



**CREATING COLLABORATIVE TEXT: KNOWLEDGE CREATION, TRANSFER, AND
LEARNING IN CROSS-FUNCTIONAL PROJECT TEAMS**

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Abstract

This paper considers the manageability of the acquisition of organizational knowledge between firms. We propose that while the acquisition of explicit knowledge is a manageable process, the acquisition of tacit knowledge at the organizational level is emergent and unpredictable. This challenges existing models of knowledge creation and acquisition that are based on the conversion of tacit and explicit knowledge. We present data gathered from a longitudinal case study of integration activities that occurred as a result of the buy-out of a U.S. telecommunications joint venture by one of its parents. This qualitative data is examined for evidence of tacit-explicit knowledge conversion and the manageability of the knowledge acquisition process. We found that tacit organizational knowledge is embedded in artifacts such as a firm's way of organizing, its operational practices, and its processes. As such, it is acquired when changes to these artifacts are implemented in a new organizational context rather than through the actions of individuals and groups making their tacit knowledge explicit. As a result, we conclude that, contrary to the belief of many strategic management theorists, the acquisition of organizational tacit knowledge is not a manageable process.

Introduction

The topic of knowledge creation and acquisition within organizations has received significant attention within the strategic management literature, and particularly within the school known as the resource-based view of the firm (e.g. Edmondson & Moingeon, 1996; Hamel, 1991; Inkpen, 2000). This interest stems from the premise that the unique knowledge of a firm, and in particular its tacit knowledge, is a fundamental source of competitive advantage (Conner & Prahalad, 1996; McEvily et al., 2000; Teece, 1998, 2000). As Hamel (1991: 83) states...

"...global competitiveness is largely a function of the firm's pace, efficiency and extent of knowledge accumulation."

As such, the precise means by which organizational knowledge assets are acquired and accumulated is of central importance to strategic management researchers and practitioners alike. In particular, the acquisition of knowledge assets resulting from the inter-firm transfer of knowledge especially in the context of strategic alliances and other cooperative ventures continues to receive significant attention (see for example, Arino & de la Torre, 1998; Child & Rodrigues, 1996; Hakanson, 1995; Inkpen, 1996, 1998, 2000; Inkpen & Crossan, 1995; Kogut & Zander, 1992, 1996). Within this body of literature there are two widely accepted beliefs that are central to current interpretations and models of inter-firm knowledge transfer. The first is that knowledge acquisition and creation can be managed to achieve a desired outcome. The second, which is integral to the first, is that tacit knowledge can and must be converted into explicit knowledge in order for it to be shared and eventually institutionalized in organizational memory (see for example, Crossan, Lane & White, 1999; Inkpen & Crossan, 1995; Nonaka & Takeuchi, 1995; Szulanski, 1996). However, there are some theorists of strategic management and organizational learning who have recently argued that both of these beliefs are flawed due to a misinterpretation of the nature of tacit knowledge (Cook & Brown, 1999; Tsoukas 2002), the complexity of organizational knowledge structures (Kogut & Zander, 1992; Lyles & Schwenck, 1993; Lyles & Salk, 1996; McEvily et al., 2000; Reberntisch & Ferretti, 1995), and because knowledge acquisition, particularly

between firms, is fundamentally social in nature and embedded in interactions and relations among people within and outside the organization making it extremely difficult if not impossible to manage (Badarracco, 1991; Blackler, 1995; Brown & Duguid, 1998; Gherardi, 2000; Spender, 1996). The implications of this debate are significant as the latter perspective questions concepts that are fundamental to both theory and practice within the resource-based view of the firm's approach to the acquisition of knowledge.

This paper examines and illustrates this debate in the context of the acquisition of *organizational* knowledge as it occurred during the integration phase of a joint-venture (JV) buy-out involving two American telecommunications companies beginning in November 1998 through November 1999. In using the term 'organizational knowledge' we refer to knowledge that has been institutionalized into organizational practices and search routines (Nelson & Winter, 1982; Nonaka & Takeuchi, 1995), as well as knowledge structures or architectures, (Lyles & Salk, 1996; Rebbentisch & Ferretti, 1995). Elements of this organizational knowledge may also be held by individuals or groups but is not dependent on their continued existence or membership within the organization (Hedberg, 1981; Huber, 1996; Nonaka & Takeuchi, 1995; Weick, 1979). As such, we begin with the premise that during a corporate integration individuals and groups learn naturally from their experiences, but we are most interested in the knowledge that is acquired at the organizational level due to its potential value as an asset to the firm. Hence, we examine the role of the individual and groups in the process of acquiring organizational knowledge but exclude knowledge acquisition that is limited merely to learning at individual or group levels.

We start this exploration by taking a closer look at the debates about knowledge conversion and the manageability of knowledge acquisition between firms. This is followed by a description of the research design which leads into the presentation of the data. Our data suggests that tacit organizational knowledge is acquired when changes to organizational artifacts are implemented in a new organizational context rather than through the actions of individuals and groups making their tacit knowledge explicit. And we conclude that, contrary to the belief of many strategic management theorists, the acquisition of tacit knowledge is not a manageable process.

