

Chapter 1

Knowledge Sharing: At the Heart of Knowledge Management

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ABSTRACT

Knowledge sharing is central to knowledge management in organizations. The more tacit the knowledge, the harder it is to share. However, successful knowledge sharing means looking not just at the content of the knowledge, and the people and technology concerned in the sharing, but the context in which that sharing takes place. This chapter discusses relevant theories from knowledge management and other fields. It goes on to present a model covering the time, place and context of the knowledge sharing activity, developed using theories about decision support systems. This forms the final part of a three-stage approach intended to help managers (and others) make decisions about how to support knowledge sharing activities in organizations. Each stage takes the form of a question to be answered, as follows: 1) What are the business processes concerned? 2) What is the knowledge to be shared related to - knowledge creation, knowledge acquisition, knowledge refinement, knowledge storage, or knowledge use? 3) What does this mean for the time, place and context of the knowledge sharing?

INTRODUCTION

Knowledge sharing is a fundamental part of almost any knowledge management (KM) initiative. Not surprisingly therefore, it has been the most researched topic in knowledge management. Ribi re and Walter (2013) demonstrate this for papers published in one journal, *Knowledge Management Research & Practice*, and any literature search will confirm that this is true more generally. However, knowledge sharing is by no means fully understood at the moment. It is a complex activity whose characteristics need to depend on the specifics of each particular situation in which the sharing might take place. Only then will knowledge sharing help an organization to achieve its goals or improve its performance. This chapter begins by considering what the key characteristics of knowledge sharing are. This includes the contentious terminological issue of what the relationship is between knowledge sharing and knowledge transfer. It goes on to explain the difference between tacit and explicit knowledge. Next comes a discus-

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sion of the barriers to knowledge sharing. To capture the complexity of knowledge sharing, far from it being the simple concept of a message passing from one party to another, the chapter then presents a detailed view of knowledge sharing as a process, based on wider theories of business processes.

The key characteristics of knowledge sharing are next identified as depending on time, place and context, as well as the content of the knowledge itself. These are brought together into a proposed model for thinking about knowledge sharing in organizations. Only in very special cases does this amount to something as simple as transmitting a message.

KNOWLEDGE SHARING (AND KNOWLEDGE TRANSFER)

Anyone writing about knowledge sharing has to face the problem of inconsistency of terminology. There are (at least) three different stances distinguishable in the literature, each of which is inconsistent with the other two. This confusion is well illustrated by articles such as that by Lee (2001) who refers to knowledge sharing as “activities of transferring or disseminating knowledge from one person, group or organization to another.” The easiest of the three positions to explain is that many authors use the terms knowledge sharing and knowledge transfer interchangeably (Klein, 2008). However, by contrast, there is a widely-accepted school of thought that regards sharing as being a broader and more complex process than transfer. This school distinguishes between the two along the lines of the definition offered by King (2006): “transfer implies focus, a clear objective, and unidirectionality, while knowledge may be shared in unintended ways multiple-directionally without a specific objective” (p. 493).

Similarly, Berends (2005) observes that “knowledge sharing and knowledge transfer cannot be treated as equals. Knowledge sharing encompasses more than only the transfer of descriptions containing justified factual information” (p. 104). Unfortunately, there is another school of thought, also widely-accepted, which calls this wider activity knowledge transfer, and does not use the phrase knowledge sharing at all. For example, Szulanski (2000), one of our key sources for this chapter, was writing about what he calls knowledge transfer, but he clearly means the wider process we are calling knowledge sharing: “Knowledge transfer is seen as a process in which an organization recreates and maintains a complex, causally ambiguous set of routines in a new setting” (p.10). His latest paper on the topic still follows this view (Szulanski, Ringov, & Jensen, 2016).

Others also use knowledge transfer for the wider activity, such as Levine and Prietula (2012), who refer to the “transfer (or exchange) of knowledge” and from their discussion, and the references they cite, evidently are addressing what we call knowledge sharing. Neither Szulanski nor Levine and Prietula use the phrase knowledge sharing in their articles. The approach that we will take in this chapter regards knowledge transfer as one-way and top-down – usually controlled by the source, whereas knowledge sharing is a broader, more interactive process, including the narrower knowledge transfer as a special case. The quote from Szulanski above raises the prospect that it may be more helpful to think of knowledge sharing as a process than as the transmission of a message, but let us first consider where the latter, mechanistic view comes from.

