Tacit Knowledge Taxonomy and Transfer: Case-Based Research

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ABSTRACT

Tacit organizational knowledge is intangible, implicit, and profoundly attached to people (Spender, 2003). While highly complex, it is also a driving force of organizational performance, and its transfer crucial in capitalizing on existing resources (Cross & Baird, 2000). Spender (1998) suggested that tacit knowledge may represent an alternative system of organizational knowledge, and this author investigated this notion. This research is built upon empirical evidence from six knowledge transfer case studies so as to examine tacit knowledge and provide insight into what makes it tacit. Nine distinct, however not mutually exclusive types of tacit knowledge were identified through this research: Skill, Cause-effect, Cognitive, Composite, Cultural, Unlearning, Taboo, Human, and Emotional. Each type can be discerned with its unique set of elements that is essentially responsible for it being tacit, or subjective. In addition, the relationship between the problematic nature of knowledge and its transferability is explored. Various knowledge transfer channels are examined for their richness. Results indicated that no transfer channel was rich independently of the knowledge it transfers, and that all effective channels involved an active 'pull' of the knowledge by its recipient.

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Introduction

The sharing of knowledge across the organization has been shown to be a critical driver of firm performance (e.g., Grant, 1991; Inkpen & Tsang, 2005; Prahalad & Hamel, 1990), especially in multinational corporations (MNCs) (Bartlett & Ghoshal, 1989). MNCs have used knowledge transfers to economize on their existing body of knowledge, or memory (Cross & Baird, 2000), to expand their competitive advantage base, and to ensure that subsidiaries can be upgraded (Kogut & Zander, 1993). While organizational knowledge had been thus recognized as central, literature is still far from fully conceptualizing its complexity (Spender, 2003); a gap that this paper seeks to mend.

Parts of organizational knowledge are more difficult to identify, access, teach or express in explicit terms. Knowledge-based literature coined these aspects *tacit* (Polanyi, 1962) or *subjective* (Spender, 2002), but provides little discussion on what various types of such knowledge may exist. It became evident, through a growing body of literature, that the ability to replicate or transfer such knowledge stood at the core of organizational existence and survival. Teece (1977) focused on the implicit or *unembodied* forms of knowledge. He related mainly to technological know-how, and professed that the international transfers of technology enabled the firm to accumulate a stock of knowledge that was applicable across borders. The characteristics that Teece focused on were the level and the determinants of the costs involved in such transfers. Later Nelson and Winter (1982) focused on the replications of organizational routines, and claimed that possessing the routine's 'template' enabled far better replication within the organization than across organizations. Von Hippel (1994) and Szulanski (1996) related to *sticky* information and knowledge. Their notion was that some knowledge was *sticky*, or "costly to acquire, transfer and use in a new location" (Von Hippel, 1994, p. 429).

This difficulty of transferring tacit knowledge was directly related to what Spender called "the human processes that actualize the firm" (2003, p. 267) since by definition, tacit knowledge is knowledge that is profoundly attached to people. The sharing of tacit knowledge is therefore highly internal and due to its intangibility can not be directly rewarded (Desouza, 2003). Lin (2007) has shown tacit knowledge sharing to have a positive and complex relationship to such highly personal and implicit notions as organizational commitment and trust.

In this paper, the theoretical and empirical investigation of the problematic, emotional aspects of organizational knowledge (Nussbaum, 2001; Spender, 2003) was continued by creating a case-based taxonomy of the different aspects of knowledge that make knowledge tacit or sticky. As Spender stated that "Only if knowledge itself is problematic can we argue that KM is a separate discipline … [to] orthodox economics or OT" (2003, p. 272). Built upon Spender's work, a novel view of Tacit Knowledge in organizations is explored and developed in this paper; one which embodies more of the inherent complexities of knowledge, and provides a more complete multi-faceted framework of analysis and understanding.

As Inkpen and Dinur (1998) showed, the tacitness of knowledge was related to its transferability. Tacit knowledge is inherently more difficult to share and transfer (Nonaka, 1991) and certain transfer mechanisms are more efficient in transferring knowledge of different tacitness (Inkpen & Dinur, 1998). The problem of tacit knowledge transfer was investigated in this paper in depth. Two related questions were posed: mainly, how can the notion of tacit knowledge be unpacked to more fully capture its problematic nature? The secondary question investigated was related to the notion of transfer channel *richness* (Voelpel, Sven, Dous & Davenport, 2005). Is richness a general notion that can include all

types of knowledge (whereas a rich channel is one that allows for better knowledge transfer) or is richness dependant on the type of knowledge being transferred?

The above questions were examined by analyzing six case studies. Nine different types of tacit knowledge were identified in this research. Each type had a distinct set of attributes that made it problematic, subjective (Spender, 2003), or difficult to teach or express in explicit terms (Kogut & Zander, 1996). This new understanding was then used to relate to transfer mechanisms or channels. By understanding what makes certain knowledge tacit, it was also possible to understand which channel would be best at transferring it. This second step resulted in a better understanding of channel richness. One transfer channel may have allowed a certain type of tacit knowledge to be transferred effectively, while being ineffective in transferring another type. The theoretical development in this article took a significant step from the current literature by not only distinguishing between more and less tacit knowledge and the appropriate transfer channels, but also moved to differentiate between one knowledge pocket and another not by *level* of tacitness (Inkpen & Dinur, 1998) but by tacit knowledge *type*. This investigation in turn lead to the contention that different mediums would be more efficient in transferring various types of tacit knowledge.

What follows is first, a discussion on the importance and use of organizational knowledge, both tacit and explicit, in various organizational theories. Second, case-study descriptions and analysis are given. Third, derived from case analyses is a discussion on the tacit knowledge taxonomy, and how it relates to transfer channel richness.

Knowledge Theory Perspectives

Organizational knowledge has played a significant role in various organizational research streams, such as organizational design (Sanchez & Mahoney, 1996), strategic alliances (Inkpen & Beamish, 1997; Mowery, Oxley & Silverman, 1996; Si & Bruton, 1999), and international acquisitions (Bresman, Birkinshaw & Nobel, 1999). Increasingly, organizational research has been centered around knowledge-based theories of firms (Foss, 1996) or on using knowledge as a basis for theory (Spender, 1996). Practitioner-oriented literature, centered on knowledge management and transfer, has also grown (e.g., Cross & Baird, 2000; Davenport, De Long, & Beers, 1998; Kransdorff & Williams, 1999; Voepel et al, 2005; Zack, 1999).

Hedlund and Nonaka (1993) defined knowledge as being constructed from "cognitive perceptions as well as skills and expertise embodied in products or services" (p. 117). They made the distinction between the tacit, intuitive, non-verbalized knowledge and the articulated, "specified either verbally or in writing, computer programs and the like" (p. 118). Other definitions of the term also related to the explicit or tangible versus the implicit or tacit parts of knowledge.

Kogut and Zander (1992) divided knowledge into two categories: information and know-how. Information, or knowing *what something means*, included facts, axiomatic propositions, and symbols. Know-how, or knowing *how to do something*, was the "accumulated practical skill or expertise that allows one to do something smoothly and efficiently" (Kogut & Zander 1992, p. 386; von Hippel, 1988). On a similar vain, Kostova (1999) referred to knowledge as *written rules explaining the practice* and the tacit meaning of it and its value as a separate concept.

The distinction between explicit and tacit or objective and subjective (Spender, 2002) knowledge has stood at the core of understanding and analyzing organizational knowledge. Going beyond such simplified division, however, may have captured more of the complexity associated with the elusive concept of knowledge. Three literature streams have been identified, each treating knowledge differently. Resource-based theory has viewed knowledge as a competency that needed to be protected from imitation to remain proprietary. Integration literature has viewed knowledge as the ability to integrate multiple levels of specialized capabilities. Innovation literature has regarded knowledge as mainly an input, a tool for creating what is more important -- innovation. All three perspectives considered organizations in a different way: a depository of competencies, an integrator of knowledge, and an innovator. As Foss (1996) noted, all such knowledge-based approaches to the theory of the firm have offered reasons as to why some firms do better than others, and they have agreed that knowledge is socially embedded.