The debate: Knowledge conversion and manageability

Much of the debate on the topic of knowledge acquisition and creation centers on Nonaka and Takeuchi's 1995 book, *The Knowledge Creating Company*. The debate is split between proponents who believe that knowledge creation and acquisition can be managed and the objective is to understand how best to accomplish this (see for example, Crossan, Lane & White, 1999; Inkpen & Dinur, 1998; Prahalad & Hamel, 1990; Szulanski, 1996; Zollo & Winter 2001), and those who argue that the complex, social and embedded nature of knowledge itself makes the idea of managed knowledge creation absurd (e.g. Cook & Brown, 1999; Gherardi, 2000; Spender, 1996; Tsoukas, 2002). Underlying these polarities exists a fundamental disagreement on the nature of knowledge and specifically whether tacit knowledge can be converted into explicit knowledge.

The knowledge conversion debate

The knowledge conversion perspective popularized by Nonaka and Takeuchi (1995: 61) contends that tacit and explicit forms of knowledge are inextricably linked and that *“knowledge is created and expanded through social interaction between tacit knowledge and explicit knowledge”* using four modes of ‘knowledge conversion’. To theorists who align with this view (see for example Davenport & Prusak, 1998; Dixon, 2000; von Krogh & Roos, 1996), the challenge, therefore, is to convert individual tacit knowledge into explicit knowledge so that it can be widely shared and codified thereby becoming a resource that can be utilized by a wider population such as the organization.

This view also suggests that the exercise of making tacit knowledge explicit rests in the ability of the individual to articulate the details (instrumental knowledge) of their actions. To illustrate this Nonaka and Takeuchi (1995) tell the story of the attempt of the Masushita organization to learn and duplicate the technique used by an expert bread-maker in the manufacturing of a bread-making appliance. They suggest that this is accomplished through observation, imitation and practice with the knowledge eventually articulated, then interpreted through iterative cycles of reflection and dialogue and finally incorporated into the design of the machine.

On the other hand Cook and Brown (1999) argue against the knowledge conversion perspective, suggest that *“tacit knowledge cannot be turned into explicit, nor can explicit be turned into tacit”*(385). As such, each form of knowledge can be used to facilitate the acquisition of the other in that one can apply one’s tacit knowledge to generate explicit knowledge and vice versa. However, the generation of new knowledge is the result of *“... our interaction with the world. Specifically it lies in the use of knowledge (explicit and/or tacit) as tools of productive inquiry (of the sort we have called “knowing”) as part of our dynamic interaction with the things of the social and physical world”* (Cook & Brown 1999: 397).

Tsoukas (2002) follows this theme in arguing that Nonaka and Takeuchi’s explanation of the bread-making innovation addresses only the technical knowledge (‘know what’) required to perform the skill, but not the practical knowledge (‘know how’) that is tacit and only exists as a part of action (see also Brown & Duguid 1998; Cook & Brown 1999; Gherardi 2000). For as Spender (1994: 392) points out, the difference between intellectual or theoretical knowledge (knowing what) and practical knowledge (knowing how) is that the latter adds the *“capacity for action to the abstract understanding of the situation”*.

The debate is particularly interesting since both views profess to be based on the work of the philosopher Michael Polanyi. Tsoukas (2002) and Gherardi (2000), however, suggest that the interpretation of Nonaka and Takeuchi and their proponents is in fact erroneous and based on a misunderstanding of this work specifically with regards to the interpretation of the ‘personal’ quality of tacit knowledge (Polanyi, 1966). The ‘personal’ quality of tacit knowledge is what makes it difficult to formalize and communicate. As such, tacit knowledge is incommunicable, intuitive, and cannot be articulated, or as Polanyi (1997: 136) states: *“we can know more than we can tell”*. It can best be understood as knowledge that has not been abstracted from practice in that the acquisition of knowledge takes place largely independent of conscious attempts to learn, and largely in the absence of explicit knowledge about what

was acquired (Cook & Brown, 1999; Reber, 1993; Spender, 1996, 1994). This is effectively illustrated by Cook and Brown's example of people knowing how to keep upright on a bike but being unable to describe exactly how this is accomplished. In fact, if they were to focus on all of the details required to be successful ('instrumental knowledge' (Polanyi, 1966)), it is highly likely that their bicycle-riding attempt would be at best extremely clumsy.

So far our discussion has focused on the nature of tacit knowledge in the context of the individual and the debate regarding the interpretation of Polanyi's observations about its 'personal' quality. This has highlighted that, according to Polanyi, tacit knowledge is inseparable from action and is inarticulable which makes it impossible for it to be converted into explicit knowledge. Yet, the resource-based view of the firm exhorts organizations to make tacit knowledge explicit. Why is this the case?

The case for the managed acquisition of knowledge

The main argument in support of knowledge conversion and the managed acquisition of organizational knowledge assets is based in economics as illustrated in the following statement from Teece (1998: 61)...

"The more a given item of knowledge or experience has been codified, the more economically it can be transferred".