Shannon and Weaver and the Mechanistic View

Many articles on knowledge sharing still cite the work on communication theory of Shannon and Weaver (1949). The original work by Shannon and Weaver was about the transmission of codes, but crucially

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it did not take into account the meaning of the symbols in the codes. They assumed, for example, that each symbol in the code was equally likely to be transmitted, which is not true for any code related to natural languages, and also assumed that there was no problem in interpreting what each code meant. It is all the more surprising that these citations are common within the human resource management and organizational studies literatures, given the entirely impersonal and mathematical nature of the original theory. Szulanski et al. (2016) ascribe the popularity of this view in those fields to the work of Boland and Tenkasi (1995) and call their contribution the “conduit model”.

Further confusion seems to have arisen in the KM field, in that several often-cited KM authors have referred to the work of Shannon and Weaver, including Boisot (1995) and Davenport and Prusak (1998), but they were not using the theory of communication *per se*. For example, Boisot cited them while discussing entropy. Berends (2005) comments “Informed by the linear communication model (Shannon & Weaver, 1949), knowledge sharing is often interpreted as the transfer of knowledge from a source to a recipient” (p.97). Linearity is, of course, a tempting simplification to make, even when it is not appropriate.

Mingers pointed out as long ago as 1996 that this theory of communication was really about data, and was not even the most useful conception of information for information systems research (Mingers, 1996). In later work, he explains how moving from information to knowledge just compounds the weaknesses of this and similar theories: “they all suffer from inadequate and unclear conceptualizations of the nature of information and its possible relationships to knowledge” (Mingers, 2008, p.65). Szulanski (2000) perhaps has it right - he refers to communication theory as providing a useful metaphor, rather than a model. That therefore gives us the elements of source, recipient, and perhaps channel to think about when considering knowledge sharing, as well as the knowledge itself, the content – but remember as mentioned above that Shannon and Weaver assumed that all codes were equally likely to be transmitted.

TACIT AND EXPLICIT KNOWLEDGE

The principal distinction in terms of knowledge content is that between tacit knowledge and explicit knowledge, usually credited to Polanyi (1966). Knowledge sharing needs to cover both types. Explicit knowledge can be set out in the form of documents or rules and so can be easily stored and retrieved, and hence shared. Tacit knowledge remains in the mind of the knower and is difficult, often impossible to articulate. At best it may be demonstrated in action, but even this is not always possible. Polanyi makes the important point that this knowledge is not even readily accessible to the knower, let alone anyone else.

A misunderstanding often seen in the knowledge management literature is to treat tacit and explicit knowledge as a simple binary categorization. Far from it; most knowledge has both tacit and explicit elements. Knowledge of how to ride a bicycle is mainly tacit, but not entirely so: “sit on the saddle and hold the handlebars” is relevant explicit knowledge, but there is little more. By contrast, the majority of the knowledge of how to fill in most types of form is explicit, and normally to be seen as a set of instructions. But any tacit knowledge that is relevant can be vital. Many years ago, when the author was a student, he ticked a box on a government form to say that he had been “unemployed” during part of the summer vacation, when he should have ticked the box for “not employed”, although this was not apparent from the instructions given. It took twelve months to sort out the problems which resulted! Records management, by definition, only deals with explicit knowledge. Preserving and sharing the associated tacit knowledge is therefore a major problem. A basic but essential element of this tacit knowledge is knowing that the explicit knowledge exists, how to find it and when to access it.

WHAT MAKES KNOWLEDGE SHARING DIFFICULT?

There has been a great deal of work on barriers to knowledge sharing, far more than on its enablers (Collier, Edwards, & Shaw, 2004; Dyer & Hatch, 2006; Inkpen, 1996; Schwartz, 2007; Szulanski, 1996; Teece, 1998). Despite more than a generation of published research into knowledge sharing, it remains difficult to explain why some attempts to share knowledge succeed whilst others fail (Szulanski et al., 2016). Space does not permit us to discuss all of the work in detail in this chapter. Instead, we will concentrate on the work of Szulanski and his co-authors (Szulanski, 1996; Szulanski, 2000; Szulanski et al., 2016). It is significant to note that the 1996 paper refers to the topic as research on the transfer of best practices. The label “knowledge transfer” appears in the extension of the original work (Szulanski, 2000) and is the one used in all the subsequent work, though it continues to be on the transfer of best practices.