Knowledge as Competency

One way to approach organizational knowledge is as an organizational capability (Levinthal & Myatt, 1994; McGrath, Venkataraman & MacMillan, 1994). The resource-based view (RBV) of the firm has focused on the importance of such capabilities (Barney, 1991; Teece, Pisano & Shuen, 1997) and on the conditions that account for the sustainability of competitive advantage gained from utilizing them (e.g., Amit & Schoemaker, 1993; Barney, 1986; 1991; Grant, 1991; Peteraf, 1993; Wernerfelt, 1984). As stated by Conner and Prahalad (1996), "a knowledge- based view is the essence of the resource-based perspective" (p. 477). Using such a view, it is asymmetries in a firm's knowledge bases that account for performance and capability variations across firms (e.g., Barney, 1991; Chen, 1996; Prahalad & Hamel, 1990; Schoemaker & Amit, 1994; Winter, 1995).

As a capability, knowledge has been a critical source of competitive advantage (e.g., Barney, 1986; Hall, 1993; Henderson & Cockburn, 1994; Lippman & Rumelt, 1982). Knowledge's value, thus, may be related to the relative role knowledge has in providing the firm with sustainable competitive advantage (e.g. Collis, 1994; Hall, 1993; Henderson & Cockburn, 1994). As a capability the more knowledge that is shared across a firm the more this knowledge is put to use.

The presence of this additional knowledge leads to greater competitive advantages, therein the higher the value of this knowledge to the firm.

As utilization of knowledge within a firm expands, however, the need to simplify it arises. Specifically the tacit knowledge must be identified in more explicit forms (Kogut & Zander, 1992; Nonaka & Takeuchi, 1995). Inherent in the RBV has been the notion that valuable, rare and imperfectly imitable resources have been key to sustained competitive advantage and financial performance (Barney, 1986; Schulze, 1992). The paradox presented by viewing knowledge as competency has been that knowledge must be shared to fully utilize its value-creating potential. By sharing knowledge, however, knowledge would also be exposed to imitation (Kogut & Zander, 1992; 1993). The sharing process would reduce the causal ambiguity associated with knowledge by simplifying it and putting it in a more explicit form. This simplification has allowed for higher teachability and transfer, although at the same time this sharing has diminished barriers to imitation that stand at the core of viewing knowledge as competency (Reed and DeFillippi, 1990).

Knowledge as Integration

While RBV scholars have regarded the inimitability of knowledge as critical to its value, it has been the combining and integrating of that knowledge, which has enabled value-creation according to the integration view (Grant, 1996a; Kogut & Zander, 1992). A partial resolution to the sharing versus protecting paradox discussed above is that ambiguity-related inimitability and complexity have been tied to a higher hierarchy of combining different types of knowledge. Often regarded as the knowledge-based view (KBV) of the firm (Foss, 1996; Grant, 1996b), the integration view has claimed that the primary role of the firm has been integration of knowledge so as to create organizational capabilities (Grant, 1996a). Knowledge alone does not imply the existence of a capability; capabilities are the integration of individual's specialized knowledge. As Grant (1996a) coined it, the hierarchy of combining has been related to the span of specialized knowledge being integrated. The higher a capability is in this hierarchy, the deeper and wider is the span of specialized knowledge it requires.

Some innovation literature has regarded integration of existing knowledge as a tool for new product development (Clark & Fujimoto, 1991; Nonaka, 1990). Not only new knowledge utilization may lead to innovation, but reconfiguration of existing knowledge may as well. Additionally, Henderson and Cockburn (1994; Henderson & Clark, 1990) defined *architectural competence* as firms' abilities to integrate knowledge, thus achieving higher research productivity. Similarly, Kogut and Zander (1992) referred to *combinative capabilities* as the process of combining new and existing knowledge to create a competitive advantage.

Knowledge as Input

While RBV and KBV have regarded knowledge as the center of firm operations, innovation scholars related to knowledge mostly as a tool for product development. Innovation researchers have viewed the firm as a "knowledge creating [entity]... whose sole business is continuous innovation" (Nonaka, 1991, p. 96) both locally and globally (Bartlett & Ghoshal, 1989; Dougherty, 1992; Franko, 1989). Knowledge has been treated as an input, an intermediary product for the production of innovation (Dorroh, Gulledge & Womer, 1994). The innovation view adopted two perspectives of gathering and inventing knowledge: combining existing knowledge (Clark & Fujimoto, 1991; Nonaka, 1990; Wheelwright & Clark, 1992); and finding management and operational tools for creating and exploring uncharted avenues for existing but unused knowledge (Cohen & Levinthal, 1990; Dorroh, Gulledge & Womer, 1994; Kimberly, 1986; Nonaka, 1991; Nonaka & Takeuchi, 1995; 1994).

While knowledge creation exists at the individual level, its utilization must occur at the organizational and social level (Nevis, DiBella & Gould, 2002; Nonaka, 1994; Nonaka & Takeuchi, 1995). Kimberly (1986) noted that "our ability to develop technological innovations will always outstrip our ability to develop the social and organizational arrangement to ensure their rapid and wide-spread use" (p. 24). The gap between the two levels has been the central issue addressed by the innovation literature.

Kimberly (1986) claimed that such a gap is inevitable, and it has been the role of the manager to minimize it. Nonaka (1994) discussed the spiral of knowledge, or the process by which individual knowledge became organizational knowledge. Knowledge was converted from the individual to the organizational level through four processes; some processes maintained the nature of the knowledge transferred, and some changed it. Individual knowledge was converted through socialization of tacit knowledge and internalization of explicit knowledge to become tacit organizational knowledge. As well, individual knowledge was converted through externalization of tacit knowledge and combination of explicit knowledge to become explicit organizational knowledge. Such processes have enabled the organization to utilize knowledge acquired by individuals thus minimizing the gap between the individual and the organizational level of innovation.

Types of Knowledge

While our understanding of knowledge (whether a competency, integration or input) has grown, theoreticians have remained relatively silent as to the specificities of what they call *tacit*, *implicit* or *sticky* knowledge. KM scholars have recently been attempting to go beyond the distinction between tacit and explicit knowledge as Polanyi (1962), Nelson and Winter (1982), Kogut and Zander (1992), Nonaka and Takeouchi (1995), to name a few, have introduced and explored. Still, however, the field of KM has found itself revolving around the two-by-two notion of Spender (1993). Spender (2003) more recently has contended that knowledge is either tacit or explicit and is held either in the individual or

collective level. This has posed a conundrum since Spender has also maintained that without capturing the complexity of knowledge KM as a distinct field cannot exist. Blackler (2002), for instance, distinguished between 4 types of knowledge: *Embrained* (mostly explicit or can easily codified); *Embodied* (action-oriented and tacit); *Encultured* (collective knowledge that is relatively explicit) and *Embedded* (which represents the tacit elements of collective knowledge). Grant (2002), when he analyzed knowledge assets, distinguished between various taxonomic dimensions: tacit versus articulable, not teachable versus teachable, complex versus simple, an element of a system versus independent, and more. These dimensions provided considerable breadth and depth to the knowledge type discussion. Inkpen and Dinur (1998) expanded on this notion and claimed a continuum of *tacitness level* of knowledge on one hand and *individual-group-organizational-inter organizational* distinction on the other. This continuum however has still confined knowledge management within the basic dichotomy of *tacit versus explicit* or *subjective versus objective*. The author has striven in this manuscript to go beyond these limitations through the identification and exploration of different types of tacit knowledge.

To shed light on the various types of tacit knowledge, next is a discussion of six multinational case studies, including methodology and general detail on each case study. Appendix A provides more details on each case, the knowledge that was transferred, and its transfer process. The theory that transpires from analyzing the multiple case studies will follow, specifying the various tacit knowledge types that emerge.

