if the correct knowledge is given to the recipient and when all pieces are presented to him/her the puzzle can be solved.

An example of the last base might initially be Attewell (1992) in the part when the technology fit, the organizational structure and its processes has to be fitted together. Saemundsson and Holmén (2007) discuss creative processes starting when KB:s are lowered or disappear. This is possible because other knowledge that the entrepreneur has access to can be utilized. Indirectly is this a sign of a connection between the entrepreneurs' perception and thoughts of the world and the disappeared KB.

These discrepancies, differing views and contradictions create blurriness which will have an effect on the conclusions and recommendations provided by authors using these definitions in the same way that a perfectly engineered building might crumble to dust if its foundation is not solid.

3. Development of the terms knowledge transfer and knowledge sharing

In the first part of this section, we try to show the emergence, reemergence and development of KT and KS. Figure 1 is an attempt to visualize the different authors' use of the terms with regards to their level on an individual-industry scale and the publication year. This is followed by the development of KBs.

3.1 The emergence and of KT and KS

Knowledge, its definition, source and method in which it is acquired has been discussed (at least) since the time of the philosophical debates by Aristotle and Plato. We would, therefore, propose that the initial emergence of the terms comes from these discussions and that the suggestions on how to deal with efficient and effective knowledge transfer and sharing has been ongoing to a varying degree of intensity since then.

The reemergence of the terms can be traced to two different streams of research.

The first can be found in product innovation and technology transfer literature in which the relationship and communication between units have been studied (e.g. Allen, 1977; Clark and Fujimoto, 1991).

The second stream is based on the writings of Michael Polanyi and the terms tacit and explicit knowledge. In an influential Harvard Business Review article, Ikujiro Nonaka touches on the issues of KT and KS, even though he does not mention them explicitly. He writes "Explicit knowledge is formal and systematic. For this reason, it can be easily communicated and shared…" (Nonaka, 1991: 98). Later in the same article, he says "This helps create a "common cognitive ground" among employees and thus facilitates the transfer of tacit knowledge." (Nonaka, 1991: 102).

These two streams have, to some extent, merged after Nonaka's original article. Since that article and later articles and books by him (such as Nonaka and Takeuchi, 1995), in which they say that KS is a critical stage in KT) have had a strong impact on the research community, we regard this as the starting point for the reemergence of KT and KS as we know them today.

Since then, the terms have developed gradually and extensively. Initially, the terms were used interchangeably (e.g. Badaracco, 1991; Hansen, 1999) but lately there has been an ongoing separation between them, which we will demonstrate in the following sections.

3.2 The development of KT

During the first years after its reemergence, KT was usually treated in line with the notion of the knowledge-based theory of the firm (Kogut and Zander, 1992; Grant, 1996). One of the most commonly cited authors here is Szulanski, who in numerous books and articles has developed the notion of KT, especially regarding intra-firm knowledge. His early work clearly states that knowledge is regarded as a firm's stock (Szulanski, 1996).

During the late '90s and early '00s, the focus within this area remains on the strategic level with authors who address the question of the role of weak ties in sharing (!) knowledge across organization subunits (Hansen, 1999), others who focus on intracorporate knowledge flows within multinational corporations (Gupta and Govindarajan, 2000) and others who study business unit innovation and performance (Tsai, 2001). One noticeable exception is when the psychological and sociological aspects of this issue merge into the research stream when the effects from extrinsic and intrinsic motivation in individuals on KT within a firm are studied (Osterloh and Frey, 2000).

During this time period, there is a switch from conceptual and theoretically-oriented research towards more empirically centered research. Paulin (2002 and 2006) studies KT processes in the automotive industry with a particular focus on the production process verification process. Schlegelmilch and Chini (2003) present a literature review in which the literature referred to (mainly from 1997 to 2002) predominates primarily in the direction of empirical studies.

More recently published reviews on knowledge transfer still align to the higher level of analysis. Both the review by Easterby-Smith*, et al.* (2008) and van Wijk*, et al.* (2008) have a clear focus on intra- and/or inter-organizational knowledge transfer.

However, Easterby-Smith*, et al.* (2008) identified a number of questions of both theoretical and practical significance to the current research frontier within the area of inter-organizational knowledge transfer and in their question "How does the process of knowledge transfer unfold at different levels of analysis?" they also open up for analysis on the individual level. This diversion from the main track is continued by Liyanage*, et al.* (2009), when they state that "knowledge transfer is the conveyance of knowledge from one place, person or ownership to another." (Liyanage*, et al.,* 2009: 122).