Thus tacit knowledge is considered to be slow and costly to transmit, it is laden with ambiguities and it is open to misinterpretation (Kogut & Zander, 1992; Lam, 1997; Nonaka, 1994; Teece, 1998; von Hippel, 1994). Thus, the more that tacit knowledge can be made explicit, the less costly the acquisition process. This can be accomplished, they suggest, by encouraging individuals to articulate their tacit knowledge using a cognitive process of personal reflection and then sharing this knowledge in social interactions through dialogue or conversation both within and across organizational boundaries (Crossan et al., 1995; Hedlund & Nonaka, 1993; Inkpen & Crossan, 1995; Nonaka, 1994; Wathne, Roos & Von Krogh, 1996).

This interpretation is the cornerstone of many popular models of knowledge acquisition in the strategic management literature whereby knowledge transfer or creation occurs as an iterative and interactive cycle or spiral of knowledge that flows through multiple levels (individual, group, organizational and inter-organizational) using a process of dialogue, inquiry and reflection as a means of framing and reframing individual and collective worldviews (Crossan, Lane & White, 1999; Hedlund & Nonaka, 1993; Inkpen, 2000, 1998; Inkpen & Crossan, 1995; Nonaka & Takeuchi, 1995). In these models, the individual is central to the flow of knowledge and learning, with dialogue and reflection as primary tools.

According to this interpretation, knowledge is transformed and legitimized through several levels of social interactions that can include interactions that extend beyond the boundaries of the organization (Nonaka, 1994; Davenport & Prusak, 1998). These interactions are frequently described as 'knowledge connections', which are defined as the connections through which individuals can share their observations and experiences (Inkpen & Dinur, 1998; Von Krogh et. al., 1994). They are formed through formal and informal relationships between individuals and groups which facilitate the sharing and communication of new knowledge and provide a basis for transforming individual knowledge to group and

organizational knowledge and tacit knowledge to explicit knowledge (Crossan et al., 1999; Inkpen, 2000, 1996; Nonaka, 1994).

Knowledge connections can take a number of different forms ranging from formal, structured opportunities such as meetings, visits to facilities, job exchanges and 'boundary spanning roles' to informal social gatherings (Brown & Duguid, 1998; Inkpen & Dinur, 1998; Lyles & Salk, 1996; Makhija & Ganesh, 1997; Rebenitsch & Ferretti, 1995). The basic premise is that because most knowledge travels through individuals, the greater the frequency and quality of social interactions that occur between members of the participating firms, the greater the richness and density of knowledge that is transmitted and potentially received (see for example also, Daft & Lengel, 1986; Ghoshal & Bartlett, 1988; Gupta & Govarindajan, 1991; Wathne, Roos & Von Krogh, 1996).

The case *against* the managed acquisition of knowledge

One of the strongest arguments against the ability to manage the acquisition of knowledge can be found in the writings of Nelson and Winter (1982: 81-82) whose descriptions of organizational routines have been highly influential in the strategic management literature...

"...much operational knowledge remains tacit because it cannot be articulated fast enough, because it is impossible to articulate all that is necessary to a successful performance, and because language cannot simultaneously serve to describe relationships and characterize the things related."

To illustrate, even if an organization acquired a piece of technology, such as a semiconductor component of a personal computer, and was able to reverse engineer and thereby imitate it, this knowledge would not include the best way to manufacture the component so as to allow a product to be delivered to the customer at the best possible price/performance trade-off (McEvily et al., 2000). This is because organizational knowledge, including operational routines, is tacit, as already discussed, as well as complex and embedded in context-specific relationships. It is complex in that it does not exist as independent pieces of knowledge but rather as part of a diverse knowledge structure or architecture consisting of many interdependent and related parts (Kogut & Zander, 1992; Lyles & Schwenck, 1993; Lyles & Salk, 1996; Rebenitsch & Ferretti, 1995). The more complex the knowledge structure, the more difficult it is to retrieve simple, discrete units and the greater the likelihood of misinterpretation and knowledge loss (Lyles & Schwenck, 1993).

Finally, organizational knowledge is embedded in context-specific relationships making it 'sticky' and inherently less transparent than knowledge that is context-free (Badarracco, 1991; Blackler, 1995; Gherardi, 2000; Granovetter, 1985; Hamel, 1991; Lam, 1997; Reed & DeFillippi, 1990). For example, the principles of radio transistors are context-free and significantly more transparent than marketing strategies targeted at diverse social and demographic populations. Both the extent to which knowledge is context-dependent and the degree of penetrability of the social context contribute to perceptions of openness or opaqueness on the part of the receiving firm (Ghoshal & Bartlett, 1994; Makhija & Ganesh, 1997; Ring & Van de Ven, 1994; Szulanski, 1996).

Research Design

From the discussion above it can be seen that there are strong and differing views regarding knowledge conversion, and the manageability of the knowledge acquisition process. These differing perspectives lead us to propose the following questions as a useful framework for conducting this exploration: (i) to what extent can tacit knowledge be converted into explicit knowledge and shared; and (ii) to what extent is it possible to manage the acquisition of organizational knowledge? In this section we describe how our empirical research was configured, and how this enables us to give a response to each of these two questions.

