THREE TYPES OF ORGANIZATIONAL KNOWLEDGE: IMPLICATIONS FOR THE TACIT-EXPLICIT AND KNOWLEDGE CREATION DEBATES

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ABSTRACT

Stream: Theorizing and representing organizational learning and knowledge management.

This paper documents the findings from research conducted in late 1998 through 1999 that studied the exchange and creation of knowledge between two large American high technology firms involved in an acquisition. The result is a framework of *organizational knowledge* consisting of three distinct knowledge types each with a tacit and explicit dimension. This has several implications for understanding the dynamics of knowledge in organizations. The first is that is provides insight into the diverse and dynamic nature of knowledge at the level of the organization, which questions the homogeneous and static definition that is currently popular in the literature. Secondly, it suggests that the tacit and explicit dimensions of organizational knowledge are similar to the two sides of a coin rather than separate entities or different ends of a continuum. Thirdly, there is evidence that the creation of organizational knowledge is both a process of transformation and amplification, as suggested by Nonaka and Takeuchi (1994), as well as a complex process similar to the 'generative dance' experienced by individuals and groups (Cook & Brown, 1999). The result is an alternative conceptualization of organizational knowledge that brings a new and rich perspective to the debates encircling the search to understand the nature of knowledge in organizations.

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1. INTRODUCTION

The dominant view of organizational knowledge is that it exists in the form of routines resulting from an accumulation of past experience that guide future behavior (Levitt & March, 1996). Routines include the rules, operating procedures, norms, beliefs and frameworks that determine how the organization is designed and operated.

> *"They are recorded in a collective memory that is often coherent but sometimes jumbled… and change as a result of experience within a community of other learning organizations"* (Levitt & March, 1996: 517).

This view is shared by many major contributors to the field including: Argyris and Schon (1996), Dodgson (1993), Hedberg (1991), Huber (1996), Nelson and Winter (1982), Nonaka and Takeuchi (1995) and Weick (1995). However, there is also a growing body of theory which emphasizes other aspects, notably organizational knowledge as a source of competitive advantage (Edmondson & Moingeon, 1996; Grant, 1996; Lyles & Schwenck, 1997; Spender, 1996) and as a defining characteristic of organizational capability (Nanda, 1996; Teece, Pisano & Shuen, 1997; Zollo & Winter, 2001). These more recent contributions are important because they start to extend our understanding of organizational knowledge; but they are also lively areas since they contain within them two major debates about the nature of organizational knowledge. The first centers on tacit knowledge and its relationship to explicit knowledge. Specifically, some theorists contend that tacit and explicit knowledge are interdependent and can be expressed in the form of a continuum in that knowledge is more or less explicit and tacit (Crossan, Lane & White, 1999; Inkpen & Dinur, 1998; Nonaka & Takeuchi, 1995) while others argue that they are actually separate and distinct types (Cook & Brown, 1999; Gourlay, 2000; Spender, 1994, 1996).

The second debate is on the process of knowledge creation and specifically whether knowledge can be generated at the level of the organization, building on the view of organizations as semi-organic systems (Reber, 1993; Spender, 1996) or quasi objects (Latour, 1987), or whether it is dependent on the amplification of individual and group knowledge and thereby is a product of this lower level process (Crossan, Lane & White, 1999; Inkpen & Dinur, 1998; Nonaka & Takeuchi, 1995; Zollo & Winter, 2001). The latter group of theorists propose that organizational knowledge is created as a result of a cycle or spiral of knowledge creation that is anchored in the learning of the individual. In contrast, the theories of Latour (1987), Spender (1996) and others suggest that organizations are self-regulating systems that are capable of knowledge generation in their own right. This has an interesting parallel to Cook and Brown's (1999) discussion of the process of knowledge creation by individuals and groups as a form of 'generative dance', which is a dynamic and fluid process that is based in productive inquiry. The work of Cook and Brown (1999) is based primarily on examples drawn from individual and group levels of activity, and there is limited evidence as to whether their framework is also applicable at the wider organizational level.

This paper explores the process of organizational knowledge creation from both perspectives and, as we discuss later in this paper, that it is not an 'either or' but rather a 'yes and' situation in that there is evidence supporting both depending on the type of knowledge being created. Specifically that the 'generative dance' provides an accurate representation of the dynamic and fluid process by which both socio-political and

strategic organizational knowledge are created. At the same time we find the amplification and transformation processes of Nonaka and Takeuchi and others are evident in the creation of systemic organizational knowledge.

This expanded definition of organizational knowledge, its tacit and explicit dimensions, and the process by which it is created have been developed from the findings gathered from a year-long study of knowledge transfer and creation as it occurred between two U.S. telecommunications companies involved in an acquisition. An in-depth exploration of changes that affected one or both organizations provided a unique opportunity to examine the nature of knowledge at the organization level and the processes by which it was both created and exchanged.

In the ensuing sections, we first set the stage by describing the research setting and the methodology used to gather and analyze the data that forms the basis of our observations. This is followed by the presentation of an alternative conceptualization of the nature of organizational knowledge which includes: (1) a model of organizational knowledge that has systemic, socio-political and strategic dimensions; (2) clarification of the nature of tacit and explicit knowledge at the level of the organization; and (3) the process by which organizational knowledge is created. Before proceeding, however, we first define what is meant by the term 'organizational knowledge' after which we present a summary of the two debates discussed briefly in this section as a foundation for the concepts presented in this paper.

2. ORGANIZATIONAL KNOWLEDGE

Although there has been significant debate in the literature regarding the question of whether organizations can learn, the concept of organization level knowledge has received limited attention. There are two main exceptions: first, structural theories of organization behavior (behavioral view of organizational learning), which recognize a systemic level of knowledge that is embedded in organization routines, and second the strategic management perspective which similarly emphasizes the embedded core competencies that determine an organization's capability.