3.3 The development of KS

In the early work presented after Nonaka's HBR article, KT and KS is used interchangeably with predominance towards KT. One author that adopts the term KS is Appleyard (1996). Here, she includes both comparisons on the industry level of interaction (by comparing KS in the semiconductor industry with KS in the steel industry) and on a national level (Japan is compared to the US) using individual respondents. Other researchers in the same stream are Dyer and Nobeoka (2000). Their findings include the statement that Toyota's relative productivity advantages are explained in part by their ability to create and sustain network-level KS processes.

Other perspectives that are strong in the KS stream of research are the psychological and the sociological. Cabrera and Cabrera (2002), for example, include the psychological notion of social dilemmas when analyzing the inclination of individuals to share knowledge with other individuals regardless of the fact that the company that they work for has invested in specific technology to enable such knowledge sharing.

Fernie*, et al.* (2003) has a strong focus on personal knowledge. They argue that knowledge is highly individualistic and that it is embedded in specific social contexts. This article is a good example of the direction within knowledge sharing that is focused on the individual level – context-specific subjective knowledge. Another example of this stream is when KS between individuals in organizations is examined (Ipe, 2003). Here, four major factors that influence KS are identified: 1) The nature of knowledge, 2) The motivation to share, 3) The opportunities to share and 4) The culture and the work environment.

In a recently published article, an in-depth review of articles on individual-level knowledge sharing is presented (Wang and Noe, 2010). They state that their article is the first to systematically review individual knowledge sharing and that previous reviews have focused on technological issues of knowledge sharing or knowledge transfer across units or organizations, or within inter-organizational networks.

Areas of previous studies are:

- Organizational context (including organizational culture and climate, management support, rewards and incentives and organizational structure)
- Interpersonal and team characteristics (including team characteristics and process, diversity, social networks)

- Cultural characteristics
- Individual characteristics
- Motivational factors (including beliefs of knowledge ownership, perceived benefits and costs, interpersonal trust and justice and individual attitudes)

To summarize sections 3.2 and 3.3, a visualization of the different authors' use of the terms based on the organizational level is shown in Figure 1 below.

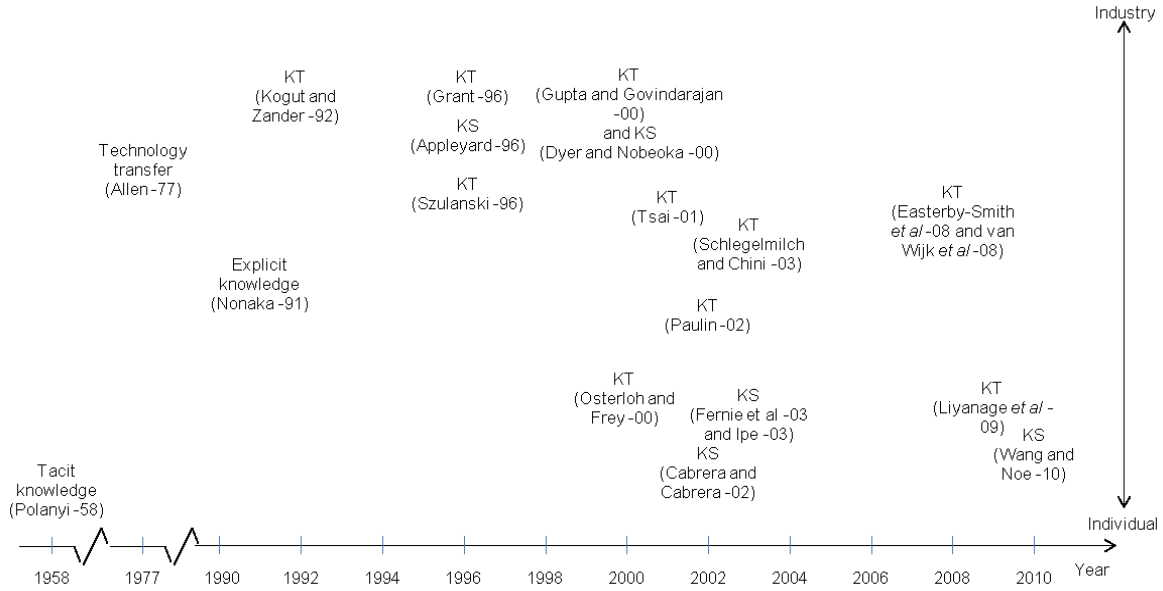

Figure 1: Different authors' use of the terms with regards to their level on an individual-industry scale and the publication year