Research setting

The study consisted of a longitudinal case study of a corporate merger that took place during 1998/9. Past researchers have found mergers to provide particularly fertile settings for exploring processes of learning and knowledge transfer at an *organizational* level (Hakanson, 1995 ; Inkpen, 2000; Lyles & Salk, 1996), and in this case the first author had the opportunity to gain access to the acquired organization in ‘real time’, while the merger was underway. This provided a rare opportunity since most studies of mergers and acquisitions take place after the event, where accounts may be constructed with the benefit of hindsight (Child & Rodrigues, 1996; Lam, 1997; Lyles & Salk, 1996). The advantage of a real-time study is that it is possible to gather data at the time when experiences, views and interpretations are being formed, and hence the data is less likely to be ‘tidied up’ by individual and collective reconstructions.

The first author was looking for a research site that would provide a fertile setting for examining organizational learning and knowledge transfer; she just happened to be engaged in an unrelated consulting assignment within the JV firm when it suddenly became the subject of a buy-out. Since she already had good relationships with senior managers, she managed to obtain permission to study the merger as it took place. Inevitably, since this was a highly political and volatile situation, there were some restrictions on access which were non-negotiable. The most problematic restriction was that research was to be limited to members of the JV firm, and would exclude participation by the parent organization. This resulted in a shift in the initial focus of the research to emphasize knowledge acquisition by the JV versus the parent. Four other conditions were that: the study should be restricted to only three business units, it should be completed within a twelve-month period, respondent participation was to be voluntary, and data collection time was to be limited so as to minimize disruption to the business. A further limitation was logistical in that the research site was located in Kansas City, USA, which was approximately fifteen hundred miles from the researcher’s base. The study therefore had to be designed in order to address the research questions while taking account of the above constraints.

We wished to adopt case study research for several reasons: it is a useful methodology for theory development based on detailed accounts of the experiences of those who lived them (Denzin & Lincoln, 1994: 8; Yin, 1994); case studies allow the researcher freedom to adapt the design to include the variables that were not anticipated prior to the start of the study (Burgess, 1985; Glesne & Peshkin, 1992; Lincoln & Guba, 1985; Reichardt & Cook, 1979). Due to the complexity inherent in the combining of the two organizations and their respective

social worlds, an emergent design was important to allow the data to transform and evolve as the organizations and their members adapt and change (Hartley, 1994; Stake, 1998, 1995).

The research site

The Sprint PCS (PCS) joint venture was formed in late 1994 as a partnership between three cable television operators and Sprint Corporation (Sprint), a large U.S. telecommunications service provider. The original plan called for PCS to build a nine billion dollar national digital wireless infrastructure using its personal communications service technology that would allow it to achieve a position of advantage over its competitors¹ (Elstrom & Symonds, 1997). However, by 1998 a number of factors contributed to a decision by Sprint to assume management control and majority ownership of the PCS JV. This included increasing tensions between the partners, and a view among the cable operators that the JV was of reducing strategic importance to them.

This provided an opportunity for Sprint to take full control of the JV, and it had sufficient financial resources to do this due to an upturn in stock prices and the recent sale of a 20% stake of its business to Deutsche Telekom and France Telecom for \$7.6 billion (U.S.) (Elstrom & Symonds, 1997). At the time that it acquired PCS, Sprint had an employee base of approximately 60,000 and generated \$15 billion (U.S.) in annual revenues serving more than 16 million customers. PCS, while much smaller with approximately 10,000 employees and serving more than 1.2 million customers², was growing extremely fast as illustrated by its 2001 results that reported a 57.4% year-over-year growth in revenues to \$9.7 billion (U.S.), a customer base of 14.5 million subscribers, and an employee base of almost 31,000³. The merger promised advantages for all the original partners: it would provide Sprint with access to the valuable knowledge assets of PCS which included state-of-the-art digital wireless technology, a successful affiliate and retail distribution network and strategy, and the capability for rapid technology deployment and build-outs thus increasing its competitive advantage; PCS would benefit from access to Sprint's knowledge assets such as its brand marketing, financial management infrastructure and more mature internal coordinating processes and structures thereby accelerating its move to profitability; and the cable partners would benefit from increased liquidity and the ability to refocus on their core business. The buy-out plan was eventually approved by all parties and finalized when Sprint's shareholders ratified the deal on November 23rd, 1998.

Accessing Tacit and Explicit Knowledge

If we adopt the view that tacit knowledge cannot be described, then there is an obvious problem in trying to identify it empirically through interviews. However, the conditions of access largely restricted data collection to the interview format and hence the researcher had to adopt various strategies to access things that might not have been conscious, or articulable by individuals. Three main features attempted to limit this problem: a total of 64 semi-

¹ In 1994/5 the majority of wireless service offerings of PCS' competitors were built on a much less versatile and robust analog platform. The improvement in coverage, service quality and potentially price was expected to provide PCS with a significant competitive advantage.

² Financial information was not available although, at the time, PCS was operating in a deficit position due to capital investment costs required to establish the wireless network.