A Sticky Situation

One of Szulanski’s main contributions is the idea of sticky knowledge - knowledge that is hard to share even when there is the willingness to do so by both parties. One theme of his research has been understanding the factors that affect this stickiness. The starting point, which has remained the same throughout, is that the degree of stickiness depends on four sets of factors representing attributes of: the practices/knowledge itself, the source unit, the recipient unit and the context in which the sharing/transfer takes place. The specific attributes whose effects Szulanski tested for in his studies (Szulanski, 1996; Szulanski, 2000; Szulanski et al., 2016) are listed below. Most of them are self-explanatory.

Knowledge Attributes

- Causal Ambiguity: The extent to which the members of the organization understand the relationship between the inputs to a practice and its outcomes (King, 2007). This is related to the tacitness of the knowledge: the greater the tacit element of the knowledge, the less likely it is that there is a widely-shared common understanding.
- Unprovenness of knowledge.

Source Attributes

- Source lacks motivation.
- Source not perceived as reliable.

Recipient Attributes

- Recipient lacks motivation.
- Recipient lacks absorptive capacity - originally defined at the organizational level “a firm’s ability to recognize the value of new, external information, assimilate it, and apply it to commercial ends” (Cohen & Levinthal, 1990, p.128) and later also adopted in the literature at the level of the individual.
- Recipient lacks retentive capacity.

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Context Attributes

- **Barren Organizational Context:** A lack of support for the sharing process.
- **Arduous Relationship:** Especially prior to the sharing/transfer in question.
- **Spontaneity:** 2000 study only - a binary variable denoting whether the sharing was ordered from above, or decided at the level of the people involved.

Causal ambiguity and lack of absorptive capacity are consistently found to be the most significant predictors of stickiness problems. Not knowing what explicit knowledge might be available, as mentioned earlier, is one form of causal ambiguity.

PROCESS PERSPECTIVES ON KNOWLEDGE SHARING

As we have seen, in addition to the concept of sticky knowledge, Szulanski (1996) was also one of the first to propose that knowledge sharing should be treated as a process. He suggested a process comprising four stages which he termed initiation, implementation (essentially the decision to proceed), ramp-up (when the recipient starts to use the shared knowledge) and integration. His later paper (Szulanski, 2000) decomposes the effects of the “stickiness” factors at these various stages, and thus serves as a partial validation of this four-stage model. Burns, Acar, and Datta (2011) observe that this model matches the stages of a typical product development cycle well.

However, it is important to note that Szulanski’s focus was entirely on knowledge sharing within an organization; within-firm knowledge transfer, as he called it. Chen, Duan, and Edwards (2006) have extended this model to inter-organizational knowledge sharing/transfer for SMEs, with a framework of five stages: identification, negotiation, selection, interaction and conversion. This is the description from the perspective of the “receiving” organization; the “source” organization is only involved in the middle three of these stages. In both cases this is concerned with the exploitation of existing knowledge, and thus incremental innovation, rather than new knowledge creation and radical change. Absorptive capacity itself has been developed from a process perspective, principally by Zahra and George (2002). They identify the four sub-processes as acquiring, assimilating, transforming and exploiting the knowledge.

These models/frameworks are undoubtedly useful, but they treat knowledge sharing as a self-contained process. For a full understanding, especially of the context, it is important to consider the wider question of why anyone wants this sharing to be taking place at all. This first necessitates a broader look at processes and knowledge management more generally.

PROCESSES AND KM

A common way of thinking about KM, and especially about KM systems, is in terms of the three elements people, processes and technology (Edwards, 2005; Rodriguez & Edwards, 2010). This applies both at the level of the business processes, and of the KM processes that support them (Edwards, 2016). Arguably, thinking about the linkages between the three elements is even more important than the elements themselves.

The linkages relevant to this chapter are comprised of two complementary pairs; those between processes and people, and those between processes and technology.

Two of the linkages are the same at both the business process and KM process levels:

- People help design and then operate processes.
- Processes determine the need for technology.

The other two linkages are subtly different at the two levels. At the level of the business processes they are:

- Processes define the roles of people, and the knowledge needed by them.
- Technology makes possible new kinds of processes.

While at the level of the KM processes supporting the business processes, they become:

- Processes define the roles of people, and the contributions expected from them.
- Technology makes possible new ways to implement processes.