The Case Studies

Methodology

To capture the illusive and problematic nature of tacit knowledge, this study used the qualitative method. It explored new notions related to the way current literature is looking at tacit knowledge, moving away from a dichotomy-based view and into a more complex, detailed taxonomy. These notions emerged as six knowledge-transfer centered case studies were conducted. Data were collected in these case studies, which suggest a new conceptual framework of tacit organizational knowledge.

The case studies were all conducted on knowledge transfers that occurred within multinational companies. The use of multiple cases allowed for external validity of the study through the use of various environments, industries and companies with varying cultures, countries of operation, strategy, leadership styles, etc. The cases involved U.S.-based MNCs and individual unit-to unit knowledge transfers from US, European and Asian subsidiaries. Firm participation was achieved using varying methods of exposure (professional conferences, direct mail and phone contact), to avoid as much as possible the problem of self-selection. The requirement for inclusion in the study was identifying a structured, project-based

transfer of a practice between two international subsidiaries of the firm. All three firms that fit this requirement were included in this study. Two knowledge transfers were identified for each firm. All identified transfers were included in the study.

Data collection proceeded in three stages. First, companies were contacted to identify a sample that qualifies according to the requirement stated above (Brewer & Hunter, 1989). Secondly, a pilot case study was conducted, where theory and data collection methods were refined. Third, a list of appropriate case studies was identified in each participant firm via a number of phone calls and interviews. To maintain construct validity (Yin, 1989; 2002), at least three in-depth interviews (60-120 minutes) were conducted for most cases: one at source of knowledge, one at recipient, and one with a corporate member of the company that has a close connection to the transfer. Table 1 summarizes respondent information for all cases. Overall, the researcher attempted to contact as many respondents as possible for each case (case 3, for instance, included 23 respondents). To maintain study reliability, a case protocol (Yin, 2002) was established, including interview and case report structure.

Table 1. Case Respondents

	Respondents
Case 1: Japanese Start-up	Corporate: Various top management team members knowledgeable or involved with the transfer. Corporate manager in charge of the Japanese subsidiary. Source: US manager in charge of the transfer. Various US team members involved in the transfer. Recipient: Head of Japanese Subsidiary, who was also the first Japanese recruit and in charge of the Japanese team throughout the transfer. Various managers in Japan who were part of the team sent to the US for the transfer.
Case 2: Mexican Start-up	Corporate: Various top management team members knowledgeable or involved with the transfer. Corporate manager in charge of the Mexican subsidiary Source: US manager in charge of the transfer. Various US team members involved in the transfer. Recipient: CEO and VP of the Mexican subsidiary, both in charge of the transfer and involved since inception.
Case 3: Implementing Performance Management	Corporate: HR manager in the US in charge of transfer. Various other HR personnel involved. A group discussion with managers of various departments involved. Source: Two US managers assigned as leaders for this transfer. Two UK managers involved in the transfer. Recipient: Managers from various subsidiaries involved, throughout the US.
Case 4: New IT-	Corporate: Head of IT department in the corporate office. Group

Based Knowledge Sharing Tool	discussion with managers at the corporate office. Source: The IT manager who designed the IT tool and was in charge of its transfer. Recipient: Various developers and users of the IT tool
Case 5: Japanese Acquisition	Corporate: Various managers in the US in charge or involved with the Japanese merger. Source: Managers from various international subsidiaries which are part of the knowledge sharing network. Recipient: CEO of Japanese subsidiary.
Case 6: Product Development Teams	Corporate: 2 managers involved in planning and executing the team projects Source: A team mentor, with experience in building, supporting and bringing to fruition various product development teams. The interview was focused on her most recently disassembled team. Recipient: Members of the team in question.

Table 1a. Methodological Issues

Main interview questions used for this study	What was your role in this project? Can you describe to me what was transferred? Why was it transferred? Can you explain in detail what exactly did the recipient need to learn? Where was it transferred from? Why? Who were the main people in charge of this transfer? Can you explain to me what they needed to do? To what degree do you think it was successful? Can you elaborate on the reasons? What would you say were the main issues you had to deal with in this transfer? Can you explain? Earlier you discussed (an issue), can you tell me a little bit about this issues? Why do you think it came up? What were the main reasons such issues/problems were encountered? Was anything done to solve the issues/problem? What was it? Was it successful (elaborate on why/why not). How was success measured? What were your (or the company's) expectations from this transfer? To what degree do you think these expectations were met? Why/why not?
Interview Schedules	Corporate representatives were interviewed first. Source respondents were interviewed next. Last were interviewed recipient respondents. At the conclusion to interviews, both source and recipient were asked specific questions on issues raised by previously interviewed respondents that were not raised by the respondent. Such as "one of the people I spoke

	with told me that there was a problem with the fact some of the managers were women. Do you agree? Why/why not?"

Cases were conducted during a period of approximately two years, with the general intent of learning more on best-practice transfers and what makes such transfers problematic. During the analysis of the cases, however, it became evident that *tacit knowledge* was a complex phenomenon that called for more scrutiny. For each of the practice components, respondents were required to discuss the nature of the difficulty, if any, of transfer (see Table 1a for a list of major interview questions). If the practice or some of its elements were not transferred according to the project timeline, budget or outcome expectations, the researcher asked *why do you think such difficulties were encountered?* This question, and the discussions that followed it, provided the researcher with the source of tacitness for each component of the best practice studied.

Table 2 below demonstrates the process through which various practice components were identified as per the nature of their tacitness, and later were loaded on various tacit knowledge types as can be evident in Tables 5a-5f, the case summaries (see Appendix A). The researcher gathered the data that identified the *source of tacitness* for each element of the transferred knowledge. It is important to note that the process of data gathering and analysis did not have the objective of identifying a taxonomy of tacit knowledge. As data were amassed, nonetheless, repetitive patterns emerged. In different cases, same sources of tacitness repeated themselves. For instance, the need to learn new attitudes such as a sense of urgency (Case 6) or empathy (Case 3) was evident in more than one case. In this paper, this type of tacit knowledge is coined *cognitive*. Another example of repetitive sources of tacitness was the need to know people and develop trust (cases 1, 2, 5). This type of knowledge was coined *human*. A detailed discussion on all emergent knowledge types follows in the Analysis section.

Table 2. The process of identifying knowledge types, example from case 1

Practice Component	**Why is it tacit? (Pre-typology question)**	**Knowledge type (Post-analysis result)**
Market Knowledge	□ Lack of clarity as to what will cause success □ Information is complex	□ Cause-Effect □ Composite
Culture and work expectations	□ Change to fit new culture □ Overcome emotional barriers □ Learn new behavioral codes	□ Cultural □ Emotional □ Cognitive
Creating synergy	□ Build network and trust	□ Human
Use of IT tool	□ Practice is required	□ Skill
Fit IT tool to market	□ Must know tool well □ Complex set of options	□ Skill □ Composite

Diversity	□ Overcome clash with Japanese customs	□ Taboo

Case Summaries

Participating MNCs included first a financial service company (cases 1 and 2). While both cases were international start ups (case 1 in Japan and case 2 in Mexico), results dramatically differed. In both cases the source of the best practice was the U.S. subsidiary, and transfers included relatively high involvement and support from the European corporate office. Both transfers required a calibration of an IT-based tool to fit the needs of the local market, and necessitated close work with other subsidiaries, to facilitate, among other things, cultural learning on the side of the recipient and market understanding on the side of the source. The financial markets in Japan and Mexico differed greatly. Also, cultural elements differed, attitudes towards the transfer varied, and the channels used to transfer the best practice were changed. Both cases are summarized in Appendix A, and the results are summarized in tables 5a and 5b respectively.