Structural theories of organizational behavior "propose that if the right conditions are put in place, the desired behaviors are more likely to occur" (Edmondson & Moingeon, 1996: 29). This perspective asserts that organizational routines, which include rules, beliefs and frameworks, determine how the organization is designed. They also guide behavior and are stored in the collective memory (Brown & Duguid, 1998; Levitt & March, 1996; Schein, 1993; Deal & Kennedy, 1982). This collective memory is believed to endure even after individual members leave….

> *"Individuals come and go but organizations preserve knowledge, behaviors, mental maps norms, and values over time"* (Hedberg, 1981: 6).

Within this perspective there are diverse views on the process by which organizational memory is created, although an area where there is consistency is the tendency to focus on processes related to 'learning how' which are seen as vital for organizational effectiveness (Edmondson & Moingeon, 1996). Some theorists believe that this is generated by individual members (e.g. Simon, 1996; March & Olsen, 1976), while others emphasize the role of groups or 'communities-of-practice' with shared interests,

'know-how, and a commonality of purpose (Brown & Duguid, 1996, 1998; Cook & Brown, 1999) or both (Doz, 1996; Inkpen, 1996, 1998; Crossan, Lane & White, 1999).

The strategic management perspective centers on the perspective of organization knowledge as the 'core competencies' that define the unique value that the organization provides to customers, shareholders, and other key stakeholders (Hamel, 1991; Hamel & Prahalad, 1993). These core competencies define the offer of the organization and determine its capability to compete in an open marketplace. They include the ability of the organization, and its members, to deal effectively with changing market environments through a combination of 'learning how' and 'learning why' (Edmondson & Moingeon, 1996: 35)….

> *"We have defined learning how as organizational members engaging in processes to transfer and improve existing skills or routines, and defined learning why as organizational members diagnosing causality. We argue that these represent two distinct organizational capabilities, which each can become strategic capabilities in different market environments. Where such factors as cost, quality and productivity are key determinants of market success, learning how is a strategic capability. Where relationship building and thoughtful analysis matter, learning why becomes a strategic capability."*

Both perspectives represent an 'epistemology of possession' (Cook & Brown, 1999) where the organization possesses knowledge in the form of routines and core competencies respectively. As such, the organization is recognized as a viable entity for storing certain 'systemic' forms of knowledge as well as, from the structural behaviorists perspective, a social element reflected in shared values and beliefs and even, according to the strategists, a strategic element manifested in responses to competitive pressures. The model we present later in this paper contends that while the 'systemic' elements have received the most attention in the literature, there are other forms of organizational knowledge, specifically socio-political and strategic forms, which are equally important to understanding its dynamic nature. It is this dynamic element that extends the concept put forward by Cook and Brown (1999) of an 'epistemology of practice' beyond individuals and groups to organizations themselves.

2.1. Tacit and Explicit Knowledge

The current debate encircling the concepts of tacit and explicit knowledge centers on whether these are separate and distinct entities as suggested by Cook and Brown (1999) or if, in fact, they "are not totally separate but mutually complementary entities" as per Nonaka and Takeuchi (1995: 61) and others (i.e. Crossan et al., 1994; Crossan, Lane & White, 1999; Doz, 1996; Inkpen & Dinur, 1998). This is an important distinction as it directly influences our understanding of the process by which knowledge is created.

Fundamentally, Cook and Brown (1999: 385) believe that "tacit knowledge cannot be turned into explicit, nor can explicit be turned into tacit". Rather, 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). By contrast,

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Nonaka and Takeuchi (1995: 61) contend 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'.

This debate is particularly interesting as both profess to be based on the work of the philosopher Michael Polanyi (1983). This may explain the similarities between the two perspectives in spite of this fundamental difference. First of all, both sides of the debate acknowledge that tacit knowledge is highly context specific and has a personal quality, which makes it difficult to formalize and communicate (Nonaka, 1994). Hence, tacit knowledge is incommunicable, intuitive, and unarticulated or as Polanyi (1997: 136) states: *"we can know more than we can tell"*. It can best be understood as knowledge that has not yet been abstracted from practice in that the acquisition of knowledge takes place largely independently 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). Cook and Brown's example of people knowing how to keep upright on a bike but their inability to describe exactly how this is accomplished exemplifies this view. Both sides also agree on the popular view of explicit knowledge as transmittable in formal, systematic language that may include explicit facts, axiomatic propositions, and symbols (Kogut & Zander, 1992; Nonaka, 1994). It is commonly referred to as objectified or scientific knowledge as it is formally encoded in organizational practices, procedures and routines. It is easily accessible and understood and generally tends be widely available (Spender, 1996).

The explanation for the difference in perspective may actually be found one layer deeper within their views on the nature of tacit knowledge. While Nonaka and Takeuchi (1995) emphasize the cognitive and technical aspects of tacit knowledge, Cook and Brown (1999) focus on its social dimension. The cognitive dimension refers to the 'mental models' that provide individuals with a working model of the world based on a personal set of schemata, paradigms, beliefs and values (Johnson-Laird, 1983; Senge, 1991). The more concrete, technical dimension refers to the 'know-hows' applicable to specific situations such as in the bicycle riding example. Polanyi (1997) and Revans (1982) offer a similar distinction in that they also differentiate between intellectual or theoretical knowledge (knowing what) and practical knowledge (knowing how) where the latter adds the "capacity for action to the abstract understanding of the situation" (Spender, 1994: 392). Brown, however, in collaboration with Duguid (1998, 1996), and Spender (1996) also propose a third dimension of tacit knowledge which they refer to as 'social knowledge'. This dimension is socially constructed and reveals itself in action or 'practice'. It is described as having partial and distributive characteristics in that it tends to exist in pieces throughout the organization in that organization members and groups do not know the same thing nor does anyone know it all (Brown & Duguid, 1998; Barley, 1996). It is similar to the definition of 'embedded knowledge' whereby some knowledge is highly embedded in social interactions and team relationships within organizations (Lam, 1997; Badaracco, 1991). Social knowledge is organized around a set of rules and a myriad of relationships that enable the organization to function in a coordinated way however these same routines are subject to failure and thereby require improvisation (Brown & Duguid, 1998).