3.4 The emergence and development of KBs

During the '90s, the spread of computers and the computerization of industry were seen as important. In this setting, Paul Attewell studied factors that inhibited the spread of computer technology in companies. He found that when the companies lacked knowledge of how to use the technology, the possibilities inherent in the technology and the efforts to maintain the technology in the company became barriers to the use of the technology (Attewell, 1992).

Although Attewell's work is important in stating the content and highlighting the term, it has been known and used before in many different settings. For example, a quick search on Google scholar shows that it had been used to discuss the construction of a theory for socialist economy (Zielinski, 1962), Caldwell (1967) used it in a discussion on how knowledge set up a barrier to its own development and in another setting Ramaswami and Yang (1990) claimed that knowledge barriers affected the potential of companies to export.

A similarity here is that knowledge barriers are regarded as a lack of knowledge, which leaves a person beyond all hope of grasping the content of the subject that is being discussed. The lack of a frame of reference from memories and experiences makes the topic impossible to understand or to connect to previous knowledge.

In 1996, Szulanski presented the concept of stickiness. The main purpose of his article was to explain why knowledge and skills might be difficult to transfer between persons, entities and organizations. Factors affecting such transfer were divided into motivational factors and knowledge barriers. Within knowledge barriers, three factors were identified: 1) Lack of absorptive capacity (in which lack of knowledge is a part). 2) Causal ambiguity – uncertainty regarding how aspects of the knowledge interact and respond to factors in the environment as well as uncertainty if necessary factors are present in a given situation. 3) An arduous relationship between the source and the recipient. How easy or frictionless is the communication and intimacy between sender and receiver?

Later, knowledge barriers were divided into three different categories to explain problems in the adoption of complex technologies (Venkatesh*, et al.,* 1999): 1) "Backbone and connectivity" – Knowledge barriers to understanding the technology and regulations of how different technologies are permitted to be used, either separate or combined. 2) The need to understand customers' equipment and the need for interoperability. Lack of such knowledge can be seen as a knowledge barrier on the supply side. 3) The understanding of how customers' applications and services interact with technology and regulations.

Tanriverdi and Iacono (1999) suggested that the technical knowledge barriers presented by Attewell (1992) should be expanded with three additional barriers in order to understand what inhibits the spread of telemedicine. These barriers are: 1) Economic – viewing the economic model in terms of the benefits gained by the organization. 2) Organizational – understanding how use of the technology fits into organizational processes. 3) Behavioral – the potential for the members in the organization to see how the technology functions in, and impacts on, their daily work.

Building on Tanriverdi's and Iacono's work, Suneson and Heldal (2010) suggested that in situations when complex (information and communication) technology will be used jointly by two or more organizations, an understanding of the other organizations and their view of the technology might be needed for efficient use. Lack of understanding might act as an interorganizational KB that impedes co-operation.

4. Discussion

In the research streams presented, similarities and differences in use of the terms can be found.

One common dividing line between KT and KS is related to the levels of analysis, in that KS is used more frequently by authors focusing on the individual level, while KT is used more frequently when groups, departments, organizations or even businesses are in focus (Argote and Ingram, 2000). This view can still be regarded as valid since there is support for this in a more recent review (Choo and Alvarenga Neto, 2010).

However, one suggestion is that the main difference is derived from the basic view of knowledge. In a recent article, Sveiby (2007) focuses on two dominating views of knowledge and their influence on research. The two views are:

- Knowledge as an object (K-O).

Sveiby (2007) exemplifies the stream of research based on this view with numerous references and points out relevant variations on this theme; knowledge contained in stock, derived from its form or content, or as objects implicitly defined by the choice of variables of statistical analysis.

One example of the K-O view when applied is taken from the Finnish cargo handling company Cargotec and their transfer of the manufacturing solution of reach stackers (heavy forklifts) from their main and original manufacturing facility in Lidhult, Sweden to their Shanghai plant in 2005-2006. The strategy was to replicate the manufacturing set-up without (initially) adapting to local conditions. The products were designed to be dismantled, transported to China and re-assembled in Shanghai. On the individual level, the operators from Lidhult acted as teachers and informants for the Chinese operators who visited Lidhult to learn how to assemble the reach stackers.

