7-17-2008

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芽|Sprouts Working Papers on Information Systems ISSN 1535-6078

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Abstract
Our study examines the knowledge sharing at a global polymer manufacturing company during its post merger integration period. Drawing on the two opposing views on knowledge in organizationsâ knowledge-as-object and knowledge-as-relationshipâ and growing recognition in the literature that deliberate and formalized knowledge sharing approaches may not exactly mirror what is going on in the organization in its daily knowledge sharing, we propose a two by two conceptual framework. Through this conceptual lens, we examined the deliberate and emergent knowledge sharing patterns in post merger integration. We found that while the companyâ s formal deliberate knowledge sharing approach focuses on codification approach, employees rely on both codification and personalization approaches, thus skillfully enacting hybrid knowledge sharing patterns. Drawing on a distributed perspective of knowledge in organizations, we theorize that such hybrid knowledge sharing patterns were necessary to connect two large webs of knowledge at two companies recently merged. Our results challenge spurious separations of knowledge-as-object and knowledge-as-relationship.

Keywords: Knowledge Sharing, Distributed Knowledge, Post Merger Integration, Case Study

Permanent URL: http://sprouts.aisnet.org/2-18

Reference: Heo, D., Yoo, Y. (2002). "Knowledge Sharing in Post Merger Integration," Case Western Reserve University, USA . *Sprouts: Working Papers on Information Systems*, 2(18). http://sprouts.aisnet.org/2-18

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Introduction

Learning, innovation and knowledge are among the key issues that concern 21st century managers. Rapid organizational learning and continuous innovation are perceived as the new sources of organizational advantage (Drucker 1993; Teece et al. 1997), while knowledge is the critical factor of production that underpins these capabilities. New knowledge is created by combining previously unconnected bodies of knowledge or by re-applying existing knowledge in novel ways (Grant 1996; Schumpeter 1934). The ability to share knowledge from one unit to another has been found to contribute to the organizational performance (Argote and Ingram 2000). Thus, developing an understanding of how knowledge is shared is of interest to academics and practitioners alike.

As a result, an increasing number of organizations have adopted knowledge management practices and implemented knowledge management systems to facilitate knowledge sharing (Alavi and Leidner 2001; Davenport and Prusak 1998). However, knowledge in organizations is often socially-complex (Dierickx and Cool 1989; Orr 1990), distributed (Argote and Ingram 2000; Boland and Tenkasi 1995; Hutchins 1995; Weick and Roberts 1993), sticky (Szulanski 1996; von Hippel 1994) and causally-ambiguous (Lippleman and Rumelt 1982), thus making it difficult for organizations to effectively share it and subsequently gain competitive advantage.

Knowledge sharing in the context of post merger integration poses unique challenges to the management. Often post merger knowledge sharing occurs across the boundary of two previous separate organizations. Thus, one can easily speculate that all of the problematic elements of knowledge in organizations will be amplified in post merger integration contexts. At the same time, current waves of mergers are often characterized as "synergy seeking," contrary to the earlier ones that focused on the reduction of the costs of capital through the creation of conglomerates (Bhagat et al. 1990; Brush 1996; Jensen 1988; Jensen 1993; Shleifer and Vishny 1991). From a resource-based view of the firm (Barney 1996; Penrose 1959; Wernerfelt 1984), mergers are seen as opportunities to increase business efficiencies and effectiveness through reformulating pools of resources (Capron et al. 1998). Thus, effective knowledge sharing across the boundaries that exist between the firms involved in a merger is critically important for post merger integration. However, there is virtually no prior research in the literature on this important issue.

To fill this gap, the current study examines knowledge sharing in the context of post merger integration between two global polymer manufactures. We found that in this situation, establishing a shared context for knowledge shared is a major challenge. This is the case despite the firm's effective implementation of a centralized knowledge repository. While this type of repository was found to be useful for sharing knowledge among individuals who used to work for the same company before the merger, it was later viewed as limiting when individuals tried to share knowledge with others from the merger partner. We further found that individuals often overcome such challenges by skillfully enacting an emergent knowledge sharing pattern that combines both centralized knowledge sharing as well as direct personal communications.