The second participant is a large chemical MNC with two knowledge transfer projects, both relating to the implementation of new processes. Case 3 was an attempt by the human resource department to implement a new performance management tool that was developed in Europe. In Case 4, on the other hand, a new IT tool that was developed in the U.S. needed to be quickly implemented by various users around the globe. In both cases (which were unrelated, and involved different personnel in different locations and departments), a great deal of unlearning needed to take place for the new knowledge to be absorbed: old ways of thinking, of doing things, of using tools to perform one's job needed to be let go, and new ways learned. While case 3 introduced a relatively simple HR practice to highly educated chemical engineers, case 4 required some recipients to push their technical ability beyond what they were used to. Cases 3 and 4 are described in Appendix A, and the results summarized in Tables 5c and 5d respectively.

The third participant in this research has been one of the largest pharmaceutical MNCs in the world. With many recognizable brand-name over-the-counter and prescription medications, it has used product development teams to launch each new product. Case 6 involved such teams, and the task was transferring knowledge from one, already disassembled, team to another, new and inexperienced one, via the team mentor. To enable the new team to work properly lessons learned from the old team relating attitudes, culture, trust as well as technical and operational details needed to be learned by the new team members. Case 5, on the other hand, involved this MNC's acquisition of a small Japanese pharmaceutical company in an attempt to integrate it into its knowledge development and sharing network. This network is essential to the success of the company and to integrate a new member required overcoming

immense cultural, technical, and trust obstacles. Cases 5 and 6 are briefly described in Appendix A, with results summarized in Tables 5e and 5f respectively.

Analysis: Unpacking Tacit Knowledge

The distinction between tacit and explicit knowledge, as made above, has indicated that explicit knowledge can be articulated, written down, identified and taught with much less effort than tacit knowledge (Ploanyi, 1962, Spender 2002). An illustration of the distinction between the two would be an organizational chart of a corporation (explicit knowledge) versus whom in the corporation has more experience with a certain client, or how to best handle that client (tacit knowledge). As the literature review above has indicated, while others have identified more than two distinct types of knowledge, the prominent view in the literature still contends a tacit-explicit dichotomy. In this section the process of identifying a more complex and comprehensive tacit knowledge taxonomy is detailed. Following that discussion, the various types of tacit knowledge are discussed.

As data were collected for each case, the traditional distinction between tacit and explicit knowledge was used to classify each element in the transferred practices, so that each element was identified as either *tacit* or *explicit*, according to the literature distinction between them (e.g., Kogut & Zander ,1992; 1993; Nonaka, 1991; 1994; Spender, 2003). However it became evident that loading everything that was *tacit* into one category did not encapsulate a great deal of complexity which was inherent in the data. In order to grasp and incorporate more of the variance the data exhibited, each element in the transferred knowledge that was categorized as *tacit* needed to be re-examined. The question that needed to be answered was *what makes this practice component tacit, or difficult to transfer?* Thus a list was compiled, with the various sources for tacitness across the six case studies.

The process of loading different parts of transferred tacit knowledge into a *type* was as follows: First, for each case the researcher listed the various *elements* of the best practice that was transferred. For each *element* the researcher identified through case data, its *source of tacitness*, as described in the methodology section above. For instance, in case 1, market knowledge was transferred (See Table 2 above). What makes this knowledge tacit is the lack of clarity as to what will cause success in the new market. Also, the knowledge itself, even if it can help answer the question of success, is highly complex. In addition, in order for the knowledge to successfully transfer to the recipient, synergy needed to be created with the other subsidiaries. Part of what made this knowledge tacit was the need to build human networks between people and develop trust.

Once the researcher listed what makes each component in the six cases tacit, it was possible to see patterns emerge. There were overall 9 groups of knowledge,

or transferred best-practice components, differing among themselves by the underlying reason they were tacit. Data showed that tacit knowledge loaded into 9 types. Going back to the example given above from case 1, as can be seen in Tables 2 and 5a (See Appendix A), *market knowledge* was categorized as *cause-effect* as well as *composite* due to the nature of its tacitness; while *creating work synergy with other subsidiaries* was tacit knowledge of the *human* type.

Table 2 above illustrates the process through which the various types of knowledge emerged. It is an example from case 1, where each tacit component was analyzed per the root of its tacitness. This process repeated itself for each case, and resulted in Table 4, where a list is provided with the exact basis for tacitness as they were identified. The various types of tacit knowledge emerged as various bases for tacitness did not fit already identified bases.

Transfer Mechanisms

The goal of this paper was to shed light on tacit knowledge, providing a multi-facetted view. Analysis of the six cases has identified nine types of tacit knowledge and (included in Tables 5a-5f in the Appendix) the mechanisms used for each component of knowledge transferred. Table 3 below provides a summary of the various transfer mechanisms evident in the cases, a brief description of each mechanism, and identifies which cases have made use of each mechanism to transfer tacit knowledge.

Table 3. Knowledge transfer mechanisms as evident in cases

Transfer Mechanism	**Description**	**Used in Cases**
Document / Manual / Codification	Formal written material distributed between transfer participants	1,3, 4, 6
Input Control	Hiring the right kind of people for recipient unit, who are perceived to possess personal and cultural qualities, which correspond to the absorption of the transferred knowledge.	1
Cultural immersion/ Long term visits/ Employee exchange	Having source personnel spend a significant amount of time on recipient location, or vice versa (recipient personnel visit source location).	1, 5
Short-term visits	Personnel from source and recipient visit each other's location for a short term.	1, 2, 3, 5, 6
Training/ Presentations/ Face-to-face interaction	Recipient personnel learning knowledge through frontal and experiential exercises, conducted by experts who possess the knowledge.	2, 3, 6

Long distance communications/ Web conferences	Using communication tools such as video- audio- or web- meetings.	4, 5
Expatriate leadership	An expert from the source unit is transferred to the recipient unit as a CEO, significant leader, or part of the top-management team.	2, 5
Hands-on practice/ Inclusion in decision making	Recipient actively uses knowledge or makes decisions based on this knowledge, under the supervision of experts from the source unit.	1, 4, 6

As can be seen in Tables 5a-5f a connection can be made between the type of knowledge transferred, the transfer mechanisms used, and the fit between them. It would seem that certain mechanisms were more efficient in transferring varying types of tacit knowledge. For instance, the two Japanese cases illustrated how *Unlearning* and *Cultural* types could be effectively transferred through long-term visits that immersed the recipient employees in the culture as in Case 1. Sending an expatriate manager, on the other hand, in Case 5 yielded poor results, cultural clashes and resistance. The same type of tacit knowledge were successfully transferred via one mechanism and unsuccessfully transferred via another. Each knowledge type, similarly, will lend itself more easily to be transferred via certain mechanisms. In the discussion below, the detailed taxonomy of the various knowledge types is identified. Each tacit knowledge type is discussed regarding what might distinguish it from the other types. In addition, the fit between certain knowledge types and transfer mechanisms is illustrated so that for each knowledge type, the mechanisms that seem more adequate through the analysis of the case studies are identified.

The Nine Types of Tacit Knowledge

Spender's (1998) investigation into the nature of implicit knowledge concluded "far from being a matter of degree, the conventional interpretation of Polanyi's work, the terms *tacit* or *procedural* may well allude to an alternative system of knowledge" (p. 25). While conceptualizing the entirety of this "alternative system" is beyond the scope of this paper, the results of this research has suggested a much more comprehensive description of organizational knowledge than was offered so far. This author has discriminated between nine types of organizational tacit knowledge. As a note, while having nine separate types is important, one has to accept that they are not mutually exclusive. For instance, often culturally embedded knowledge has a strong emotional ingredient. We labeled such knowledge as *Cultural Emotional*. Once types of tacit knowledge are recognized and provide significant addition to the field, clearly more research would be advantageous.