- Knowledge as something that is constructed in a social context and which cannot be separated from the context or the individual (or knowledge as a subjective contextual construction, K-SCC).

Sveiby states that this view is based on Polanyi's idea of personal knowledge (Polanyi, 1958). Among authors that subscribe to this view, Nonaka (Nonaka, 1994; Nonaka and Takeuchi, 1995) as well as Sveiby himself (Sveiby, 1997) can be highlighted.

A theoretical concept that can be seen as connected to the K-SCC view is the term sensemaking (Weick, 1995).. This is seen as a process to understand the world. In Weick´s view it is an "ongoing", social, retrospective process and it is dependent on the situation it is situated in (which is a construct in itself). The sensemaking process starts from a personal mental model of the world (see e.g. Klein 2008, Endsley 2000). In each situation a human actor is trying to figure out and understand the situation by comparing the situation with the mental model and important cues give an awareness of the situation. Endsley (2000) uses the concept of situation awareness to explain how perspectives of

situations can develop. He uses three different levels to explain situation awareness entailing at level 1 the perception of a situation, at level 2 the comprehension of the situation and at level 3 the projection of the situation. Level 1 is to focus perception on certain cues and events in the surroundings while level 2 discusses how information is combined, interpreted and retained and level 3 is a prognosis of possible future events with the current situation in mind.

An example of the K-SCC view when applied can be taken from the Swedish home furnishing giant IKEA and a concept called "Development on the Factory Floor". Here, the product and the manufacturing process are developed jointly by the R&D engineer and the manufacturing representatives at the local plant. The R&D engineer shares his/her thoughts and ideas about the prospective product with the manufacturing engineer, who in turn shares relevant knowledge about the possibilities and limitations of the manufacturing systems.

These different views of knowledge seem to influence the choice of using KT or KS. In the literature presented in previous sections, there is a bias towards using KT if the author's view of knowledge tends towards K-O and a similar (if not as clear) bias towards KS if the K-SCC view is adopted. KS interpreted from a K-SCC view would contain aspects like trying to create meaningfulness for the participants and an increased importance of socialization (which are aspects similar to those included in the concept of sensemaking).

Since all three terms are closely related, the different views of knowledge also influence the view of knowledge barriers and how to overcome them. If knowledge barriers are regarded as broken transfers it seems like the view coincides with a K-O view. In this view the solution to overcome barriers is to just see to that the knowledge is spread further on to the recipients. Knowledge is rather clear and straight forward in this view. Only when the knowledge is spread and noticed, the solution will be obvious and the knowledge barrier torn down. A knowledge barrier and a failure in knowledge transfer is more or less the same thing, just as that a failure in transfer of the knowledge will result in a knowledge barrier. Knowledge is definitely considered as some kind of object that can be easily moved in this view. Further, the distinction between information, data, and knowledge is not clear. These solutions are hardly possible if a K-SCC view is adopted. Here, knowledge cannot be taken out of context and treated as something to transport. Instead considerations of how the information will fit into the situation and be treated in making sense (in connection to the prevailing mental model) have to be done.

When knowledge barriers are considered as lack of education the situation becomes somewhat more complicated. In a K-O view that kind of knowledge barriers can be lowered by standardized education about a topic. In a K-SCC view, the knowledge fit within the situation and with the recipients has to be considered. If Szulanski's (2003) search for best practices is used as an example, the question would arise if all best practices can be interpreted in the same way in all situations.

Considering knowledge as part of the perceptual system complicates the overcoming of knowledge barriers considerably. This view seems to be closest to a K-SCC view. Knowledge, in a sense, cannot be transferred but has to be redeveloped by each individual. New knowledge has to fit a mental model, be incorporated by sensemaking into this model and by that develop and change it. In this view there is no way to state what knowledge is because of the tight connection to earlier experiences and personal values and background. This means that a knowledge barrier cannot be overcome by just presenting knowledge to the individual by giving access or educate the person in a standardized course. There is a distinct difference between information and knowledge in this case where information is some kind of objective entity presented to the person that that individual might transform to knowledge by its sensemaking. To overcome such knowledge barrier several additional factors have to be considered.