A model such as “people, processes and technology” helps us to think about the question “What is the business process that the knowledge sharing activity is connected with?” This gives an overview of some contextual factors, but having answered this question, we then need to go into more detail and ask “What precisely is the role of the knowledge that is to be shared?” This leads us on to knowledge lifecycle models, also known as KM process models.

KM PROCESS MODELS

Two well-known descriptions of the KM process, although they are really only intended as lists of knowledge-related activities, especially Heisig’s, are:

- Creation, storage/retrieval, transfer, application (Alavi & Leidner, 2001).
- Use, identify, create, acquire, share, store (Heisig, 2009).

New versions continue to appear. For example, Jimenez-Jimenez and Sanz-Valle (2013) present a model of the KM process comprising knowledge acquisition, distribution, interpretation and memory, which they attribute to Huber (1991). Now, Huber was working before the term KM had come into widespread use, so it is not surprising that at the time he described these activities as relating to organizational learning. However, Jimenez-Jimenez and Sanz-Valle (2013) have made significant changes to the names of the constructs: originally they were knowledge acquisition, information distribution, information interpretation, and organizational memory. Changing “information” to “knowledge” is a non-trivial difference!

There are many other such lists/models. Naturally we prefer our own, as shown in Figure 1: note that the store-refine-use loop runs in both directions. This is not simply bias, but because the model in

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Figure 1. KM process model

Source: Modified from Edwards, 2001

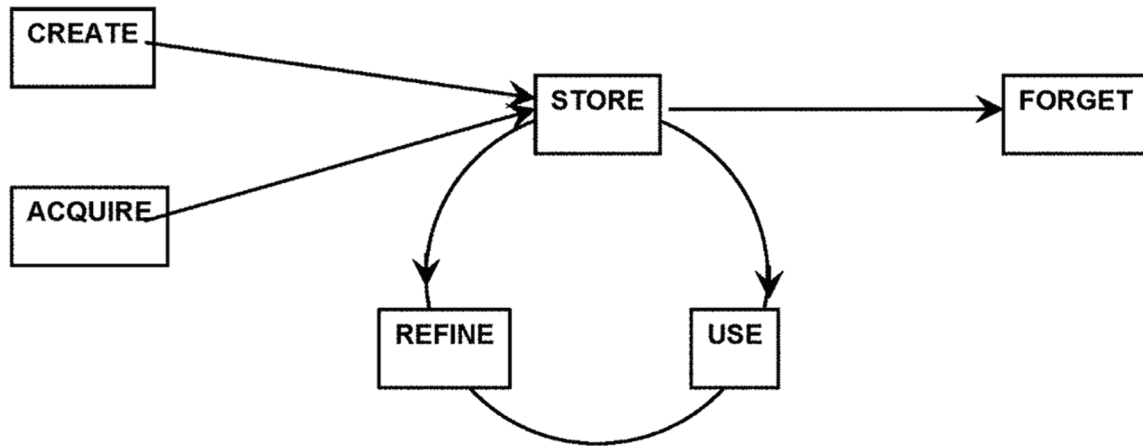


Figure 1 does not include either knowledge sharing or transfer as activities in themselves. We believe this difference in focus is important, since we do not regard knowledge sharing, at least in an organizational context, as an end in itself, but as a means to some wider purpose. That purpose can be addressed in two stages: first, the business process or processes to which the knowledge is relevant; and second, the knowledge-related activity, which is one or more of creation, acquisition, storage, refinement and use - forgetting is a specialized activity and so beyond the scope of this chapter.

Zahra and George's model of absorptive capacity (2002) can be mapped onto the model in Figure 1 straightforwardly. Acquisition is the same. Assimilation maps to storage, transformation to refinement and exploitation to use. Knowledge creation is the production of new knowledge. Many studies of knowledge sharing/transfer, including those of Szulanski, do not cover this activity. It may nevertheless still be partly inspired by knowledge sharing "...many knowledge sharing episodes contribute to the creation of knowledge, by formulating a problem, suggesting a potential solution, contributing to the justification of solutions or stimulating someone to reflect on something" (Berends, 2005, p.104). Once the knowledge-related activities have been identified, the final step is to look at the type of knowledge sharing more closely. To develop the typology, we first look back into work from the 1980s and 1990s.

WHY KNOWLEDGE SHARING?