This difference in emphasis on the three dimensions is significant. Referring back to an earlier quote from Cook and Brown, knowledge is created through the process of interaction with the social and physical world. This suggests a dynamic interplay of interactions that supports their view of tacit and explicit knowledge as distinct forms

which are socially constructed. In contrast the more structured cognitive/technical model lends itself more easily to the conversion theory of Nonaka and Takeuchi (1995). Although the latter recognize the importance of social interactions to the creation of new knowledge, they see this as occurring between individuals as a process of converting tacit to explicit knowledge and vice versa.

2.2. Organizational Knowledge Creation

An examination of the different perspectives regarding the process of organizational knowledge creation is closely tied to the previous discussion of tacit and explicit knowledge however it also brings to light a fundamental ontological difference. This difference centers on the role of individuals and groups or collectives in the process of knowledge creation. Interestingly, until this paper, the debate has yet to extend to organizations.

Specifically, Nonaka and Takeuchi describe individual tacit knowledge as the basis of organizational knowledge creation. In their view, individual tacit knowledge is 'mobilized' through four modes of knowledge conversion in a spiral process from the individual to the group and eventually the organization as reflected in the following quote (1995:59):

> *"... knowledge is created only by individuals. An organization cannot create knowledge without individuals. The organization supports creative individuals or provides contexts for them to create knowledge. Organizational knowledge creation, therefore, should be understood as a process that 'organizationally' amplifies the knowledge created by individuals and crystallizes it as part of the knowledge network of the organization."*

Other theorists such as Crossan and her associates (1994, 1999), Inkpen and Dinur (1998) and Doz (1996) have supported this view and provided enhancements of the amplification process. Zollo and Winter (2001), for example, describe organizational knowledge creation as dependent on individuals and groups to accumulate new experiences, articulate or share knowledge with others and codify this knowledge so it is accessible by other organizational members and can be retained in organizational memory. These models tend to view knowledge creation as a cycle or spiral similar in many respects to an organizational learning cycle such as that proposed by Nancy Dixon (1994), which is based on David Kolb's initial work on individual learning cycles (1984).

There is however a theory emerging in the literature which contends that "individuals and groups each do epistemic work that the other cannot" as illustrated in the knowledge of a surgeon regarding the performance of a specific diagnostic procedure versus the knowledge of what constitutes acceptable practice which is possessed by a group of surgeons (Cook & Brown, 1999: 386). In their view, no individual will possess all of the knowledge of the group. This knowledge is possessed by the group as a whole and is used by the group to perform its functions, which are different from the work performed by individual group members. As such, both individual and group knowledge are separate, distinct and of equal importance as are tacit and explicit forms of knowledge. As a result, they propose an alternative conceptualization of the process of knowledge creation, which they refer to as the 'generative dance'. The generative dance refers to a dynamic process of shaping and reshaping knowledge through interactions

with the world around us. It suggests that individuals and groups apply their tacit and explicit knowledge as part of action (the act of *'knowing')* and in so doing create new knowledge.

The differences between these two perspectives are significant as, although Cook and Brown have not extended the concept of knowing to organizations, it suggests that the process of knowledge creation is fluid and dynamic whereas Nonaka and Takeuchi and others suggest an approach that is somewhat more mechanistic and cyclical in nature. There are, however, also some similarities that are significant specifically with reference to the central role of individuals and groups as catalysts for knowledge creation. Neither perspective suggests that knowledge can be created independent of individuals and groups at the level of the organization. This paper, however, suggests that in fact certain types of organizational knowledge can be created independent of individuals and groups and that there is merit in both models of knowledge generation when applied at the level of the organization. Both of these concepts are discussed later in this paper.

2.3 Summary

So far, we have described several broadly accepted defining concepts that are influencing current thinking in the area of organizational knowledge. The first is that organizational knowledge tends to be defined somewhat homogeneically as a set of repeatable and replicable organizational routines. New knowledge is created when enhancements are made to these routines. Views on the process by which organizational routines are enhanced vary somewhat although there appears to be wide spread acceptance of the importance of individuals and groups in organizational knowledge generation.

Beyond these fundamental concepts, there are however debates regarding the nature of tacit and explicit knowledge and the process by which organizational knowledge is generated. Some theorists suggest that the challenge in organizational knowledge creation is making the tacit knowledge of individuals, and to some extent groups, explicit so that it can be shared and over time embedded in routines. Hence, understanding this process of transformation and the mechanisms that support and enable it becomes central to related views on knowledge creation (e.g. Nonaka & Takeuchi, 1995; Zollo & Winter, 2001). There are, however, some scholars who suggest that in fact tacit and explicit knowledge are separate and distinct and it is therefore not possible to transform one into the other. They suggest that both tacit and explicit knowledge are created through a process of dynamic interaction with the outside world that is fluid and non-mechanistic (e.g. Cook & Brown, 1999).

The remainder of this paper examines these concepts using qualitative data obtained from an in-depth study of a major corporate acquisition. Specifically, this paper attempts (a) to illustrate some alternative concepts regarding organizational knowledge types, (b) to identify evidence for/against the tacit/explicit distinction, and (c) to examine the applicability of a dynamic theory of knowledge creation at an *organizational* level of analysis.

3. METHODS AND DATA

This paper is based on findings gathered from a longitudinal study of Sprint Corporation's acquisition of a wireless company called PCS. An acquisition setting

provides a unique opportunity for the examination of the nature of organizational knowledge due to the importance of knowledge exchange, transfer and creation to the success of the venture. The opportunity to conduct this research was both fortuitous and opportunistic. At the time of the announcement of the acquisition, the first author was engaged in an unrelated consulting assignment within the PCS organization. This provided her with access to senior executives who were willing to allow her to conduct independent research throughout the period of the acquisition.