The nine types of tacit knowledge

1) **Skill**: Skills that need practice, similar to Polanyi's (1962) swimming or bike riding examples. Corresponds to Blackler's (2002) embodied knowledge. Spender (1998) as well as Nelson and Winter (1982) made the distinction between the abstract knowledge (such as Algebra) and activity-based skill, or *techne*, such as carpentry. The data suggested that to transfer this type of knowledge, hands-on practice with experts, or other kinds of apprenticeship that allows for close contact, observation and practice are best. This type of knowledge can be seen in Case 2, for instance, where multiple hands-on short-term visits were more effective channels than frontal seminars.
2) **Cause-Effect**: Non-linear or erratic cause-effect relationships, such as how to diagnose and repair a complex machine. Due to its problematic nature, to internalize this type of knowledge, the recipient could not effectively utilize a list of options or a manual. There was a strong sense of intuition or insight (Simons, Egidi, Marris & Viale, 1992) that was needed in order to be able to access and use this type of knowledge. This is related to what Winter (2002) coined as *not observable in use*. This type of tacit knowledge seemed to be related to complex problem solving, such as in Case 4, where only strongly committed users were able to internalize the knowledge.
3) **Cognitive**: Knowledge that is cognitively complex (Borgatti & Cross, 2003; Hollingshead, 1998). Attitudes, intentions or thoughts, such as how to know a client is lying. In case 3, for instance, a sense of empathy and making an employee feel a certain way was attempted to be transferred via detailed manuals. Not only was that transfer strategy a *push* that did not create a sense of desire in the recipient to *pull* it, but also it was ineffective in conveying attitudes or feelings.
4) **Composite**: When a large array of varied, complex information exists, such as plays at football or human anatomy. This type of knowledge was not so much about problem solving, such as Cause-Effect, but more about sheer volume. To learn all the organizational practices involved in a start-up, for instance, Case 2 source used frontal presentations, which were mostly ineffective. While relatively easier to codify and self-learn, this type was considered tacit since only internalization could allow for adequate access to such multiplicity of information.
5) **Cultural**: Deeply culturally embedded concepts, that the source of knowledge takes for granted, such as how to behave when given a business card from Japanese counterparts. This often is related to as a collective knowledge, such as in Blackler's (2002) *collectively embedded knowledge*. To the individual, there was a sense in inaccessibility of this knowledge (Spender, 1998) that stems from this knowledge being "taken for granted" (Schutz, 1972). This can explain why in this research, only long-term exposure to such knowledge through socialization resulted in its internalization.
6) **Unlearning**: A new way of doing the same thing, requires unlearning of past behaviors. Many culture-related behaviors needed to be unlearned in Cases 1, 2, and 6. This type of knowledge, however, exhibited itself also in organizational knowledge such as in Case 4, where cooperation of recipient could only be achieved by unlearning the notion that the IT unit is a group of

"do nothings". Similarly, performance management practices that were already in use never changed, since no attention was given to the fact previous practices needed to be unlearned before a new practice could be accepted in Case 3.

7) **Taboo**: Taboo-related or socially loaded knowledge. Due to its covert nature, Taboo knowledge was difficult to observe. It was evident in Case 3, where the women interviewed noted that the Japanese recipients seemed shocked to see them and took time to open up to them. When asked, one Japanese respondent confirmed this notion to the researcher, though with some discomfort. To transfer Taboo knowledge, it must be recognized and dealt with in order to change its taboo status.
8) **Human**: When using the knowledge requires human relationships and trust. Winter (2002) referred to some knowledge assets that were not independent but existed as an element of a system. Such as in Case 5, where using the transferred knowledge was an integral part of the relationships between the various source units. Organizational learning literature referred to this as *social relationships* (Borgatti & Cross, 2003) and their importance for acquiring information (Allan, 1977; Burt, 2000).
9) **Emotional**: Emotion is a type of tacit knowledge (Spender, 2003). This type related to knowledge that was challenging to one or more of the parties, since it tapped into an emotional issue. In Case 3, a human-resource skill was transferred to scientists, who later reported to never ask for help in implementation since it tapped into an emotional barrier of acknowledging that they as educated as they were required additional training; especially from Human Resource executives whom they considered less educated than themselves.

Transfer mechanisms

As Spender (2003) noted, tacit knowledge is "acquired through activity and retained in action systems" (p. 275) as opposed to explicit, or objective knowledge, that is carried and learned through language. Indeed, most types of tacit knowledge that were observed in the Case studies were effectively transferred through action. Hands-on training, apprenticeship, and long-term immersion in culture seemed effective in transferring Emotional, Cultural, and Unlearning types of tacit knowledge. Implicit, subjective knowledge could only be transferred through *pull* or channels that required the recipient to actively seek learning. Without the desire of the recipient to accept tacit knowledge (thus actively participating in the transfer) implementation did not occur.

What, then, is a *rich* transfer channel? For tacit knowledge, a rich channel will always be one that actively involves the recipient, as Szulanski (1996) noted in his discussion of recipient motivation. Besides that, the effectiveness of the channel will be determined according to its suitability to the type of knowledge transferred. The more deeply rooted the knowledge is in the psyche of the

source, more time and immersion is needed from the recipient. Table 4 summarizes the nine types of tacit knowledge. It highlights the most prominent

Table 4. Summary of knowledge types, transfer barriers and channels

Knowledge Type	Major Transfer Barrier	'Rich' Channel should provide
Skill	Requires expertise through practice	Hands on practice Apprenticeship Long term visits
Cause-Effect	Non-linear relationship. Need to develop intuition.	Codification when possible Time and hands on practice Apprenticeship
Cognitive	Attitudes and feelings are extremely personal experiences	Hands on practice Long term visits Apprenticeship
Composite	Too much complex, varied information	Codification Exposure to information from various perspectives Time and use of information
Cultural	Unaware, collective, taken for granted	Socialization through long-term exposure Skilled outsider observes and codifies practice when possible
Unlearning	Requires going against one's nature	Codification Long term visits Dialogue on issue Psychological tools Apprenticeship
Taboo	Socially risky or prohibited to articulate	Shed light on the issue where possible, directly or indirectly. Psychological tools
Human	Need to know people and develop trust	Codification Long term visits Social Interactions Apprenticeship
Emotional	Requires breaking an emotional barrier	Confront Issue Psychological tools Apprenticeship

feature that makes each type tacit, and includes suggestions for some transfer mechanisms that could be considered rich channels for each type.

Conclusions, Limitations and Future Research

The goal of this paper was to unpack the notion of tacit knowledge, and more fully theoretically capture its problematic nature. The author has investigated this question through a series of knowledge transfer Case studies that were analyzed according to the type of knowledge that traveled from source to recipient and the various mechanisms used to transfer it. Nine distinct, however not mutually exclusive, types of tacit knowledge were observed. Each type can be discerned with its unique set of elements that are essentially responsible for it being tacit.

In addition, the author wished to move beyond a general discussion of "transfer channel richness" by better understanding the relationship between the problematic nature of knowledge (Spender, 2003) and its transferability. The main contribution this paper offered, besides providing a tacit knowledge taxonomy, is the understanding that channel richness was not an independent characteristic or variable of the transfer mechanism. Certain transfer mechanisms were observed to be more effective in transferring different knowledge types. Conceptually, channel richness must remain strongly related to the type of knowledge traveling through it.

While great effort was put into designing a research that is valid and can be generalized, one must acknowledge the inherent limitations of the research methodology. Validity was established through collecting case data using multiple respondents. However, the fact that the data was collected and analyzed by a sole researcher limited this research's external validity and generalizability. In addition, this study put forward results attained from re-examination of existing data. While providing significant contribution to the field of knowledge management, a study pre-designed and designated to investigate various types of tacit knowledge would have been preferred. One of the main advantages of conducting multiple, in-depth case studies is that such methodology lends itself to emergent theory rather than to testing existing ones. This is a crucial first step in advancing the field of knowledge management in organizations.

Being a first attempt in unpacking tacit knowledge, and considering the complex and difficult nature of such knowledge, more research attention should be given to further clarify and detail tacit knowledge. It is possible that more archetypes could be identified, but more importantly, it would be valuable to know in what way are the different types inter-related. The author has observed that some types often appear together, such as Cultural and Emotional. Is this a coincidence or does it have a basis that could be theoretically explored? What other types tend to co-appear, and why? Expanding upon this theory-building piece, perhaps more quantitative-centered research could clarify such questions using such statistical techniques as analysis of covariance.