This study sheds light on the issue of sharing contextualized knowledge in organizations (Nidumolu et al. 2001; Orlikowski 2002). According to Brown and Duguid (1991, p.40), de-contextualized knowledge, or "abstractions detached from practice, distort or obscure intricacies

of that practice. Without a clear understanding of those intricacies and the role they play, the practice itself cannot be well understood, engendered, or enhanced." Even though the effect of de-contextualized knowledge on knowledge sharing and a firm's performances is an important issue, it has seldom been studied. Thus, by examining knowledge sharing in PMI, this study makes important contributions to these issues.

Our study also contributes to the post merger integration literature by pointing out the difficulties and importance of effective knowledge sharing across the boundaries between the two merger partners. Given the increasing importance of the integration of knowledge resources of the companies involved in the merger, effective knowledge sharing should be an important part of the discourse in post merger integration literature. However, with the exception of a few empirical studies (e.g., Bresman 1999; Capron and Hulland 1999), there has been no systematic research on knowledge sharing in the context of post merger integration. Our study suggests that management needs to reduce the uncertainty associated with knowledge sharing through various means of support. Our study also suggests that knowledge sharing practices that might have been effective before the merger may not be sufficient in the post merger integration.

Background

Knowledge Sharing in Organizations

Over the last several years, significant theoretical and empirical efforts have been dedicated to uncovering the various aspects of knowledge sharing in organizations. Out of those intensive efforts, two different perspectives of knowledge sharing have emerged in the literature (Alavi 2000; Cook and Brown 1999; Hansen et al. 1999; Orlikowski 2002). Rooted in different epistemological traditions, these two perspectives suggest rather contrasting approaches to knowledge sharing in organizations.

The first perspective likens the knowledge in organizations to objects "out there" that can be created, collected, stored, retrieved and reused (Alavi 1997; Alavi and Leidner 1999; Davenport and Prusak 1998; Hansen and Haas 2001; Szulanski 1996; Szulanski 2000; Zack 1999). This perspective emphasizes that knowledge in organizations needs to be codified in order to be effectively managed. This perspective results in knowledge sharing practices that aim to "package and pass" on knowledge through centralized knowledge repository. In this perspective, knowledge sharing can be understood using a conduit model of communication (Shannon and Weaver 1949; Szulanski 1996; Szulanski 2000) that consists of a sender, a receiver, a conduit, knowledge, and environments. In the literature, this approach is often referred to as the *codification approach*.

The second perspective draws on the sociology of knowledge (Boland and Tenkasi 1995; Brown and Duguid 1991; Brown and Duguid 2000; Hutchins 1995; Latour 1987; Lave 1993; Lave and Wenger 1991; Nidumolu et al. 2001; Nonaka and Konno 1998; Orr 1990; Weick and Roberts 1993; Wenger 1998) and suggests that knowledge in organizations is socially constructed and collectively held. Furthermore, according to this perspective, knowledge is malleable, uncertain, and embedded in work practices and social relationships. This perspective results in knowledge sharing practices that focus on "communities of practice" in organizations that nurture and preserve collective knowledge in organizations. Thus, the individuals' identification with such communities is a critical aspect of knowledge sharing. In this view,

stories, narratives, and metaphors are viewed as important tools for knowledge sharing. In the literature, this approach is often referred to as *personalization approach*.

Often these two approaches are viewed as two competing "strategic" alternatives of knowledge management (Alavi 2000; Hansen et al. 1999). For example, Hansen et al., suggest that companies with different strategies should adopt different knowledge management approaches. According to these researchers, if a company's products and services are standardized, it must adopt a codification approach to knowledge management. On the other hand, they also argued that if a company creates innovative or customized products and services, the company must adopt a personalization approach. Furthermore, they argue that these are strategic choices that need to be made by top executives in order to effectively manage knowledge in organizations.

Recent empirical studies of knowledge sharing practices in organizations, however, reveal that such formalized approaches may not mirror exactly what is going on in the organization in its daily knowledge management practices (Nidumolu et al. 2001; Orlikowski 2002; Wenger 1998). Thus, organizations' formalized efforts to introduce standardized knowledge management approaches - in many cases with information technology - may not produce the intended outcomes.