For KBs, it can be said that the original definition of KBs as a lack of knowledge (if you adopt the K-O view), or a lack of possibility to make sense of something (in line with the K-SCC view) becomes blurred and diluted by later contributions.

Szulanski's term 'lack of absorptive capacity' is partly a lack of knowledge (in accordance with Attewell (1992)) but it also allows other influencing factors, such as intelligence or logic skills, to be included. Another of Szulanski's terms is 'arduous relationship'. This factor is hardly connected to knowledge. Instead, it is clearly connected to interpersonal relations. In this sense makes these

different views also the term KB a bit blurry. Another problem with the diversion from the original definition can be exemplified by using Riege. He refers to different experience levels – which might be interpreted as different content in personal knowledge – as a KB (Riege, 2005). Later, he modifies this to "resistance to sharing knowledge because of differences in experience levels" (Riege, 2007: 55) and suggests that this might be overcome by, for example, better integration. When doing this, he redefines the content of a KB from being lack of knowledge (in line with the second view of KBs) or as a part of a perceptual system to become a barrier to KT or KS (in line with the third view). If a K-SCC perspective is adopted, neither of Riege's proposed suggestions would help to overcome differences in knowledge, but only to smoothen transfer of information.

The following example is taken from a study conducted to explore the launch of an information and communication system for public safety organizations based on mobile phone technology. Here, it became quite obvious how many different types of KB interact in the same situation. In this study, user organizations and launching organizations were questioned regarding their impressions of the launch. The user organizations stated that it was problematic and that confidence in the system decreased when observing deficiencies in reception due to insufficient mobile network coverage. However, the specialists in the launching organization stated that they could not understand why that was a cause for concern – it was easily solved by installing a new radio base station. In this example, the traditional technical KB is present and it can easily be identified both from an objectivistic (K-O) view and a subjectivist (K-SCC) view. However from a K-SCC view, two other KBs can be identified: the lack of understanding from the launching organization can be interpreted as a KB related to how the user organizations are constituted. For the user organizations, KBs are not limited to the technical problem (the traditional view of KBs) but also to how the launch of the process to acquire a new base station is started.

5. Conclusions

After having reviewed literature in KM, we conclude that the three terms knowledge transfer, knowledge sharing and knowledge barriers are blurry. The blurriness is related mainly to which with what view and understanding of knowledge that it is used. Regarding use of the terms, there are clear indications that authors who use the term KT have a tendency towards the K-O perspective and that authors who use the term KS are drawn more towards the K-SCC perspective. The view of KBs and the interpretations of how to lower or pass a KB differ depending on the view. To find useful content in any definition, it is necessary adapt it to the specific situation.

What effects would these two perspectives have on our blurry terms?

One effect would definitely be how to manage the processes of KT and KS and KBs related to those processes. If you have a K-O perspective and want to create good conditions for knowledge flow, you amplify the enablers, suppress disabling conditions and overcome obstacles, including the barriers. In a K-SCC perspective, you focus more on the development of "ba" ("ba" is a Japanese word that roughly translates as "space" or "environment" and it was introduced into the KM sphere by Nonaka and Konno (1998)), to better fit individuals who need to develop personal knowledge with the help of those who have already developed it.

The authors of this article believe that the positive effect of KM will improve if a well thought out standpoint of practitioners and researchers would fit the type of problem and the ontological thoughts well. These standpoints needs to be considered also when, for example, IT-systems aimed at improving KM are developed so that functions and content match what is requested.

6. A final thought

Other key terms in KM are also likely to be affected by different perspectives. Even though it is not this paper's original focus, we cannot refrain from making the following comment: The concept "ba" (Nonaka and Konno, 1998) is also affected by the knowledge perspective. From a K-O perspective, "ba" has to do with designing the physical (or virtual) space to optimize KT or KS. However, from a K-SCC perspective "ba" has more to do with the "spacetime" (cf. Einstein, 1905) since the context changes over time and affects knowledge. In other words, a particular line of reasoning and logic built on knowledge seems straight if you have a similar background and experience (or frame of reference) to the individual who harbors the knowledge but appears more bent if you have a background and experience that differs significantly!

References

Allen, T. J. (1977) *Managing the Flow of Technology*, MIT Press, Cambridge, MA.

Appleyard, M. M. (1996) 'How does knowledge flow? Interfirm patterns in the semiconductor industry', *Strategic Management Journal*, Vol 17, No. pp 137-154.