Additionally, the author did not have sufficient data to prove causal relationship between types of tacit knowledge transferred; mechanisms used, and transfer success. However, there is enough evidence in the above study to suggest that such a relationship may exist. Further research might shed more light on this

causality, potentially providing valuable insight to managers involved in transferring tacit knowledge. If one understands the underlying reason behind what causes knowledge to be tacit, one can choose a transfer mechanism that targets that cause, thus making the transfer more efficient, and in some cases – saving it from failure.

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Appendix: Case Study Descriptions

Knowledge transfer case studies are briefly introduced below, across four main aspects: why transfer; what was transferred; transfer process, and tacit knowledge. In addition, tables 5a-5f provide more specific information regarding the various elements of the transferred tacit knowledge, as well as a break-up of the types of knowledge transferred and the mechanisms used. In addition, Tables 3 and 3a provide additional methodological specifications such as respondents for each case and main interview questions.

Case 1: Japanese Start-up

Why transfer: The company provides financial services worldwide, and recognized the opportunities presented by the Japanese market. Japan represented both a new market and a gateway to the entire region. Responding to the local needs was perceived as very important, and an assessment was done at the corporate level for fit between the local market and existing systems and products worldwide.

What was transferred: The case focused on a transfer of a best practice from the US unit to the new Japanese Startup. The knowledge transferred was extensive and covered many areas of a unit's operations: from selecting the right local team to training, establishment of a product line, dealing with local authorities, etc. The company operates mainly as a mediator: coordinating and controlling transactions between outside fund managers and outside distribution agents such as brokers and banks.

Transfer process: There is a strong belief in the Company regarding the importance of hiring the right people for the job. Here they looked for Japanese that were not typical: the aim was to narrow the cultural differences by picking people that started out being closer to the Company profile: open to diversity, non-traditional, willing to share ideas and work together as a team. Their motto is "Hire for attitude, train for skill". The head of the Japanese unit was educated in the US and lived there for a few years. This reduced most of the language barrier and enabled some cultural alignment. This person was responsible for hiring the rest of the Japanese team.

About 4 months after the initial meetings in Japan, part of the Japanese team came for about 6 months to the US to finalize the product. The Japanese team came to the US with a written report on the Japanese market's assessment and needs. A few iterations of programming and testing yielded a completed product. During these months the Japanese got an opportunity to be exposed to the way business is done in the US. The organizational culture could penetrate to a certain degree, and better communications could develop as well as trust. One of the most important themes in the US is "Knowledge is power, but only if you share it". Various cultural and language problems were encountered along the

Table 5a. Case 1; Japanese Start-up

	Knowledge type	**How it was transferred**	**Comments**
Knowledge of the Japanese market	**Cause-effect**: unclear what the market needs are and what may cause success **Composite:** an extensive amount of complex information	Document	Document was not perfect but was accepted with its limitations. Excessive amount of stress was reported with connection to the seemingly impossible task
Organizational culture and work habit expectations	**Cultural:** the Japanese needed to accommodate themselves to the requirements of a significantly different culture. **Emotional:** by overcoming many emotional barriers **Cognitive** and learning attitudes and behavioral codes	Input control, long-term cultural immersion in US	Reported as extremely difficult for the Japanese but also very successful. 'Boot-camp' style living for 6 months, away from all that is familiar including family members.
Creating work synergy with other subsidiaries	**Human**: need to build a network of acquaintances, to know whom to talk to in what circumstance, building trust.	Long term visit in the US. Shorter regular visits at other subsidiaries	
Use of IT-based tool	**Skill**: require a great deal of practice	Long-term hands-on practice with knowledgeable users	
How to fit IT-based tool to needs of market	**Skill**: Require extensive knowledge of IT tool, **Composite:** complex set of options	Long-term hands-on training. Codification.	
Learning how to work with Women managers	**Taboo**: Clashes with Japanese customs and beliefs, and is not to be openly discussed		The issue was not addressed as part of the knowledge transferred. Japanese seem to have adapted to the notion of working with women non-Japanese executives.

way, as well as personal and adjustment difficulties for the Japanese team in Japan and in the US.

After returning to Japan, continuous contact was maintained between the US, UK, Stockholm and Japan, where the Japanese were pushed towards the most effective utilization of the transferred knowledge. Leadership is evident both by example during the period of long-term visits, by pushing the source to be their best, and by continuously addressing and solving problems. Periodic meetings occurred every 3-4 months and many phone conversations and e-mails enabled the completion and implementation of the transfer.

Tacit knowledge: Table 5a summarizes the various types of tacit knowledge that was transferred. On one hand, it was important to learn the local Japanese market in order to customize an IT tool that would fit it best. On the other hand, in order for the Japanese unit to work in synergy with the rest of the organization, an intense cultural experience was involved, attempting to bridge a significant cultural (both national and organizational) gap. While some codification practices were used, the transfer relied heavily on long term exposure and training to the cultural and technological parts of the knowledge. This enabled trust to be developed as well as the necessary social ties to result in a highly satisfactory transfer.

Case 2: Mexican Financial-service Start-up

While this case took place at the same company as in Case 1, at the Mexican start-up operation, it was significantly different both in the type of knowledge transferred, the transfer mechanisms used and the overall satisfaction with it.

Why transfer: The Mexican site was chosen following the establishment of the NAFTA agreements. A new, large market was identified and attempted penetration started in 1994. To allow for the new subsidiary to operate, knowledge of the Mexican market needed to be transferred to HQ and to the US executives in charge of the new subsidiary. In addition, knowledge of the company and of the IT tool needed to be transferred to the Mexican subsidiary.

What was transferred: A major difference between the Mexican and the US market was the culture of customers. While in the US there is a general habit of saving and using mutual funds, in Mexico it is almost nonexistent. This issue was perceived by the source as well as the recipient to be one of the major reasons behind difficulties in implementation of transferred knowledge. There was a real need to train people on both sides of the business transaction: from employees to lawyers, auditors, government officials and more. The recipient therefore was giving various training opportunities such as conferences to the entire community. The issue of customer habits on one hand and education of professionals on the other continues to influence the operations of the Mexican subsidiary.

Additionally, it was required to establish a subsidiary that is technologically, operationally and culturally in line with the rest of the organization. Work processes, attitudinal expectations as well as an IT-based tool were transferred from the US to Mexico.

Transfer process: Following the initiation of the project, the entire establishing team traveled to the US a few times, for periods of 1-3 weeks at a time. Specifically, global level meetings with other IT people and with the head of IT at various stages of the process were instrumental in the knowledge transfer. These trips had a specific goal of creating social contacts, talking with people who have already transferred and received similar knowledge. These trips were relatively unstructured, and allowed for contact at the individual and group levels. Most of the Mexican team was already employed by the company and had some previous knowledge of the company as well as the Mexican market.

Similarly to the Japan case, an IT tool needed to be developed and adapted to the new market. The IT Mexican team worked in conjunction with American as well as Columbian IT people to adapt the system. A one-week visit took place in the US. Additional frequent meetings and e-mails enabled the completion of the process.

Additionally, the representative of the American source that headed the transfer, traveled very often to Mexico. The recipient also contacted various units that already received similar knowledge and "asked for advice". Visits followed where the recipient unit hosted representatives from other past recipients from Europe (especially Germany). The recipient unit perceives itself to be more culturally similar to European units than to the American, source unit. It was believed that contacts with European personnel would therefore yield more successful results.

Tacit Knowledge: Throughout the case interviews, the importance of being part of a larger, tight-knitted company was stressed. Cooperation, trust, good communications and the exchange of ideas are noted as critical to the recipient's success. Independence and high trust are promoted and no one is expected to go "by the book". The important goals are outlined and incentives are put in place to achieve these goals. Additionally, new people joining the company needed to have the right attitude, and employees are always involved in business decision and operations. As can be seen in Table 5b, the process of transferring knowledge involved in unlearning through seminars alone was unsatisfactory. As well, the lack of long-term visits may have affected the overall success of the transfer since the knowledge was mostly of the Human, Cultural and Cognitive tacit knowledge types as detailed in the taxonomy.