The specific question that has not been addressed so far is: why share knowledge at all? Put another way, how does it help an organization? The simple answers are first, that knowledge sharing is crucial to the related concepts of organizational learning (Argyris & Schön, 1978) and the learning organization (Senge, 1990). Second, knowledge-related activities, such as those described in the previous section, almost always have a knowledge sharing dimension; the "lone wolf" is a rare character in modern business. This is not to say that lone wolves are completely absent, but while individual contributions are important, from the organizational perspective there is a huge risk in leaving knowledge with just one individual. Additionally, knowledge is not a resource like (say) capital, where sharing that resource

inevitably means that some of the parties involved have less of it. Sharing knowledge with someone else does not devalue it, and theories of intellectual capital suggest that in fact knowledge sharing can have a multiplier effect on the value of that knowledge.

DESCRIBING TYPES OF KNOWLEDGE SHARING

Some of the most relevant concepts for describing knowledge sharing were developed in related fields before the term “knowledge management” was even in widespread use, especially those of Group Decision Support Systems (GDSS) and Computer-Supported Cooperative Work (CSCW). The first two elements came from work by DeSanctis and Gallupe (1985) as part of a typology of different types of GDSS. Originally these related to the duration of the decision-making session (limited or ongoing) and the proximity of the group members (close, i.e. face to face, or dispersed). The categorization has evolved somewhat from the original research, but the dimensions remain as time and place. For our purposes, we have categorized each of these factors as being either the same or different time when and place where the sharing occurs, producing a 2x2 matrix as shown in Table 1. These two factors capture some of the most salient points about the relationship between the parties to the knowledge sharing (source and recipient, in mechanistic knowledge transfer terms).

Grudin (1994), working in the CSCW field, added a third category to each of the two factors by introducing the issue of the predictability of the two dimensions of time and place. This splits the “different” category in each case. For place, different but predictable means the cooperative work is being carried out in several places, all known to the participants. Predictability of time also encompassed the element of constraint or expectation, for example expecting that something would be done by the end of the following day.

We propose to add a third dimension, that of context, with a similar division into three possible values: same; different but predictable; different and unpredictable. This will give three versions of a 3x3 matrix, as shown in Tables 2, 3 and 4. We have tried representing them as a three-dimensional cuboid, but it did not prove to be easy to read.

Context includes the elements from the earlier section on stickiness, and also those which Schwartz (2007) listed under organization. These include the role, experience and education level of the parties involved, and also their motivation. Osterloh and Frey (2000), looking at motivation in the transfer of tacit knowledge, make the important point that intrinsic motivation and extrinsic motivation cannot

Table 1. 2x2 matrix

		Time	
		same	different
Place	same	same time, same place	different time, same place
	different	same time, different place	different time, different place

Developed from the work of DeSanctis and Gallupe, 1985

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simply be added to each other. There is actually a potential conflict when both are present, which they term “crowding out” of one by the other.

Another element of the context relates to codification and especially decodification. Hall (2006) studied decodification in a KM initiative at the UK Post Office. He stresses that “decodification is not simply one of understanding words at face value, but also requires a recipient to possess or acquire context-dependent knowledge necessary both to decodify the codes themselves, and the knowledge codified using them” (p.120). This then ties in with experience and prior knowledge, so that “even to some within the group, the codes had limited meaning because they lacked the underlying knowledge and experience of postal operations” (p.124). This is a crucial element of absorptive capacity, in the assimilation step (Zahra & George, 2002), and also indicates a context high in causal ambiguity.

Parallel issues occur with the sharing of more tacit knowledge. Klein (2008) points out that “The advantage offered by stories is much clearer in the way in which they allow implicit knowledge to be shared, by invoking the framework of assumptions possessed by their audience.” (p.42) but also adds that it is vital that the story teller does understand the assumptions that the audience possesses. This makes sharing over time especially difficult: the author is surely not the only professor to find that a teaching example “story” used successfully for many years suddenly (it seemed) no longer conveyed the desired learning point to the students in the class. Even though none of the elements of the story had actually dated (it did not depend on a specific technology, for example), the students’ shared assumptions had gradually changed until a tipping point was reached and it no longer worked for them.

There are also issues of differences in language, but they are beyond the scope of this chapter.

SUGGESTIONS FOR A MODEL AND AN APPROACH

Tables 2, 3, and 4 show the matrices of the three factors time, place and context, together with some examples of knowledge sharing situations, often embodying the support provided, to fill the cells.