A recent empirical work by Orlikowski (2002) provides an account of five different practices—sharing identity, interacting face-to-face, aligning efforts, learning by doing, and supporting participation—related to knowledge sharing in the new product development teams of a successful multinational software company. She attributes the success of the company primarily to its members' ability to collectively enact these five practices in their ongoing and daily accomplishments. Nidumolu et al. (2001) also argue that understanding ongoing and situated knowledge practices is essential to the success of effective knowledge sharing in organizations. They studied a failed knowledge management project in a company and later suggested that a disconnection between the ongoing situated knowledge management practices and the formal knowledge management efforts was the critical reason why the company's knowledge management efforts failed.

This line of work suggests that some of the earlier works in knowledge sharing literature did not pay enough attention to what—following Mintzberg's (1979; Mintzberg and Waters 1985) distinction between deliberate and emergent strategies—may be termed "emergent" knowledge sharing. While a deliberate knowledge management approach is the realization of strategic and planned patterns of knowledge sharing, emergent knowledge sharing is the realization of new patterns of knowledge in the absence of explicit and intended plans. Emergent knowledge sharing thus underscores the agency of individuals who skillfully adopt the prescribed knowledge sharing strategy initiated by the company's management.

This suggests that knowledge sharing in organizations can be represented in the following two dimensions: (1) the *approach* to knowledge sharing (codification and personalization); and (2) the *nature* of knowledge sharing (deliberate and emergent). These dimensions yield a four-fold classification of knowledge sharing patterns (as shown in Figure 1). Such a classification framework can be used to explain, anticipate, and evaluate knowledge sharing patterns in organizations. Using this framework, we analyze the knowledge sharing patterns in post merger integration.

		Deliberate Knowledge Sharing	Emergent Knowledge Sharing
Approaches to Knowledge Management	Codification Approach	Centralized knowledge repository	Local intranet / knowledge
	Personalization Approach	Knowledge maps, expertise directory	Communities of practices

Nature of Knowledge Sharing

Figure 1. Approaches and Nature of Knowledge Sharing and Examples

Knowledge Sharing in Post Merger Integration

As noted earlier, post merger integration presents a unique and challenging context for examining knowledge sharing in organizations. During the post merger integration period, while the desire for and necessity of effective knowledge sharing may be high, it is particularly challenging to share knowledge across the boundaries of the two newly merged companies due to the lack of shared context and mutual knowledge. It is the "taken-for-granted" knowledge (Giddens 1984), or the lack thereof, that prevents effective knowledge sharing between the employees of the companies involved in a post merger integration.

Similarly, past research on organizational routines (Nelson and Winter 1982; Winter and Szulanski 2001) has shown that knowledge in organizations is established and accumulated over a period of time through repeated actions. As such, knowledge in organizations can often be ingrained into organizational routines that are deeply held and observed by organizational members. Thus, knowledge in one organization can be seen as ironic, mystic, and problematic to those who are not familiar with such routines (Lam 1997).

Past research on intra-organizational knowledge transfer (Cohen and Levinthal 1990; Szulanski 1996) also suggests that the lack of absorptive capacity or related knowledge can be a serious challenge to knowledge sharing in post merger integration, even if individuals are highly motivated to share knowledge. Brown and Duguid's (2000) colorful example of Xerox's failure to share knowledge internally is in stark contrast to Apple's success in importing the same knowledge across organizational boundaries and clearly shows the importance of mutual knowledge in effective knowledge sharing.

From this discussion, it is evident that post merger integration adds additional layers of complexity and difficulty in knowledge sharing in organizations. In a sense, knowledge sharing in post merger integration is like a "stress testing" of knowledge sharing in an extreme condition. Therefore, studying knowledge sharing in post merger integration can provide insights not only into post merger integration itself, but also into knowledge sharing in general.

Our goal in this study is to examine knowledge sharing in post merger integration through the framework presented in Figure 1. In particular, how individuals overcome challenges during post merger integration and how such efforts are reflected in emergent knowledge sharing is our prime focus in this study.