Table 5b. Case 2: Mexican Start-up

What was transferred	Knowledge type	How it was transferred	Comments

Knowledge of products and services to local market players such as officials, customers, accountants and decision makers.	**Unlearning, Emotional**: required Mexicans businesses and authorities to totally rethink the way they view the financial management choices – choices that may be emotionally entrenched.	Seminars	The transfer does not seem to have been successful, since the lack of knowledge at the local market was attributed as the main source of difficulty of the Mexican unit.
Becoming a part of a collaborative community. Finding solutions to problems throughout the organization	**Human**: getting to know people and develop a relationship of trust and collaboration	Short term visits	This required many repetitive visits. A few short term visits did not seem sufficient
Organizational culture and HR practices	**Cultural, Cognitive**: learning of attitudes, believes and values – many of them are culturally embedded at a 'taken for granted' level.	Expatriate leadership: having a source-nationality CEO for the first year, continuing with close contact with leadership	
Various organizational practices	**Composite**: learning complex ideas of how to make the unit succeed while incorporating it into the organization	Face to face interactions and structured presentations	"We support, not dictate, we provide policies, not manuals". This approach resulted in some operational difficulties in the Mexican unit
Use and adaptation of IT- based tool	**Skill:** require knowledge and experience in IT tool	Multiple short-term visits	

Case 3: Implementing performance management

Why Transfer: The case took place in a multinational company attempting to transfer a Performance management practice into its US units thus creating a company-wide HR practice. The strategic goals associated with the knowledge transfer were threefold: First, The Company needed to incorporate an almost paradoxical combination of having a structure similar to one of a holding-company on one hand and a history of family-oriented culture on the other. While

the culture was one of flexibility and low accountability, the structure presented an extensive complex multitude of locations, sizes, and goals. Achieving company-wide consistency was viewed by top executives as a way to bridge the gap. Successful transfer of consistent employee development and appraisal across the entire organization was the one of the first corporate attempts of achieving such consistency. It would enable higher levels of accountability as well as a critical common denominator crossing all organizational units.

Secondly, the importance of aligning employee behavior with stakeholders' expectations became evident, and adequate performance management was hoped to allow for better alignment. Thirdly, The Company's executives recognized the need for higher-level employee development coupled with a stronger connection between outputs and rewards. The existing performance evaluation practices across most of the company did not take advantage of tying evaluation with either personal improvement or rewards. Exceptional in these characteristics was the UK-based practice that was implemented across most of The Company's Western European operations.

What was transferred: The short-term goal was thus set to transfer the UK performance management practice to US-based units via the US-based headquarters.

Transfer Process: The practice first went through a process of turning parts of it into explicit form: Articulation of tacit knowledge and combination of the more explicit (Nonaka 1994). In addition to the written material that was produced as a series of booklets and distributed across the US, a training program was developed. The program involved the short-term travel of UK experienced personnel to teach layers of US executives in the employee evaluation and development practice. The estimation was that lower-level management would learn both from the training session and from experiencing being evaluated themselves via their upper-level managers.

Tacit Knowledge: Despite more than three years of attempts, the knowledge transfer was only marginally successful. Only two out of nine US units were estimated to effectively implement the transferred practice. The material that was sent to recipient executives was vast and thorough, containing a workable explicit representation of a practice that is mostly tacit. It could be that reading the material would have enabled the executives to implement it, but most of them never got to read it. Few of them had the time to read the hundreds of pages included in the manuals. Most of them didn't see the point in reading the material, and no incentive was set to ensure that they do. The training sessions were few and unpopular, and resulted in patchy implementation of the practice. Table 5c illustrates the lack of fit between the Cognitive, Emotional and Unlearning nature of the knowledge – with the transfer mechanisms used, that lost those specific attributes that were most important in implementing the knowledge. Namely: cognitive and emotional elements.

Table 5c. Case 3: Implementing Performance Management (PM)

What was transferred	Knowledge type	How it was transferred	Comments
A new PM practice	**Cognitive**: a complex process of employee development. Requires sensitivity and empathy. **Unlearning**: PM was already taking place in an unsatisfactory way	Manuals Training Limited short-term visits from source to recipient In two distinct cases was transferred through hands-on training by dedicated leaders	The practice was not implemented in most of the organization. Clear lack of fit between tacit knowledge and transfer mechanisms. Implementation was successful only in these two units, where leaders were committed to the success of the transfer.
An ability to accept practices from corporate without changing them	**Emotional**: clashes with employee's needs to reinvent every process they encounter	Manuals	Not addressed or recognized as a separate need.

Case 4: New IT-based knowledge sharing tool

This knowledge transfer case takes place in the IT unit of a large multinational company (Fortune 500). It involves the transfer of a computerized tool that allows the movement of data across servers. The source of the knowledge is an individual developer located in Pennsylvania. The recipient targets are a small group of developers located around the globe.

Why Transfer: Before the transfer took place, an IT system was in use across the company, with entire infrastructure personnel to support it. On the other hand, the internal customers of this IT had little knowledge regarding the existing applications: What was available, how to use it, what was it good for, how to tackle problems, etc. As one source respondent put it, the IT infrastructure unit was considered "the id black hole" (referring to the Freudian notion of the id as the satisfier of basic urges, needs and desires). Many employees were referred to as "do nothings" by their internal customers, while the customers were viewed by the employees as "unreasonable". The customers were generating applications and other needs for the IT system, but they could not rely on the infrastructure units to "make these things happen". Hostility, lack of cooperation, and lack of coordination were the main characteristics of the system.

A new IT-based communication system was thus developed, to enable better resource-allocation, coordination, and the availability of solutions to the community of developers. Besides the IT application, a system of leadership, stewardship, and team building was designed and put in place. This leadership

encouraged multi-cultural exposure of employees to enable better communication with the rest of the organization. The communication between the two elements of the IT system (developers and infrastructure personnel) incorporated three enablers: web sites specifically designed for this use, bi-monthly teleconferences, and a mail interface were implemented.

What was transferred: An IT knowledge management system was developed at a northeastern American location. This solution enabled overcoming the complex nature of the problem by a simple point-and-click application. Since replacing the existing system was a must, the availability of this solution was critical to most users.

Transfer Process: The above-described IT mechanism of knowledge transfer was used to make the solution available across the organization. The explicit elements of the knowledge (i.e. computer program and its manual) were available to download from the internal web, and a teleconference was scheduled to discuss more implicit elements. Additionally, the IT tool web site included a list of frequently asked questions, where the developer as well as the users could post questions they encountered in implementing the knowledge, together with the solutions they found to be effective. The IT-based system of knowledge sharing was the major vehicle of transfer. There was a heavy reliance on manuals, lists of questions and answers, and shared database. A more limited use of teleconference and e-mail supported the transfer where needed. More heavy reliance on personal interactions occurred in more eventful transfers.

Tacit Knowledge: Table 5d shows that some of the knowledge was of the 'unlearning' type, and was not efficiently transferred through the IT system. The Cause-effect and Skill types were more effectively transferred, but only to the users that had internal commitment to receive the new knowledge and learn how to implement it.

Table 5d. Case 4: New IT-Based Knowledge Sharing Tool

What was transferred	Knowledge type	How it was transferred	Comments
A new way of thinking about the IT infrastructure unit	**Unlearning**: change of attitude as well as usage of system and reliance on it.	By inclusion of internal customers in decision making process and specifically addressing their needs	The process was slow but once applications started using the system successfully, the implementation rate picked up quickly
How to use the IT system effectively	Large parts were explicit. Otherwise, **Cause-effect:** requires support	Great deal of codification Electronic access to support team Scheduled online	Recipients that wished to commit to learning the system, learned. Others who wished to devote less time to it seemed to

	and quick problem solving mechanisms **Skill**: requires personal competence and practice	conferences	encounter more difficulties

Case 5: Japanese acquisition as part of a knowledge sharing network

The case is centered in the research division of a Pharmaceutical company. Seven sites around the world take part in the development of compounds, and share information in order to prevent repeating the expensive process of discovery. The sharing process is enabled by a database as well as by monthly discussions, assisting in minimizing internal competition over resources.