³ 2001 results were taken from Hoover's Company Capsule delivered via ProQuest on-line services.

structured interviews were held in three waves over the 12-month period between November 1998 and November 1999; interviews were recorded and transcribed on each occasion which allowed the significance of statements to be reviewed and discussed with informants in subsequent interviews; managers were selected within only three departments and this provided triangulation and some redundancy of data; and analysis emphasized the identification of discrete ‘stories’ which provided tight organization of data but allowed its significance to emerge later.

The interview technique used was ‘critical incident interviewing’ which asks the respondent to talk about their experiences based on a theme that is provided by the interviewer (Coffey & Atkinson, 1996; Spencer & Spencer, 1993). For example, a central question that was asked in all three interviews was “*what changes have you experienced as a result of the acquisition of PCS by Sprint?*” The response to this question provided the outline of the interview, which was then explored by asking the respondent to describe the changes with the questions focused on eliciting information pertaining to integration strategies and inter-firm knowledge transfer. This technique is effective in that it ensures that the questions asked provide a clear framework for the respondent’s story to emerge yet the story itself provides data that is useful to the researcher (Jones, 1985).

Twenty-four manager were interviewed in the first phase in November 1998. In addition, six individuals at the vice president level or higher located outside of the three target departments were interviewed in order to gain background information and insight into the partnership restructuring, the integration of PCS with Sprint, and the personalities at the executive level. Over the course of the study respondent attrition occurred as a result of integration-related changes, such as the dismantling of the PCS Tax and Treasury departments, as well as workload demands. As a result, nineteen interviews were completed in phase two held in April 1999 and fifteen in phase three which took place in November 1999 with five interviews conducted in each business unit. Although the core questions were consistent, some modifications were made based on the data that emerged from each set of interviews. Specifically, with each subsequent interview, the questions became more focused on seeking out examples of knowledge acquisition and related influencing factors

In addition to interviews, the organization also provided access to documentation, including departmental and company newsletters, access to the internal intranet sites at both PCS and Sprint, and e-mails from respondents. This kept the researcher apprised of some of the changes that occurred during the research period, and allowed her to take an informed position during the interview in that she was familiar with many acronyms, names and roles of key individuals, ‘messages’ from executives, and some of the changes that had occurred or were underway such as integration of the PCS and Sprint benefits programs.

Data analysis

Analysis of the data was consistent with a Straussian approach to grounded theory, which suggests that the researcher should openly question the data thereby allowing complex theories to come to light (Strauss & Corbin 1998; Locke 2001). This recognizes the validity of interpretation, and accepts that these are influenced by the unique perspective that the researcher brings as a result of her training, theoretical background and orientation, and personal experiences.

Data, which consisted of over 1000 pages of transcripts, was analysed through three main stages. The first stage involved ‘open coding’ in which 27 stories linked to the integration exercise were identified. Collation and clustering of these stories led to the identification of nine provisional categories of integration related changes, activities, and processes. Anything and everything about the ‘story’ was included and coded by respondent name and department to ease later sorting and for later reference if there were contextual questions that required that the source interview be revisited in its entirety. These nine categories were grouped into three main themes concerning knowledge transfer during the integration process. These are summarized below in Figure 1.

Themes	Categories
Human Resource Process Integration	Mandated HR process integration ‘Best practices’ HR process integration
Organizational Restructuring	Change in departmental role Change in reporting relationship Merger of Legal departments Elimination of PCS Treasury department Assimilation of PCS Tax department.
Change in Executive Leadership	Replacement of PCS CFO Change in HR VP

Table 1: Themes and categories

The third stage involved further exploration of the categories in order “to clarify the story they have to tell about the social situation or phenomenon that was studied” (Locke, 2001: 52). This required organizing the insights captured in the researcher’s formal notes and journal with respect to each question. For example, on the question of whether tacit knowledge can be converted into explicit knowledge, data was gathered from each of the stories and memoed to capture its relevance to the question. This revealed some interesting differences in terms of the specific insights. For example, the assimilation of Tax and Treasury stories provided insights into tacit organizational knowledge in the form of artifacts such as tax returns and related accounting transactions. By comparison, the merging of the Legal departments highlighted tacit organizational knowledge in the form of ‘cultural practices’. As such, each insight contributed a dimension to our understanding of the issues underlying the research questions while remaining consistent at the level of theoretical concepts.

The Acquisition of Organizational Knowledge

Examination of the data revealed evidence of tacit knowledge at the organizational level that is embedded in organizational processes and in a firm’s way of organizing. This is relevant to answering the questions of whether tacit knowledge can be made explicit and whether it can be managed.

Tacit knowledge embedded in business processes

Tacit knowledge was evident in several Human Resource processes that were transferred from Sprint and implemented in PCS. One of the more notable examples was found in the story of PCS' transition to Sprint's exempt compensation plan. This change was mandated by Sprint's executives and, as a result, was one of the first examples of knowledge transfer between the two organizations. In this situation, extensive dialogue occurred between subject matter experts in both organizations however these discussions failed to reveal critical design elements that had an immediate and negative effect on PCS as noted in the following excerpt from a Director in the Human Resources (HR) organization...

"Sprint has a hard-lined salary minimum so if you are hiring someone you have to pay them at least this amount. And that's 22 to 23% increase that we didn't need to pay. I've now been asked to fix our problem. A. (PCS CEO) has said if we knew now what we know we wouldn't have gone through this in April."