Case Study

Research Design

We conducted a single case study to examine knowledge sharing in post merger integration (Yin 1994). According to Yin, a single case study can be useful when the purpose of the study is revelatory in its nature. This is a case that had rarely been investigated by other researchers, even though the case itself can be found in other situations (p.40). While post merger integration is a common phenomenon and knowledge sharing in post merger integration can be found in many organizations, it has not often been studied. Thus, we opted to use a single case study in order to begin to understand the nature of knowledge sharing in post merger integration by examining the account grounded in empirical observations or the data generated (Eisenhardt 1989; Martin and Turner 1986). By incorporating the organizational context, organizational processes, and changes associated with knowledge sharing into the study, these theoretical accounts expected to produce accurate and useful results that would reflect the complexities of reality (Orlikowski 1993).

Site Selection

The study involved one of the world's largest polymer compound manufacturing and service companies located the U.S. (referred to as Omni hereafter). Omni was formed through a merger of two firms—Alpha and Beta. The merger was collaborative in nature and combined two equal but complementary firms in the same industry. Before the merger, Alpha was known as one of the world's largest producers of vinyl compounds and vinyl specialty resins/formulators. It had grown its business through the acquisitions of other companies with complimentary products as well as through a series of joint ventures with other corporations. Prior to the merger, Alpha had been successful in integrating these acquisitions and joint ventures into its business operations. On the other hand, Beta had been a provider of a wide range of color additives and custom plastic/rubber compounds on the market and had offered resin distribution services. It also grew from a series of acquisitions and emerged in the late 1980's as a company focused on the polymer industry. Throughout the late 1980s and 1990s, Beta focused on acquiring a number of polymer companies and participating in a series of joint ventures, all of which helped Beta become a global, Fortune 500 company.

In the year 2000, Omni produced 55,000 products, generated $3 billion in sales and now has 10,000 employees who serve 35,000 customers in over 30 countries. Omni is organized into the three following business segments: 1) performance plastics; 2) elastomers and performance additives; and 3) distribution. These three segments were, in turn, made up of five business units working independent of one another.

Omni was chosen for the study for two primary reasons: (1) it has been recognized as having a strong culture of managing corporate knowledge in the past; (2) it has recently experienced a merger between two almost equal but complimentary firms in the same industry. This provides an excellent opportunity to observe both deliberate and emergent knowledge practices in post merger integration.

Data Collection and Analysis

Data collection and data analysis followed the recommendations by Eisenhardt (1989) and Yin (1994). Data was collected mostly from 22, in-depth interviews with managers, employees and staff members of Omni Knowledge Center and complimented by direct

observation of the systems and archival documents. Table 1 describes the job area, positions, and original membership of the interviewees.

		Managers		Employees		Total
		Alpha	Beta	Alpha	Beta	
Job area	R&D (Scientist group)	3	2	2	2	9
	Operations and Marketing (Business group)	2	1	3	2	8
	System development (IT group)	2	1	2	0	5
Total		7	4	7	4	22

Table 1. Description of Characteristics of Interviewees

Data were collected in three steps. First, archival data and documents on the history, sales, organization, and policy of Omni (including Alpha and Beta) were collected and direct observations of the firm's official knowledge management system was done with the help of Omni's Knowledge Center. Two pilot interviews were then performed in an open format to explore the potential research issues. Finally, based on the insights obtained from the pilot interviews, semi-structured interviews were conducted to examine both deliberate and emergent knowledge sharing patterns. The interviews with managers and the staff members of the Knowledge Center were conducted in order to identify deliberate knowledge sharing patterns, while the interviews with employees were used to find out emergent knowledge sharing patterns. In particular, when we interviewed employees, we used a critical incident method in order to ask them to give us a detailed account of their recent experience of sharing knowledge from individuals from Alpha, if the person used to work for Beta, and vice versa. In addition, we asked them about the merger experiences and the role of information technology, before, during, and after the merger. Each interview lasted for one to two hours; all were tape-recorded.

Following the recommendations by Eisenhardt (1989), Boyatzis (1998), and Yin (1994), we repeatedly read the transcripts and interview notes to identify key aspects of each interviewee's perspective on knowledge sharing, information technology and the merger process.

Results

Knowledge Sharing at Alpha and Beta Before the Merger

Before the merger, Alpha and Beta had different cultures and knowledge management practices. Alpha's corporate culture had been recognized as open, trusting, and collaborative. Two prior Alpha employees recalled the following:

> "Back then, we used to know one another very well. Promotions, marriages, births and retirements were company-wide news and all employees took the time to celebrate the occasions. … Also, we trusted each other."