3.1. Research Setting

PCS is a U.S. telecommunications company that markets and sells personal digital wireless communications products and services direct to the public. It was formed in 1995 as a partnership between three cable television operators and Sprint Corporation with the mandate to develop a national 'footprint' which would differentiate them in the industry. The start-up was funded entirely by the partners and a few other private investors and within three years, before the doors were even open for business, they had over 3,000 employees. The growth rate was staggering both in terms of internal infrastructure and customer base to the extent that within 3 years of entering the business, PCS was one of the top 3 providers in the United States and the fastest growing! However, this also created stress on the ownership situation as costs rose in line with efforts to gain market share but profits continued to be elusive. Finally, in the spring of 1998, Sprint Corporation bought out the cable partners interest in PCS thereby gaining 100% ownership. The deal was ratified by Sprint's shareholders on November 23rd, 1998.

The implications of the acquisition were significant. To start with the change in ownership structure gave Sprint Corp. direct management control over PCS. Previously, PCS was able to maintain its autonomy as an offshoot of the power struggles between the cable partners and Sprint, neither of which was willing to let the other take the upper hand. Secondly, executives at Sprint did not hesitate to assert their new authority by replacing the Chief Financial Officer of PCS with one of their own and placing the Chief Executive Officer of PCS in a direct reporting relationship to Sprint Corp.'s Chief Operating Officer. This effectively made PCS a division of Sprint along with its long standing Long Distance and Local divisions. In addition, numerous other integration tactics were deployed including task forces to examine opportunities for process alignment, organizational restructuring to reduce perceived duplications and to force alignment of work practices and policies, as well as the 'One Sprint' initiative. 'One Sprint' was a program sponsored by the Chairman and Chief Executive Officer of Sprint with the intent of increasing the alignment and integration of its various divisions, including PCS, so as to be able to provide customers with a seamless portfolio of products and services. The organization was tasked with identifying areas for action that were in line with this mandate. Given that, at the time, Sprint Corp.'s employee base was approximately 60,000 people and PCS' was closer to 10,000, this created significant anxiety and skepticism within the newly acquired organization.

3.2. Method

Three separate business units – Human Resources, Legal and Finance - were selected as research sites within PCS based on the CEO's expectations that these would be most affected by the acquisition. The heads of each business unit were then asked to work with the researcher to identify six to eight respondents who would participate in the

study. Each respondent had at least one year of service with PCS, and were personally interested in being involved. Each of the twenty-four respondents agreed to participate in three, one-hour interviews over the course of the year which were held in November 1998 (pre- transition), April 1999 (early transition) and October 1999 (mid transition). Of the original eight respondents in each group, five were available for all three interviews. The attrition was the result of voluntary and involuntary terminations as well as withdrawals from participation in the study due to workload issues. This data was complemented by information about developments in the organization and key messages from senior management obtained through internal documentation such as department and company newsletters, access to the internal intranet sites at both PCS and Sprint Corp., and forwarded copies of e-mails from respondents.

Each interview was audio-recorded and transcribed so that the data could be analyzed and sorted using a structured approach to grounded theory (Locke, 1996; Strauss & Corbin, 1988). Due to the volume and complexity of the data collected a systematic objective coding process was used to maximize the reliability of the findings (Perrault & Leigh, 1989). Specifically, an initial coding table for knowledge types was developed from a review of the literature. In fact, not one but three different literature-driven frameworks were applied to the data until ultimately these were discarded and the categories were allowed to emerge. The final emergent approach involved analyzing each interview using a set of questions as a guidepost. These questions consisted of (a) what is organizational knowledge? (b) what is tacit and explicit knowledge at the level of the organization? (c) how is organizational knowledge created? (d) what variables or factors influenced the creation of this knowledge? Although these questions formed the basis of the analysis of all three sets of data, additional refining questions were added based on the answers that emerged. This included (e) how did the planned and unplanned use of power influence the creation of organizational knowledge? and (f) how did specific acquisition integration strategies affect organizational knowledge creation? The result was a framework that clearly identifies organizational knowledge and planned and unplanned power types linked causally by different modes of knowledge creation and exchange. The process of defining these causal relationships was difficult, as it required a multi-dimensional analysis, which we refer to as relationship mapping. Relationship mapping is consistent with the variation on pattern identification known as 'explanation-building', which Yin (1994: 111) describes as follows…

> *"The gradual building of an explanation is similar to the process of refining a set of ideas, in which an important aspect is again to entertain other plausible or rival explanations."*

This was accomplished by building a matrix with each identified knowledge creation and exchange mechanism as the central fulcrum balanced by different forms of power and knowledge types. The results of this analysis are presented in the following section.

4. ORGANIZATIONAL KNOWLEDGE TYPES AND CREATION DURING A CORPORATE AQUISITION

Our research data support the views of structural behaviorists and management strategists, to the extent that organizational knowledge exists in the forms of routines and core competencies. However there is also evidence that it is manifested as socio-

political and strategic organizational knowledge types. It is also apparent that each organizational knowledge type has both an explicit and a tacit dimension. Furthermore, the explicit and tacit dimensions of systemic knowledge appear to be related and potentially part of a continuum that is more or less explicit or tacit, this is not the case with socio-political and strategic organizational knowledge. Finally, the data also provides evidence that knowledge can be created at the organizational level independent of individuals or groups and that the process by which organizational knowledge is created appears also appears to vary by knowledge type.

4.1. A Typology of Organizational Knowledge

The most popular approach in existing models of knowledge types in organizations is to treat organizational knowledge as a single category that comprises knowledge embedded primarily in routines as discussed previously (eg. Bontis & Crossan, 1999; Child and Rodrigues, 1996; Dodgson, 1993; Hedberg, 1981; Levitt & March, 1996; Spender, 1994). In the few cases where knowledge types are differentiated, these tend to either focus either on the individual or to be a mix of individual, group and organization knowledge types. An example of the former is Spender's (1994) exploration of knowledge types that managers require to be effective in organizations, and an example of the latter is Child and Rodrigues' (1996) framework related to knowledge transfer between organizations. In contrast, our research indicates that it is possible to identify and study three distinct types of organizational knowledge: systemic, socio-political and strategic.