In addition to the cost implications noted in this excerpt, the change in compensation plans also resulted in PCS experiencing difficulties in hiring people with a personality profile that was consistent with the needs of an entrepreneurial culture. The PCS organization's compensation system was designed with the intent of attracting people for the short term by using a lower base salary structure combined with a strong incentive package. This was consistent with the need to keep costs down while focusing on growth of the customer base. In contrast, Sprint's compensation plan emphasized long-term tenure and employee loyalty by offering an attractive base salary package with a lower incentive portion. This is consistent with their mature stage and an emphasis on lowering costs. As a result, the shift of the PCS compensation plan to Sprint's plan made it more difficult for the company to attract the entrepreneurial-oriented employees they require.

"... in some of the other big centers like Los Angeles, Chicago, New York and Denver and so on where there's a lot more competition for top notch resources and we're not such a big player. In these locations we're definitely struggling with getting the folks we want so we're going to have to relook at the incentive package at least for these areas" (Director, HR, November 1999).

In both of these examples, organizational knowledge was embedded in the design characteristics of Sprint's compensation plan and only became evident *after* it was implemented and negative consequences were experienced in PCS. Another example of the embeddedness of tacit organizational knowledge was found in a related story about mandated changes to the way that jobs are evaluated in PCS. In this story, members of the PCS HR organization described how the implementation of Sprint's job evaluation process in PCS resulted in new behaviors among members of PCS that were consistent with Sprint's more mature and bureaucratic culture as illustrated in the following excerpt...

"What we have now is I'm a director so I don't talk to anyone who isn't at least a director... People are certainly more aware of grades. It is more common knowledge so I think that yesterday I would have approached you to

resolve an issue now I'm concerned about approaching you because of what you might think of lowly little me" (Director, HR, April 1999).

Once again, this was not a planned outcome of the process change. In fact, we believe that it was entirely unforeseen most likely because these behaviors are an entrenched and widely accepted part of Sprint's culture that is embedded in many of its artifacts such as its HR processes. Similar stories were also told in the Finance organization where an increase in operational discipline and formality within PCS was observed as a result of the implementation of changes made by its new Chief Financial Officer, a former Vice President (VP) of Finance in Sprint, requiring greater analysis and data to support decision-making as described in the following excerpt from a November 1999 interview with a Finance VP...

"We're doing a lot of things differently as a result of B.G. (CFO) being over here. He's much more operationally oriented. Much more so than B.N. (ex-CFO) was and as a result we're in probably an order of magnitude higher in degree of analytical rigour and analysis that is going into a lot of decision making. A good chunk of which is actually good although it's normally very bureaucratic. At this point the good outweighs the bad as a result we're forcing people to be accountable and put more thought into the decisions."

These examples highlight aspects of the nature and transfer of tacit knowledge. The first is that the interaction of the newly implemented process or plan with the social and physical world of the organization, in this case PCS, causes new knowledge to be generated that is part of the interaction itself. It is context dependent in that the dynamics of the organization as a social system influence the outcomes and thus will differ from organization to organization. The second is that there is no clear way of mapping the process by which tacit organizational knowledge is transferred between firms. It emerges as a part of action itself not by a process of knowledge conversion whereby tacit knowledge is made explicit. In fact, the reverse is true. This knowledge was transferred and then made explicit as a result of its implications for PCS. Thirdly, the transfer of tacit organizational knowledge occurs independently of individuals and groups although it may be manifested in the behaviors of organization members. In the above compensation example, even experts with specialized knowledge did not articulate crucial details of the plan. In fact, they may not even be aware of the impact of the design on Sprint as this knowledge is buried deep in the organization's memory.

This highlights the impracticality of suggesting that it is possible or likely that individuals, even experts in specialized roles, are able to accurately and fully articulate the complete body of knowledge that is part of an organizational process. This is especially true when the process has been widely implemented over an extended period of time and thus is likely to have been subject to modifications and enhancements. Furthermore, even if the process had been documented and was current, it is highly unlikely that it would address the full range of potential scenarios arising from a change in organizational context as it is only when a process is put into action, that much of the knowledge that is embedded in it becomes apparent.

Tacit knowledge embedded in organizing principles

In these stories, tacit organizational knowledge was evident in a shift that occurred in the way that the Legal department was organized. ‘Organized’ in terms of the implementation of new organizing principles that included job specialization, centralization and hierarchical authority structures versus changes in roles, responsibilities and reporting relationships. While the latter changes did occur these were observed as a catalyst for individual learning and knowledge acquisition, the former was an extremely effective vehicle for transferring tacit organizational knowledge in the form of norms of behavior and rules of governance.

The shift to greater specialization within PCS Legal positions was seen as a primary cause of the increase in meetings and electronic mail (e-mail) that occurred in order to replace informal and role driven information sharing as the primary means by which people stayed informed on issues and policies affecting their area of responsibility:

“...one of the jokes we had when we became One Sprint was we had I don’t know how many meetings...It just seems that some departments just like to have meetings and they don’t seem to realize that meetings don’t count as work...” (Law Clerk, Legal, April 1999).