Why transfer: The company acquired a local Japanese pharmaceutical company in an attempt to widen the sharing network of drug development. The Japanese firm needed to learn the practice of knowledge sharing and to implement it, so that the process remains effective and productive. However, it took about 5 years for this to be successfully accomplished.

What was transferred: The main goal of the transfer was to incorporate the Japanese unit fully into its knowledge sharing network. In essence, what was transferred was the ability to be a contributing, integrated part of the network. Besides maintaining an up-to-date database, knowledge sharing mechanisms include personal-level interactions that take place every 'once in a while' on a small scale. Personal acquaintances among personnel from various units are encouraged and preserved regardless of project or other job-related meetings across units. Overall, in order to achieve and maintain healthy flows of knowledge between units, open discussions among personnel from various units and generally between the units is encouraged. Between various units, long-term successful relationships have been the norm, with a regular basis of mutual visits and high levels of trust.

Transfer process: To enable the sharing of knowledge from other units with the recipient in a way that could potentially provide immediate, low-cost implementation, the following actions were taken:

1. The manager that developed and provided leadership to one of the more innovative best-practitioner unit was sent to become the new manager at the recipient for the first few months.
2. Regular short-term visits to and from the Japanese unit.
3. Longer-term exchange of employees occurred between recipient and other units, for periods of one year.
4. After communication problems emerged despite the above efforts, it was discovered that the use of video- and teleconferences could not facilitate

mutual understandings, as can face-to-face discussions. For a long period, therefore, important meetings were only made when all involved personnel could be located in the same room. Only later could more distant communications be effective, once levels of acquaintance, trust and mutual culture were achieved.

Tacit knowledge: As can be seen in Table 5e, the transfer mechanisms that were used were appropriate for skill-type tacit knowledge or for other non-emotional types such as cause-effect. Analysis shows, however, that while the acquired company possessed most of the technical knowledge required to absorb the knowledge, cultural gaps, attitude problems, miscommunications and inability to collaborate were results of inappropriate mechanisms. The acquired Japanese unit was quickly ready to begin drug development processes and other technical parts of the transferred knowledge. It took over 4 years, however, for it

Table 5e. Case 5: Japanese acquisition as part of a knowledge sharing network

What was transferred	Knowledge type	How it was transferred	Comments
Knowledge regarding drug development processes	**Skill:** developing an ability to create new compounds **Composite**: highly complex processes on innovation	Short and longer term visitation Long distance communications via phone, video, web Expatriate management	Very few problems occurred in transferring this type of knowledge
The ability to become an integral viable part of a knowledge sharing network	**Human**: getting to know people and achieving a level of trust that enables collaboration	Limited scale visitation that expanded somewhat later on	The new unit took long expensive five yours to be considered a viable part of the network.
Integrating organizational culture aspects into the acquired company	**Unlearning:** The acquired Japanese company had an established, and different, culture that needed to be unlearned	Expatriate leadership Limited scale employee exchange	Cultural clashes were frequent. Japanese attitudinal problems and cultural resistance exceeded professional knowledge gaps.
Operational knowledge from various units	**Emotional:** The Japanese needed to overcome resistance to perceived 'orders' as opposed to 'suggestions'	Expatriate leadership Short and longer term visits	Mechanisms allowed for the transfer of more explicit elements but not for emotional-type tacit knowledge

to become a partner unit in the network it was acquired for. Due to a lack of close contact that could have been achieved through longer-term visits and face-to-

face communications, the cultural and attitudinal parts of the transferred knowledge encountered recipient resistance and bitterness. The knowledge type involved here was highly involved: Human, Emotional, and Unlearning: three types that require closer connection between source and recipient, similar to what we saw in the other Japanese case, Case 1 above.

Case 6: Product development team

Why transfer: This case took place in the same Pharmaceutical Company as in Case 5, and involves product development teams. Once a drug is authorized for production, an ad-hoc team is assembled and designated to it. The team handles the details of production from finding a suitable site to construct a manufacturing plant, to deciding upon a name and logo for the product. Team members come from various professional backgrounds, countries of origin, and experience. A leader is designated to each team, who is responsible for the effective operation of the team. Once a team completes its tasks, it is dismantled and each team member returns to his or her usual organizational role.

What was transferred: The process of launching a new product from scratch to finish was the knowledge transferred. The team leader and mentor possess the knowledge and the leader transfers it to the teams as the process emerges.

Besides its explicit stages, the process itself is extremely complex. It involves an unlimited set of solutions to problems and ways to conduct the process effectively. For each new product, a new team is formed. The only person who develops an expertise in this knowledge is the team leader (that later can become a mentor to another leader), and it is his or her job to transfer it to the team so that the same level of effectiveness is maintained across teams, including lessons learned, best practices, and key contacts within and outside the firm. The leader channels suggestions, requests, and messages from top management and from his or her mentor. Leaders are responsible that the team works as a unit, that they understand their tasks, that their job is done correctly and on time, and that mutuality and openness exists at all times.

Technical knowledge was usually not part of the knowledge transferred. Team members brought technical skill and understandings with them and were responsible to fulfill any technical issues required.

Transfer process: This case focuses on a specific team of 12 members. It was somewhat smaller and somewhat less diverse than the 'typical' team used at the company. However, the processes, challenges, and other issues the team needed to deal with were not reported to be of any meaningful difference than any other team. Most members were American and most worked at the same location. Two members were located in international locations, and the product that was expected of the group was of international nature. According to the team leader, creating a unity was very important; as well as making sure every group

member was given a voice. Challenges in this case were mostly around getting all members to think as a team, attend meetings regularly, and cooperate. The team went through 3-day training, where much of the knowledge was expected to be learned. Due to distance and complexity, the team and leader did not meet much face-to-face. Distance communications and some meetings were mostly used.

Tacit knowledge: The transfer mechanisms used in this case can all be considered as appropriate for tacit knowledge, yet much of the attitudinal and cultural elements of it were never fully implemented by the recipient team. According to the source, group members needed to acquire a sense of commitment to the project and the team, create unity with other group members,

Table 5f. Case 6: Product development teams

What was transferred	Knowledge type	How it was transferred	Comments
Process of bringing drug to market, overcoming problems	**Composite**: very complex. There is no way to describe all the options of things going wrong and appropriate actions	Written policies and manuals 3 day training Leader-team face to face interactions Hands-on problem solving on the spot	
Creating unity in the group	**Unlearning**: going against each members own ego to create unity	Spending limited time together, making some joint decisions	This task encountered many difficulties. Most of the work was done individually and not as a team.
Taking responsibility over the group's tasks	**Unlearning**: putting the team's needs ahead of personal needs **Cognitive**: creating an attitude that is difficult to teach. Creating a sense of urgency that was not present	3 day training Leader-team face to face interactions	Only 4 out of 12 members were reported to take responsibility over the entire work load
Commitment to team	**Cultural:** overcoming an unspoken organizational culture, not favoring participating in these teams	3 day training Leader-team interactions	Commitment to team remained low throughout the project

whom they met only briefly, and take responsibility over tasks required from the team. Analysis shows that while the 3-day training and contact with the source allowed for the learning that enabled each member to accomplish tasks, transfer mechanisms that build team unity, commitment and responsibility were lacking, making the knowledge transfer unsuccessful to a large degree, see Table 5f for more detail. While working face-to-face with a team, having appropriate knowledge put into manuals and policies, and having a dedicated leader may be suitable to transfer case-effect, skill or composite knowledge (and it did) – such transfer mechanisms do not seem to be sufficient for building commitment, trust or unity.