These examples are still a work in progress: indeed, they will in any case need to change as technology advances and business practices change. For example, e-mail no longer implies a predictable place as it did for Grudin (1994), when it could only be accessed from one’s desktop at work, though there are still expectations about reply habits that put it in the “different but predictable” time column. There are some very general “rules”: when interaction is possible, then it is better to do that, especially if it

Table 2. Time and place varying; same context

Context: Same		Time		
		Same	Different but predictable	Different and unpredictable
	Same	Face-to-face, similar expertise	Work shifts with good relationship between shifts	Machine operating sheets
Place	Different but predictable	Video conferencing, similar expertise	Pre-prepared set of slides	Pokayoke
	Different and unpredictable	Engineer in the field telephoning a colleague	Guidelines for fellow professionals	Low-level admin procedures

Table 3. Time and place varying; context different but predictable

Context: Different but predictable		Time		
		Same	Different but predictable	Different and unpredictable
	Same	Face-to-face, different expertise (e.g. different roles within one organization)	Work shifts with arduous relationship between shifts	Team rooms
Place	Different but predictable	Video conferencing, different expertise	Campus-wide learning labs	Collaborative writing
	Different and unpredictable	Video lecture	E-mail	FAQs, workflow

Table 4. Time and place varying; context different and unpredictable

Context: Different and unpredictable		Time		
		Same	Different but predictable	Different and unpredictable
	Same	Hospital emergency department	Advice centre	Public notice board (physical)
Place	Different but predictable	Information kiosk	Teaching material sold on DVD	Equipment manual
	Different and unpredictable	Webcasts, vodcasts (open)	Computer bulletin boards (open)	Blog post

can be immediate (same time). Much research on knowledge sharing therefore assumes same time: this is better still, because the greater interactivity improves the chances of sharing tacit knowledge. The “narrow” one-way knowledge transfer literature always assumes predictability, at least, if not sameness.

So, to summarise the approach, there are three stages, each in the form of a question to be answered, as follows.

1. What are the business processes concerned?
2. What is the knowledge to be shared related to - knowledge use, knowledge acquisition, knowledge refinement, knowledge storage, or knowledge creation?
3. What does this mean for the time, place and context of the knowledge sharing?

FUTURE RESEARCH DIRECTIONS

There are three directions in which more research would seem to be most fruitful. In no particular order, the first is the relationship between context and knowledge sharing. What are the effects of the continuing technology-enabled shift from predictable to unpredictable place, and to a lesser extent from predictable to unpredictable time? The second is the effect of the sequencing of different knowledge sharing activities and supporting technologies. Szulanski et al. (2016) raise the latter as a potential future direction for their research into stickiness. The third is to look more closely at the role of knowledge sharing in knowledge creation, perhaps by linking the operational support for knowledge sharing covered in Tables

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2, 3 and 4 above to the strategic support for knowledge creation described by Nonaka and co-workers in the theories of *ba* (Nonaka & Konno, 1998).

CONCLUSION

Knowledge sharing is at the heart of knowledge management, but can only be purposeful as part of another knowledge-related activity. Just as the emphasis in KM generally needed to shift from the knowledge to the knower, representing a move from object to process, so the emphasis in knowledge sharing or transfer still needs to shift further from the message (the knowledge) to the process of sharing. However, this should not be limited by viewing knowledge sharing as a process in and of itself. In fact, consideration of knowledge sharing needs to be driven by its ultimate purpose, which is most probably knowledge use or knowledge acquisition, though it could be knowledge refinement or knowledge storage, or even knowledge creation. At the more detailed level, we have offered some suggestions for an approach, stressing the need to consider the three attributes of time, place and context, not just the knowledge content. Of course, when it can be done face to face and interactively, then it's much easier(!).

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KEY TERMS AND DEFINITIONS

Absorptive Capacity: An organization's ability to acquire, store, refine and use knowledge from elsewhere.

Business Processes: The activities that an organization performs, for its customers and internally, that literally determine what kind of organization it is.

Explicit Knowledge: Knowledge set out in a form such as documents or rules, also known as codified knowledge.

Knowledge Management Process Model: The activities involved in carrying out knowledge management within an organization.

Knowledge Sharing: A process, usually interactive, by which one person, unit or organization acquires knowledge from another person, unit or organization.

Sticky Knowledge: Knowledge that is difficult to share, even when both parties are willing.

Tacit Knowledge: Knowledge that is difficult or impossible to express.