Job specialization also meant that more people needed to be involved to answer questions or discuss issues and make recommendations on items that crossed over multiple areas of specialty. As a result, responsiveness to client requests and decision-making in general was slowed significantly...

“There are simply more people you are going to have to contact in order to get an answer to your question and of course that delays your being able to respond to the employee. The other thing is that there is a good percentage of the time you can’t get hold of anyone particularly in the benefits area so it’s frustrating because you can’t respond to that person. I used to be able to go over and ask Dave (PCS Benefits Manager) what was happening or pull a file if I needed to so I could respond very quickly” (Manager, HR, April 1999)

Whether this is the only driving factor is unclear, however the adoption of a specialist model of organizing certainly contributed to organizational norms of high involvement and consultation, and slow response times. Slow response times were also associated with the centralization of certain roles, such as Benefits Administration in the HR organization, due to difficulties in reaching individuals with the required information to answer client questions and respond to issues. In addition, centralization was seen as causing a loss of the personal quality of service that clients had received in the past when they were supported by a small team of dedicated resources as illustrated in the following excerpt...

“We used to have a Benefits manager we could refer people to but he’s gone now. They would have to call the EBAC centre so where they were used to talking to someone who they could remember their name its not easy now. You don’t know whom you are going to talk to. I’m sure it’s someone who is just as

competent but you don't have the relationship any more" (Manager, HR, April 1999).

This also further contributed to the isolation of people within functional areas that led to communication difficulties and the need to use meetings as a means of sharing information and knowledge...

"...but there isn't quite the sense of knowing what the other departments are doing. We're pretty focused on Marketing and Sales. It's kind of a product of the size of the Legal group and also that they are so centralized in to departments with specific areas of specialization" (Law Clerk, Legal, November 1999).

The third aspect of Sprint's way of organizing that affected PCS was its strong orientation to a hierarchical model of governance which was explained as being anchored in Sprint's history as a *"heavily regulated"* company which was governed by strict rules of operation and an emphasis on detailed documentation and extensive analysis – *"This 't' had to be crossed at this section of the page and no other"* – as well as secrecy – *"The (wireless) industry is fairly open on exchanging information whereas Long Distance is less so and Local is very good at keeping secrets"*. Governance rules and related processes are entrenched in Sprint's culture and appear to be inviolate. For example, all decisions required multiple approvals although ultimate decision-making authority was vested in the senior position in the department or organization. An excellent example of this can be found in the story of the creation of a new role in Tax which had to be approved by *"everybody and their brother"* after it was socialized with *"28 to 30 people at Corporate"*. This was reinforced by administrative processes such as the approvals process and method used to distribute work.

Thus, we have a culture where power is vested in one's position in the hierarchy and reinforced by rules such as the fact that an individual's title and compensation is determined by the number of people in their organization...

"They (Sprint VPs) want more people reporting to them in part because that's how their titles and compensation are determined – by the number of people in their organization. So the more of us they get, the better for them personally" (Attorney, Legal, November 1998).

In sum, the organizing principles of job specialization, centralization and hierarchical governance are linked to Sprint's history as a regulated company and have embedded in them tacit organizational knowledge in the form of organizational norms and related practices. This explains why the introduction of these organizing principles had such a profound effect on PCS' culture as became almost immediately apparent by the widespread adoption of many of these associated norms and practices. This indicates that a transfer of tacit organizational knowledge has occurred as a result of the implementation of new organizing principles however, once again, this only became evident *after* these were implemented in PCS.

Managing the Creation of Organizational Knowledge?

We return now to the two questions posed earlier in this paper about whether it is possible to convert tacit knowledge into explicit knowledge, and hence whether the acquisition of knowledge can be managed to achieve a desired outcome. In the remainder of this paper we will examine them in the context of the observations and interpretations developed from this case study.

To what extent can tacit knowledge be converted into explicit knowledge?

As noted previously, this is a very significant topic in the organizational knowledge literature because it is central to various models of knowledge transfer (see for example, Crossan, Lane & White, 1999; Inkpen & Dinur, 1998; Nonaka & Takeuchi, 1995). The first step in answering the question was to identify evidence of tacit knowledge itself. This was an interesting challenge as one might suggest that finding evidence of tacit knowledge could only be accomplished by it being made explicit by individuals thereby ending both debates at least as far as this research is concerned. Given that our data source was individual interviews this seems preordained to be true but in fact what we discovered was evidence of tacit organizational knowledge that was acquired by the JV but only became evident to individuals *after* it led to changes in their organization. As such, we suggest that...

...there is evidence of organizational knowledge that is and remains tacit in its full extent but individuals' experience of this new tacit knowledge can be made explicit.

Second, we observed that tacit organizational knowledge can be acquired as a part of the implementation of integration-related changes in a new organizational context. We provided examples of tacit knowledge that was embedded in organizational processes and organizing principles that was only evident to individual members after they or the organization experienced negative consequences. On this basis we argue that...

...tacit organizational knowledge is embedded in organizational artifacts and is transferred as a part of action when these are implemented in the receiving organization.