Argote, L. and Ingram, P. (2000) 'Knowledge transfer: A basis for competitive advantage in firms', *Organizational Behavior and Human Decision Processes*, Vol 82, No. 1, pp 150-169.

Attewell, P. (1992) 'Technology Diffusion and Organizational Learning - the Case of Business Computing', *Organization Science*, Vol 3, No. 1, pp 1-19.

Badaracco, J. L., Jr. (1991) 'Alliances Speed Knowledge Transfer', *Planning Review*, Vol 19, No. 2, pp 10-16.

Bundred, S.. (2006), 'Solutions to Silos: Joining Up Knowledge', *Public Money & Management*, April 2006., pp 125 – 130.

Cabrera, A. and Cabrera, E. F. (2002) 'Knowledge-sharing dilemmas', *Organization Studies*, Vol 23, No. 5, pp 687-710.

Caldwell, L. K. (1967) 'Managing the Scientific Super-Culture: The Task of Educational Preparation', *Public Administration Review*, Vol 27, No. 2, pp 128.

Choo, C. W. and Alvarenga Neto, R. (2010) 'Beyond the ba: managing enabling contexts in knowledge organizations', *Journal of Knowledge Management*, Vol 14, No. 4, pp 592-610.

Clark, K. B. and Fujimoto, T. (1991) *Product development performance: strategy, organization, and management in the world auto industry*, Harvard Business School Press, Boston, Mass.

Dyer, J. H. and Nobeoka, K. (2000) 'Creating and managing a high-performance knowledge-sharing network: The Toyota case', *Strategic Management Journal*, Vol 21, No. 3, pp 345-367.

Easterby-Smith, M., Lyles, M. A. and Tsang, E. W. K. (2008) 'Inter-organizational knowledge transfer: Current themes and future prospects', *Journal of Management Studies*, Vol 45, No. 4, pp 677-690.

Einstein, A. (1905) 'Zur Elektrodynamik bewegter Körper', *Annalen der Physik*, Vol 322, No. 10, pp 891-921.

Endsley, M. R. (2000), 'Theoretical underpinnings of situation awareness: a critical review', in Endsley, M. R. and Garland d. J. (eds), *Situation awareness analysis and measurement*, Lawrence Erlbaum Associates, Mahwah, NJ

Fernie, S., Green, S. D., Weller, S. J. and Newcombe, R. (2003) 'Knowledge sharing: context, confusion and controversy"', *International Journal of Project Management*, Vol 21, No. 3, pp 177-187.

Grant, R. M. (1996) 'Toward a knowledge-based theory of the firm', *Strategic Management Journal*, Vol 17, No. pp 109-122.

Gupta, A. K. and Govindarajan, V. (2000) 'Knowledge flows within multinational corporations', *Strategic Management Journal*, Vol 21, No. 4, pp 473-496.

Hansen, M. T. (1999) 'The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits', *Administrative Science Quarterly*, Vol 44, No. 1, pp 82-111.

Ipe, M. (2003) 'Knowledge Sharing in Organizations: A Conceptual Framework', *Human Resource Development Review*, Vol 2, No. 4, pp 337-359.

Jonsson, A. (2008) 'A transnational perspective on knowledge sharing: lessons learned from IKEA's entry into Russia, China and Japan', *The International Review of Retail, Distribution and Consumer Research*, Vol 18, No. 1, pp 17-44.

Klein, G. (2008), 'Naturalistic decision making', *Human factors*, Vol 50, No. 3, pp 456-460.

Kogut, B. and Zander, U. (1992) 'Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology', *Organization Science*, Vol 3, No. 3, pp 383-397.

Liyanage, C., Elhag, T., Ballal, T. and Li, Q. P. (2009) 'Knowledge communication and translation - a knowledge transfer model', *Journal of Knowledge Management*, Vol 13, No. 3, pp 118-131.

Nonaka, I. (1991) 'The Knowledge-Creating Company', *Harvard Business Review*, Vol 69, No. 6, pp 96-104.

Nonaka, I. and Konno, N. (1998) 'The concept of "ba": Building a foundation for knowledge creation', *California Management Review*, Vol 40, No. 3, pp 40-54.

Nonaka, I. and Takeuchi, H. (1995) *The knowledge-creating company : how Japanese companies create the dynamics of innovation*, Oxford University Press, New York.