Systemic Knowledge. Systemic knowledge, or knowledge that is embedded in systems, policies, processes and procedures that govern how and what gets done in organizations aligns with the previously discussed structural theory of organization behavior and is similar to Spender (1994) and Child and Rodrigues (1996) definition of technical or scientific and systemic knowledge. It includes the 'know how' 'know what' and 'know why' that is a popular orientation within the cognitive school of thought represented by Nonaka and Takeuchi (1995), Edmondson and Moingeon (1996), March and Olsen (1976) amongst others. In its explicit form, systemic knowledge is formally encoded in practices, procedures and routines and includes the acquisition and implementation of new techniques such as statistical quality control or the structure of compensation plans as described in the following example provided by a senior HR manager at PCS …

> *"Sprint has a system that is a very open system that is more concerned with internal equity within all of Sprint. Much more fostering being able to go anywhere within the Sprint company and a grade 77 job is always a grade 77 job. It has basically the same structure, same base compensation structure. It is very clear that if you are a grade 76, a grade 77 is a promotion. We didn't have that clarity in our system."*
> Spring 1999

In addition, our research found evidence of a tacit dimension to systemic knowledge that refers to the hidden meaning embedded in the design of the processes, practices, systems and so on. Tacit systemic knowledge is the underlying reason for why things are designed a certain way or what they are intended to accomplish in terms of outcomes such as desired behaviors or actions.

In this study, tacit systemic knowledge only became apparent after a decision was made to change an existing process, such as the PCS compensation plan for non-exempt employees. Early in the acquisition process, senior executives at Sprint made a decision to transition PCS' non-exempt population to Sprint's compensation plan so as to ease the movement of people between the two organizations. The ensuing discussion between compensation experts of the companies focused on the mechanics of the transition process – how to make it happen as quickly and smoothly as possible. The tacit knowledge that only surfaced after the change was implemented was that the design of the PCS compensation plan attracted entrepreneurial people with a high tolerance for ambiguity and risk – a profile that was very different from that of Sprint's targeted hiring population. As a result, PCS is working with Sprint's lawyers and

compensation experts to determine a way to modify the plan to be able to address this key design element and enable it to attract and retain the right type of people, as well as reduce its annual costs.

> *"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. Andy has said if we knew now what we know we wouldn't have gone through this in April."* Director Human Resources, Fall 1999

Furthermore, grasping the intent of the meaning of the design of the PCS compensation system is dependent on Sprint being able to intelligently interpret the design in a similar context. The assumption made by Sprint was that the organizations were drawing on the same candidate pool and, therefore, the same compensation schema should be effective. Although correct on the surface, it quickly became apparent that each company attracted a very different character profile that was important to the employment relationship they wished to establish. In Sprint's case, they were seeking people with a strong orientation towards operational efficiencies and a long-term view on employment relationships whereas PCS hoped to attract the entrepreneurial risk-taker who wanted to be part of a start-up and was less interested in long-term employment. In this example, Sprint did not have the context to accurately interpret the intent of the design of the PCS compensation system. The learning resulted from experience and practice.

Socio-Political Knowledge. The second type of organizational knowledge is socio-political which refers to knowledge of the social and political composition of the organization including its people, roles and responsibilities (who does what) as well as coalitions, influence networks, and formal and informal decision-making processes. This is similar to certain aspects of 'social knowledge' (Brown & Duguid, 1998, 1996; Barley, 1996; Lam, 1997), or understanding of the broader societal context in which the organization is embedded including the social, cultural and economic contexts within which managers operate, and 'local knowledge', which is specific knowledge of the people and processes that managers encounter in their work (Spender, 1996, 1994). In its explicit form, socio-political knowledge includes knowledge of the organization's design, as well as formal decision structures and the expressed values of the organization.

> *"I participate now in a Sprint Policy Committee which is a newly constituted group to work out policy differences between divisions. I have a veto right over any policy that Sprint takes which is a nice change because Sprint has advocated things before government, State and Federal, that have harmed our interests in the past…I'm not sure what the process to use it (the Subcommittee of the Board) is though, although I think I have that in my back pocket if I ever need it. It's not just for resolving things between the divisions but also if there is a conflict between PCS and the rest of the phone divisions. I still have another way of getting that resolved in our favour."* Spring 1999

The tacit dimension refers to the hidden workings of the organization that includes knowledge of who is influential, how to 'really' get things done, what coalitions exist and who's in them, the norms of behavior, values and beliefs that define the organization's culture and so on. This is knowledge that is generally well known to insiders, although rarely articulated, but not to outsiders. In one respect, this knowledge

is a 'right of passage' to membership in the organization. In the interview transcripts there were numerous examples of PCS people trying to figure out the internal politics of Sprint as compared to the formal decision process that they had been communicated as illustrated in the following exchange…

> *"Interviewer - Have you seen this slower process actually affecting PCS decision making?*
> *Respondent - I don't know I guess it would depend. I haven't allowed it. I just go ahead and do things. If I had allowed it and this used to happen to me where I changed the way I worked like when we had a partnership I tried to run things by the Sprint partners…I never had any trouble with the cable partners they signed off on everything right away…but I never could get decisions from Sprint so I stopped running things by them. If I were to run things by them, I wouldn't get decisions so I don't do it.*
> *Interviewer - Are you getting any push back?*
> *Respondent - No because the person who would have had the ability to stop the way I was doing things was the guy that left. Everybody else is at my level and they can't dictate anything to me and (the General Counsel) who doesn't get involved in these sort of things and I'm covered in the other way by (the PCS CEO)"* Spring 1999

In another example, a director in Human Resources described her frustration with a decision made by Sprint executives to roll out a new job grading system at PCS that would align the two organizations. She strongly disagreed with the decision that was made yet was unable to determine how to influence the right people at Sprint to get the necessary result. She knew exactly how to make the right things happen at PCS but was constantly running into walls in her efforts at Sprint. In contrast to systemic knowledge, there does not appear to be a dependency between explicit and tacit socio-political knowledge. The latter is dynamic and seems to evolve as a result of a myriad of interactions within and external to the organization.