In the example of the exempt compensation plan there was tacit knowledge relating to the underlying rationale of the design. This 'know why' was contextual in nature and over time became embedded in organizational artifacts such as the split between base and incentive compensation. As such, it was no longer part of the conscious awareness of individuals or even experts within a community-of-practice.

This has significance for theories of competitive differentiation, because it suggests that 'intangibles' are linked to contextual factors. This is consistent with Edmondson (2002) who shows how knowledge is situated within local practices; it also supports her earlier argument (Edmondson & Moingeon, 1996) that 'learning why' is an organizational learning process which can provide a source of competitive advantage. It is not enough to 'know what' or even 'know how' as it is 'know why' that determines whether a particular process, such as a compensation plan, will provide the desired outcomes that potentially lead to competitive

advantage when applied in a new organizational context. ‘Know why’ is difficult to articulate since it is context-dependent and dynamic; there are just too many factors which influence the success of a particular process or course of action to be able to predict how it will play out in a different organizational context. Hence, a process that appears to have relatively predictable outcomes, such as the implementation of Sprint’s compensation plan, can result in unexpected costs, new hierarchical behaviors, and an inability to attract new employees in large urban centers. In sum...

...tacit organizational knowledge is context-dependent and context-specific.

According to our data, dialogue encourages the sharing of explicit knowledge between individuals and groups, which increases the information base for decisions and hence the likelihood that integration and knowledge acquisition will be successful. However, because of the very nature of tacit organizational knowledge and differences in organizational context, it does not make tacit knowledge explicit. No matter how effective and complete the dialogue, the results of integration and knowledge transfer are inherently unpredictable. Furthermore, there are situations, such as those reported in the organizational restructuring story where dialogue, or a lack thereof, does not affect either the success of integration-related activities or knowledge acquisition. In these cases, knowledge acquisition occurred as a result of structural level changes introduced into PCS not as an output of dialogue and other elements of knowledge conversion. This leads us to suggest that...

Tacit knowledge at the organizational level is embedded in context-specific organizational artifacts. As such, it can not be articulated or converted into explicit knowledge rather it is acquired as a part of the implementation of changes enacted in a new organizational context.

To what extent can organizational knowledge acquisition be managed?

Several of the incidents in our case study suggest that it is difficult to predict the results of the transfer of *organizational* knowledge because it is tacit, complex and socially embedded (contextual). Furthermore, we have argued that organizational knowledge is transferred as a part of action, or in this case as part of the implementation of integration-related changes, rather than as a product of knowledge conversion. Both of these challenge the premise that knowledge transfer is predictable or manageable at least at the organizational level.

It was the implementation of changes to the firm’s way of organizing that resulted in the transfer of organizational knowledge in the form of explicit knowledge pertaining to the structural rules governing organization design (centralization, job specialization and hierarchical governance) and, more importantly, tacit knowledge pertaining to Sprint’s cultural ‘practices’, such as its orientation towards tight controls, secrecy (closed system), an emphasis on inviolable rules and procedures, and minimal risk-taking (Hofstede, 1997; Khandwalla, 1985; Pumpin, 1984). Furthermore, the implementation of Sprint’s HR and Finance processes within PCS resulted in unforeseen negative consequences that provided further evidence of embedded tacit knowledge at the organizational level that only became evident after these consequences were experienced. This leads us to suggest that...

Organizational knowledge is transferred as a part of the implementation of integration-related changes in a new organizational context. As such, it is not

possible to predict or manage the outcomes that result from the transfer of organizational knowledge.

Conclusions

We conclude from this case study that there may be problems with the idea of conversion of tacit to explicit knowledge, and that the creation and transfer of organizational knowledge is not easily managed, least of all because of its situated and contextual nature. Naturally, since this is but a single case we have to be cautious about claiming too much significance for the results. This is a limited case study involving a single organization in a unique situation and the observations may not hold in other situations, whether they be other forms of organizational takeovers, or just normal organizational life. Another potential limitation is presented by the fact this study only reported the experiences of members of the ‘acquired’ firm rather than both firms, although the longitudinal design of this study meant that we accessed the views and emotions of informants before, during and after the merger had taken place – providing both temporal and spatial triangulation. Finally, we were only able to observe three business units, all of them support groups, rather than the entire organization. Although these may have provided a window onto the wider organization since these functions drove organization-wide changes such as the new compensation plan and related processes. Thus, in a few cases, we have made interpretive leaps without corroborating evidence based on a process of logical induction.

These limitations are balanced by some major strengths of the study. First, unique case studies are recognized (Stake, 1998, 1995; Yin, 1994) as strong vehicles with which to generate and test theoretical (rather than statistical) generalizations. Second, the longitudinal elements, including the opportunity to develop relationships with informants over the 12 month period, will have greatly added to the richness of the data. Third, the setting of a corporate merger, or takeover, is one of those unusual circumstances where issues of knowledge transfer and learning are likely to be both significant and evident. And finally, the case study was collected ‘live’ which means that it may have highlighted emergent aspects which would not be visible in retrospective case studies – and which may have led to insights which would not be reached in the course of other studies.

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