Osterloh, M. and Frey, B. S. (2000) 'Motivation, knowledge transfer, and organizational forms', *Organization Science*, Vol 11, No. 5, pp 538-550.

Paulin, D. (2002) *Virtual verification: Impact of a new work method on the final verification process*, Licentiate thesis, Chalmers University of Technology, Göteborg.

Paulin, D. (2006) 'The Effects on Knowledge Creation and Transfer in Production Process Verification due to Virtual Prototypes', [online], Academic Conferences Ltd, www.ejkm.com

Polanyi, M. (1958) *Personal knowledge; towards a post-critical philosophy*, University of Chicago Press, Chicago,

Ramaswami, S. N. and Yang, Y. (1990) 'Perceived Barriers to Exporting and Export Assistance Requirements', *International Perspectives on Trade Promotion and Assistance*, Vol No. pp 187-206

Riege, A. (2005) 'Three-dozen knowledge-sharing barriers managers must consider', *Journal of Knowledge Management*, Vol 9, No. 3, pp 18-35.

Riege, A. (2007) 'Actions to overcome knowledge transfer barriers in MNCs', *Journal of Knowledge Management*, Vol 11, No. 1, pp 48-67.

Sambamurthy, V. and Subramani, M. (2005) Introduction to: 'SPECIAL ISSUE ON INFORMATION TECHNOLOGIES AND KNOWLEDGE MANAGEMENT', *MIS Quarterly*, Vol 29, No. 1, pp 1-7.

Sæmundsson, R.J. and Holmén, M. (2007) 'Changes in Entrepreneurial Opportunities: New Capital Goods and Changes in Knowledge-Barriers to Entry', [online], Institute for Management of Innovation and Technology, http://www.imit.se/pdf/reports/2007_146.pdf.
Schlegelmilch, B. B. and Chini, T. C. (2003) 'Knowledge transfer between marketing functions in multinational companies: a conceptual model', *International Business Review*, Vol 12, No. 2, pp 215-232.
Schwartz, D. G. (2006) *Encyclopedia of Knowledge Management*, IGI Global. [electronic], http://library.books24x7.com/toc.asp?bookid=14700.
Suneson, K. and Heldal, I. (2010) 'Knowledge Barriers When Launching new Telecommunications for Public Safety', *In proceedings from The 7th International Conference on Intellectual Capital, Knowledge Management & Organisational Learning*, The Hong Kong Polytechnic University, Hong Kong, China, 11-12 November 2010, pp 429-438.
Sveiby, K. E. (1997) *The new organizational wealth : managing & measuring knowledge-based assets*, Berrett-Koehler Publishers, San Francisco, CA.
Sveiby, K. E. (2007) 'Disabling the context for knowledge work: the role of managers' behaviours', *Management Decision*, Vol 45, No. 10, pp 1636-1655.
Szulanski, G. (1996) 'Exploring Internal Stickiness: Impediments to the Transfer of Best Practice Within the Firm', *Strategic Management Journal*, Vol 17, No. Winter Special Issue, pp 27-43.
Szulanski, G. (2003) Sticky knowledge: barriers to knowing in the firm, Sage Publications, London.
Tanriverdi, H. and Iacono, C. S. (1999) 'Diffusion of telemedicine: A knowledge barrier perspective', *Telemedicine Journal*, Vol 5, No. 3, pp 223-244.
Tsai, W. P. (2001) 'Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance', *Academy of Management Journal*, Vol 44, No. 5, pp 996-1004.
van Wijk, R., Jansen, J. J. P. and Lyles, M. A. (2008) 'Inter- and Intra-Organizational Knowledge Transfer: A Meta-Analytic Review and Assessment of its Antecedents and Consequences', *Journal of Management Studies*, Vol 45, No. 4, pp 830-853.
Wang, S. and Noe, R. A. (2010) 'Knowledge sharing: A review and directions for future research', *Human Resource Management Review*, Vol 20, No. 2, pp 115-131.
Weick, K. (1995) *Sensemaking in organizations*, Sage Publications, Thousand Oaks, California, USA.
Venkatesh, M., Nosovitch, J. and Khan, S. (1999) 'Knowledge barriers to technology adoption: The case of second-generation community networking', [online], http://www.scn.org/the_network/Proj/ws99/venkatesh-et-al-pp.html.
Zielinski, J. G. (1962) 'An attempt to construct a realistic theory of socialist economy', *Economics of planning*, Vol 2, No. 1, pp 87-104.