Strategic Knowledge. The third type of organizational knowledge is strategic knowledge, which refers to the position or context of the organization vis-à-vis its external environment and includes its history, status and position in the industry and society, its strategic plans, core competencies and competitive position. In its explicit form strategic knowledge includes the documented strategic context of the organization including knowledge of its history such as that recorded in annual reports and the news media. It also includes strategic plans, vision and mission statements, competitive analysis documents, and industry prospectus – the 'official word'.

> *"The organization had been paralyzed by the partnerships inability to agree on a business plan or on investment dollars. In 1997 cable partners refused to put up the money to buy the remaining 20% of the POPs. Sprint got their agreement to let them buy it without any contractual or financial arrangements. As a result we ended up having to run as a kind of weird hybrid organization reporting financials in strange ways. This was a major mistake by the cable partners who were listening to external analysts who were predicting $43 a block purchase price of POPs for a $2Billion investment when in actuality it went for close to $8 a block. This was a major win for Sprint in gaining control of PCS."* Fall 1998

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Thus, tacit strategic knowledge can broadly be defined as the hidden meaning behind the official word. It includes the legends, myths and stories of the organization that are the foundation of its culture and vision. It is the interpretation of the official word in terms of its implications for competitive positioning, market perceptions, customer perceptions and other stakeholder relationships. It also includes the social, cultural, competitive and economic context within which the organization operates and the core competencies that define its uniqueness in the marketplace. It allows for decisions to be made that include an understanding of the implications at a broader, strategic level. Child and Rodrigues (1996) description of 'strategic understanding' is somewhat similar however this is clearly an individual level of knowledge as it specifically refers to the mindsets of senior managers especially their criteria of business success and their mental maps of factors that are significant for achieving that success. In this case, tacit strategic knowledge was evident in the shift in internal power that occurred between PCS and its sister divisions, Local and Long Distance, at Sprint.

There wasn't a single quote that could adequately exemplify the tacit strategic organizational knowledge. It was the sum of a number of external events such as increased demand for digital wireless products, a strong economy that supported sale of luxury/commodity items etc. plus internal strategies and accomplishments such as the fastest build-out of a national cellular network, the fastest growth in terms of new customers, attaining #3 position in less than 3 years. These combined to create a position for PCS in the industry and marketplace that was a result of the combination of a variety of factors. The manifestation of the growing status of PCS was a rapid increase in share price, very positive attention in the media and with external analysts, and Sprint was targeted by MCI WorldCom as an acquisition because of its PCS business. The result internally was that PCS had greater clout with respect to decisions affecting the integration of the organizations as illustrated in the following quote…

> *"They did put out a tracking stock but aside from the financial benefits to those of us who have stocks and options, it's been one way of measuring the value of the company. Not just the financial value but the value in terms of how does Wall Street and the investment communities view our worth. Even in terms of purely financial terms of how you view the company's worth our stock has done extremely well. It's increased 5 fold in under a year. And I think that makes everybody feel good about how the company is perceived. We've had great growth not just in our stock but in our customer base as well. We've continued just in this past year to lead the rest of the industry by a long ways in terms of our growth. So I think there are a lot of things that PCS employees feel good about today that maybe they had mixed emotions about a year ago. And the WorldCom acquisition plays into that in that WorldCom…if you read the press and analysts comments, everyone points to the PCS business as the real driving factor of the WorldCom acquisition so in another way we view what we've done over the past 4 years as having value and that that value is being recognized by this merger. So I think those of us who survived the Sprint maneuvers feel legitimated by what we've accomplished."* Fall 1999

As in the case with socio-political organizational knowledge, strategic knowledge does not seem to result from an amplification of individual knowledge or a transformation of tacit-explicit knowledge. Rather it seems to be a fluid and dynamic outcome resulting from ongoing interactions internally and externally that may or may not directly involve

the organization. For example, a strong move in the stock market that affects an industry sector will impact an organization's position and influence without it being directly involved.

Summary. This study has provided evidence that in addition to knowledge that exists in organizational routines (systemic), organizational knowledge also takes the form of socio-political and strategic knowledge. Furthermore, each has a definable explicit and tacit dimension and each type is independent of the others. The exchange of knowledge that falls within a specific type does not require or, in many cases include, knowledge within the other types. For example, systemic knowledge of an organization's process designs can be transferred or created without including either socio-political or strategic knowledge. This is significant because, for knowledge exchange and creation between organizations to include all knowledge types, it requires attention to the modes of knowledge transfer used and, perhaps of even greater importance, the power dynamics that are influencing it. An in-depth discussion of the dynamics of power and knowledge during an acquisition is contained in a separate paper by these authors (Evans & Easterby-Smith, 2000).

Organizational Knowledge Type	Explicit Dimension	Tacit Dimension
Systemic	➢ Know-how ➢ Documented systems, processes, practices and policies	➢ Unspoken rules and meanings associated with the policies, processes etc.
Socio-Political	➢ Organization charts, roles and responsibilities ➢ Who does what where ➢ Formal decision process i.e. governance structure	➢ How to get things done i.e. influence networks, coalitions etc. ➢ Who's powerful and who isn't ➢ Values, norms and behaviors
Strategic	➢ Documented context including annual reports, industry prospectus etc.	➢ Interpretations of the 'official word' ➢ Competitive and industry position and perceptions of stakeholders ➢ Core competencies ➢ Status and role in industry, society and community

Table A: Organizational Knowledge Types and Dimensions

5. DISCUSSION

As noted in the introduction, there are currently two major areas of debate in the literature regarding the nature of organizational knowledge. The first is epistemological and deals with the nature of tacit and explicit knowledge and the second is ontological and focuses on the role of the individual and groups/collectives in the creation of organizational knowledge. Both of these debates are discussed in this section from the perspective of the findings from our research.