> "Alpha never seemed like a powerful leader culture where somebody would say, 'this is what we going to do, this is how you going to do it, and here's your task'. That was never our culture. Our culture was, …if there is a project being launched, somebody would sit down and say 'well … you know, here's the area that's going to be involved. We need somebody who can deal with that'. Then, somebody would be identified and brought in. So, it's like a committee and team management strategy. And that was the flavor we always had."

Based on its open and trusting culture, the management of Alpha encouraged knowledge sharing among people by training new members, evaluating employees' knowledge sharing practices and developing the firm's knowledge sharing policy. The firm established a Knowledge Center in its information systems department in 1997. The Center developed from the corporate library, which was established at Alpha in 1963 to manage the company's books, journals, manuals and technical reports. Within the library, a knowledge repository called Central Technical File (CTF) that holds polymer and plastic R&D information was established in 1980. Right before the merger, CTF contained about 70,000 research documents. The Knowledge Center also managed the corporate intranet that hosted CTF, human resource modules and other research related databases that included information about material safety data and quality. Alpha's top management actively supported all these projects by assigning necessary financial and human resources.

Most new employees at Alpha participated in a training session hosted by the Knowledge Center. During the training session, the employees were taught the importance of knowledge sharing, how to search for knowledge and how to post to CTF the new information they had obtained. Researchers and scientists *voluntarily* followed the policy by generating, storing, and leveraging reports from projects. One researcher made the following comment: "We have a motto, 'In God, we trust and bring knowledge.'"

Contrary to Alpha, Beta had a different culture and knowledge sharing practices. Since Beta had grown primarily through a series of acquisitions of direct competitors, Beta always emphasized an entrepreneurial spirit. As a consequence, internal competitions among different divisions were encouraged and expected. Most top executives often made decisions independent of one another and there was a minimum of, and perhaps no, communication among employees outside of their own division. A former Beta manager stated the following:

> "There was no so-called Beta culture. There's only cultures representing units or divisions of Beta, not for entire Beta … Beta didn't much care about culture."

The lack of a cohesive organizational culture also led to a lack of knowledge sharing within Beta. As one Beta manager said:

> "Some of Beta departments used to have rooms filled with file cabinets. In each cabinet, there were files and documents never shared with others outside the department. Sometimes, even members of the department had no idea what's in there."

Complicating the situation even more, Beta had 18 different systems that operated independently with little integration as a result of its growth strategy through acquisitions. Thus, knowledge was rarely shared across these systems, especially across different divisions. A staff member of the Knowledge Center described the situation at the time of merger:

> "We tried to have Beta people [who were specialized in knowledge management] in our Knowledge Center at the time of merger. But we couldn't, because we couldn't find any. There was no one doing knowledge management or even a library job at Beta. Since they were bigger than we were, we expected some facilities and systems [for knowledge management]. But, there was nothing. One time we heard that they had a library at one place. But, it was a bunch of books located at the corner of small office. And there was no one managing those books."

In summary, at the time of merger, Alpha had very active knowledge sharing practices throughout the firm, particularly among researchers and scientists, and the senior executives provides necessary support to encourage active knowledge sharing. CTF and the Knowledge Center played vital roles in establishing knowledge sharing practices at Alpha. On the other hand, Beta had little, if any, systematic efforts in place that encouraged or promoted knowledge sharing.

Deliberate Knowledge Sharing at Omni

Since the merger, knowledge sharing at Omni has been established based on the Alpha's model. Beta employees were integrated into Alpha's systems and culture under the initiatives of the new CEO, who happened to be Alpha's former CEO. Beta's databases, enterprise resource planning systems, and other systems were all absorbed into Alpha's system. As Omni CIO mentioned, "We did an inventory of all different Beta systems and tried to get our arms around it and then developed one Omni system." Alpha's intranet, with its knowledge management system, was given some cosmetic changes and became the official company site, called Knowledge Web right after the merger. This wasn't a difficult decision for the company as Beta did not practice knowledge management and did not have an Intranet before the merger. Former Beta employees were being introduced to the knowledge management system and culture. Finally, the training sessions were offered by Knowledge Center to Beta's managers and employees.