5.1. The Explicit – Tacit Knowledge Debate

Our research, we suggest, provides an important clarification of the debate regarding whether explicit and tacit dimensions are part of a continuum or separate and distinct. By examining the data from different epistemic perspectives, we believe that it is possible to support both arguments. If one views organizational knowledge from the popular position as residing in routines, practices, procedures and norms (Hedberg, 1991; Levitt & March, 1996; Zollo & Winter, 2001), by definition the type of knowledge that is the focus of analysis is systemic organizational knowledge. A closer examination of the definitions and examples of systemic organizational knowledge provided earlier in this paper, illustrates a dependency similar to a mirror image between the two dimensions. For example, the type of person attracted to work for the company manifested the explicit description of the design of the company's compensation plan in tacit form. Furthermore when explicit knowledge, in the form of the design of the compensation plan, was transferred from one company to another, its tacit dimension was also transferred. In these examples, knowledge became more or less explicit as a result of experience and, as such, arguably can be viewed as part of a continuum as per Inkpen and Dinur (1998), Crossan, Lane and White (1999) and Doz (1996).

However, if one analyzes the tacit and explicit dimensions of knowledge from a more social and relational perspective, as manifested in the socio-political and strategic forms of organizational knowledge, there appears to be a greater degree of separation and uniqueness. In fact, our research indicates that these two knowledge types each has both an explicit and a tacit dimension that exists in separate and distinct forms rather than as part of a continuum. Take for example, the design of the organization. When PCS became a division of Sprint, new explicit socio-political knowledge was created in the form of new reporting structures, decision-making forums, roles and so on. However, although new tacit socio-political knowledge was created, it did not mirror that of PCS' sister divisions, Long Distance and Local, nor did it take a static form. In fact, tacit socio-political knowledge continued to evolve and be generated over time as a result of a number of factors of which the new organization design was only one. Likewise, the acquisition of PCS by Sprint resulted in an explicit change in the strategic positioning of the organization within its industry however this was only one of several factors that affected its influence and perceptions in the external marketplace and regulatory bodies. In the case of both socio-political and strategic organizational knowledge, it appears that the tacit dimension is dynamic and affected by context to a much greater extent than the explicit dimension.

In sum, our research suggests that the explicit-tacit knowledge debate can be resolved by accepting that the perspectives taken by each side reflect different epistemic positions. As such, both are correct. The real value lies in understanding the need to apply a pluralistic approach to the analysis of organizational knowledge and its tacit and explicit dimensions.

5.2. The Knowledge Creation Debate: Conversion or Generative Dance

A pluralistic approach is also useful in examining the debate surrounding the process of knowledge creation. One side of the debate views knowledge creation as a process of knowledge conversion from individuals to groups and eventually organizations in combination with the transformation of explicit and tacit knowledge, as suggested by

Nonaka and Takeuchi (1995), Inkpen and Dinur (1998), Crossan, Lane and White (1999), Zollo and Winter (2001) and others. Although there are some discreet variances in the models proposed by these theorists, such as the number of stages in the process and terminology used, there is agreement that knowledge creation starts with the individual through a phase of exploration variously referred to as 'experience accumulation' (Zollo & Winter, 2001), 'intuiting and interpreting' (Crossan, Lane & White, 1999; Inkpen & Dinur, 1998), 'information generation' (Dixon, 1994) and 'enlargement' (Nonaka, 1994). This new information is shared with others, examined and challenged through a stage of 'integration' (Crossan, Lane & White, 1999; Dixon, 1994; Inkpen & Dinur, 1998), 'knowledge articulation' (Zollo & Winter, 2001), and/or 'sharing and conceptualization' (Nonaka, 1994). This collective knowledge is then 'crystallized' (Nonaka, 1994), 'codified' (Zollo & Winter, 2001), and 'institutionalized' in the form of organizational routines or knowledge. Nonaka and Takeuchi (1995) refer to this process as 'amplification' whereby individual knowledge is amplified into knowledge of the collective and eventually the organization.

This study found evidence of the amplification process however this was primarily in the generation of systemic organizational knowledge specifically where documentation was lacking in certain business practices such as in the Legal department. In this example, the PCS legal staff and the Sprint legal staff were reorganized resulting in new responsibilities that required them to deal with issues affecting both organizations. As in most Legal organizations, it is important that there is a consistent interpretation and application of practices, policies, legislation and the law. This forms the majority of systemic organizational knowledge within the Legal department. However, because of the reorganization, individual members lacked personal knowledge of the specific precedence and interpretations applied within the other organization and, in many cases, documentation was insufficient or lacking. The situation was resolved by providing forums, both formal and informal, for members of the Legal staff to discuss cases and their interpretations with their peers thereby promoting consistency through knowledge sharing within social interactions. This shared body of knowledge thus was amplified from the individual to the group and the organization where it was 'crystallized' in the form of precedence and policies. Using this example, it is also possible to observe the interaction between tacit and explicit knowledge that characterizes the cyclical or spiral models of knowledge creation posited by Nonaka and Takeuchi (1995), Crossan, Lane and White (1999), Inkpen and Dinur (1998), Zollo and Winter (2001) and others.

The amplification process however is less useful as a means of understanding the generation of socio-political and strategic organizational knowledge. In fact, our research suggests that the process by which these types of organizational knowledge is created is complex and multi-dimensional due in large parts to the dynamics of internal politics and external market struggles that shape the environment within which the organization and its' members interact and act (Evans & Easterby-Smith, 2000). For example, the decision processes at PCS changed both as a result of direct intervention by Sprint's senior executives in the form of different reporting relationships and formal approval processes but also as a result of perceptions of status and centrality to the organization's strategy and goals. The latter was particularly apparent after the MCI WorldCom merger announcement, which challenged the existing balance of power amongst Sprint's divisions leading to increased status and power gains by PCS. In this example, existing organization decision processes, which are a form of organizational routine, were directly affected however, more significantly, a subtle and widespread shift took place in terms of the 'voice' of PCS and its influence on organization decisions.

As such, the creation of socio-political and strategic knowledge at the level of the organization is more of a 'generative dance', to borrow a term from Cook and Brown (1999), than a transformation or amplification. In the 'generative dance', multiple images, experiences, interactions, and other information bites from a multitude of sources come together to shape and continually reshape the organization including its relationships, influence structures, culture, values, and position in the industry and marketplace. In this way, our findings are consistent with Cook and Brown's observations, which however is limited to theory related to knowledge creation by individuals and groups, in that we suggest that socio-political and strategic organization knowledge is generated through "a process 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" (1999: 397). In this respect organizations resemble "semi-autonomous organic systems" (Spender, 1996: 56) or "quasi-objects" (Latour, 1987) which are highly adaptive, open, flexible and comprehensive in that they include the total system that comprises the organization, its artifacts, environment and social world. Given that these organic systems, such as organizations, are also self-regulating this suggests that knowledge can be created at the organizational level independent of the actions of individuals and groups. In fact, as Reber (1993) suggests, this higher level of knowledge provides the context that brings meaning to the content of individual and collective knowledge.

The concept of 'knowing' is also of particular interest to understanding organization knowledge in that it distinguishes knowledge that is part of action versus something that is possessed or as Cook and Brown explain….

> *"By knowing we do not mean something that is used in action or something necessary to action, but rather something that is part of action (both individual and group action)"* (1999: 387).

Spender (1996: 54) likewise describes knowledge that "can only be known, evidenced, and communicated through action". We suggest that organizations, as organic systems, engage in the act of 'knowing' as a result of interactions with their environment that consist of other companies internal and external to the industry, government agencies, communities, customers, suppliers and others. As stated previously, these interactions occur in multiple forms, and at different times and although knowledge may discipline action, it is the act of interacting that results in the productive inquiry that leads to the generation of both tacit and explicit knowledge.

In sum, there is evidence to support both sides of the knowledge creation debate. On the surface, it would appear that the fundamental difference is the ontological position of the researcher. In the case of Nonaka and Takeuchi (1995) and other cognitivists, the emphasis is on the individual whereas Cook and Brown (1999), Spender (1996) and Latour (1987) and the social constructionists clearly focus on interactions with the social and physical worlds as the engine for knowledge creation. Interestingly, our research suggests that although this may explain their different orientation to the data, a second important difference lies in the types of knowledge that are involved. This is not to say that amplification cannot result in the creation of socio-political knowledge nor that the generative dance cannot result in new systemic knowledge. However, at the level of the organization, amplification is most effective for creating new systemic knowledge and the generative dance for the creation of socio-political and strategic knowledge.

6. CONCLUSION

The opportunity to study inter-organizational knowledge exchange and generation in an acquisition setting provided the researchers with a unique opportunity to study the nature of organizational knowledge. These findings form the central premise of this paper, which presents a model of organizational knowledge that both supports and, in some cases, builds on existing theory.

Fundamentally, this paper argues that organizational knowledge exists and is distinct from knowledge of individuals and groups. Specifically, there is evidence of three distinct forms of organizational knowledge types each with an explicit and tacit dimension. These are systemic, socio-political and strategic knowledge. Explicit knowledge is readily available in codified or documented forms whereas tacit knowledge is highly dynamic and difficult to access or share. Tacit knowledge also has cognitive, technical and social dimensions that are similar to existing theoretical frameworks of individual tacit knowledge.

However, our research also provides an important clarification pertaining to the debate that is currently centered on understanding the nature of tacit and explicit knowledge at the organizational level. Whereas some authors, such as Nonaka and Takeuchi (1995), Inkpen and Dinur (1998) and Spender (1996) suggest that there is a continuum of tacit and explicit knowledge, and others position them as distinct and separate (Child & Rodrigues, 1996; Cook & Brown, 1999; Lam, 1997), we contend that there is evidence supporting both positions. In fact, there is evidence that systemic organizational knowledge exists in a form that is more or less tacit and explicit whereas the tacit and explicit dimensions of socio-political and strategic knowledge, are more accurately conceptualized as separate and distinct. The difference, we argue, lies in the definition of organizational knowledge. The popular view has focused on procedures, routines and practices, which we refer to as systemic knowledge, and has ignored the other two knowledge types, which are more relational and social in nature.

In fact, there was significant evidence that the creation of socio-political and strategic organizational knowledge is a complex and highly dynamic process that has striking similarities to Cook and Brown's (1999) description of the 'generative dance' where new ideas and information are interpreted within the organization's context and thus generate new meaning and new knowledge. The input to the generative dance comes from a multiple of sources at any given time or over a prolonged period of time. As such, we argue that the creation of these two types of organizational knowledge is less a transformation of explicit or tacit knowledge or amplification of individual and group knowledge and more a result of productive inquiry consistent with the act of 'knowing' (Cook and Brown, 1999). There was, however, also evidence that supported the amplification process defined by Nonaka and Takeuchi (1995) and subsequently refined by others such as Inkpen and Dinur (1998), Crossan, Lane and White (1999) and others. In fact, it appears that amplification is effective at explaining the process by which systemic organizational knowledge is generated in both its explicit and tacit forms.

In sum, expanding our understanding of organizational knowledge beyond the systemic to include socio-political and strategic knowledge types assists us in better

understanding both the nature of organizational knowledge, its tacit and explicit dimensions, and the process by which this knowledge is created.

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