The codification approach was dominant in the discourse of Omni's upper management and staff members of the Knowledge Center. Their beliefs and attitudes were evident regarding what should be 'desirable' knowledge sharing at Omni as well as the best way to plan and implement it. Most of Omni's upper level managers and Knowledge Center staff members thought that Omni's corporate knowledge should be documented and fed into a system following a set of standardized rules. As one upper manager described:

> "… Our knowledge management process follows three steps. First, we gather ideas and opinions from people. Then, we put these together. And finally, I think that this is the most important step, we generate reports for the decision-making or future use. … We have a standardized format to store knowledge in our Intranet. So, all the reports follow this standardized format."

In many cases, among management and staff members of the Knowledge Center, coding and storing were considered to be methods of knowledge management or knowledge sharing in this mode. The following interview with a technical group leader effectively illustrate the situation:

> Interviewer: How important do you think *knowledge management is* to your group?
>
> Interviewee: *Documentation* is so important to us. It is the only way we can preserve the valuable research knowledge for the future projects. … Also, every time we begin new project, the first thing we normally do is search the previous research documents from the systems.

Here, in reference to the importance of knowledge management, this manager explained the role of documentation. For him, both documentation and knowledge management are the same. A similar example can be found in the following excerpt from an interview with another manager:

> "I always emphasize the importance of *knowledge sharing* to my staff members. So, I keep telling my people that we should *document and feed the Intranet* with what we have done. And, I am sure that all my team members are pretty good at how to generate, download, and upload the documents. At least, in my team, we actively create and share most important work related knowledge."

For this manager, the phrases 'knowledge sharing' and 'document and feed the Intranet (storing)' are interchangeable.

From the vantage point of the deliberate knowledge sharing mode, it is believed that reliable content emerging from codified knowledge is highly valued. Thus, codified knowledge is distributed as "official" knowledge to relevant individuals and teams throughout the firm. On the other hand, "unofficial" forms of communication such as phone conversations, voice mail and email messages are used only to convey informal feedback. One manager of a technical group mentioned the following:

> "We normally send written document to the other staffs and production people, and [we] hardly use e-mail or videoconference, because these methods cannot store and codify the knowledge at all."

These content-oriented attitudes and practices seem to stem from the belief that sharing a standardized format of knowledge enables the same understanding among people doing the same job. As one manager explained:

> "It is so important for us to share the same understanding of each issue that we handle. We also need to keep all the records for our future use … So every time we (he and his staff) discuss the project, we try to document our idea about what the goal of this project is, how to approach the issue, what the possible solution is, and what the expected problems are. … And, next time we discuss or work on the same issue, we always go back to what we had documented first and then build on it. …"

Finally, in deliberate knowledge sharing at Omni, a knowledge repository is the most important tool. For about forty years, a firm's library has served as Alpha's central knowledge repository and the center of all the knowledge management activities. Major outputs from research and development projects were required to be documented and fed to the central repositories such as CTF and other databases according to company policy. Staff members were encouraged to document other knowledge and to upload the material onto the Intranet. Similarly, Knowledge Web has been another knowledge repository that extends Alpha's library concept after the merger. On the other hand, they never tried to make knowledge maps, discussion boards or virtual communities of practice in order to facilitate direct and informal knowledge sharing and communications among employees. As the manager of the Knowledge Center described:

> "The greatest part of Knowledge Web is pulling things together in one place. In other words, all the contents and the applications can be integrated in Knowledge Web."

A similar view was expressed by a staff member of the Knowledge Center when she shared her perspective of Beta's knowledge sharing practices at the time of the merger:

> "What we saw from Beta was that they were not storing any documents anywhere. I guess maybe each research lab may keep their documents. They didn't have a library. There's no centralized facilities searching and storing knowledge. … Their knowledge was scattered all over the company. And they didn't share the knowledge between operations for whatever reasons."

Taken together, it is evident that the codification approach supported by the centralized knowledge repository (CTF and Knowledge Web) and the Knowledge Center located within the corporate headquarters dominates deliberate knowledge sharing at Omni after the merger. Much of the beliefs and practices that were inherited from Alpha had a successful knowledge sharing tradition.

Emergent Knowledge Sharing at Omni

While the codification approach still plays an important role in the daily knowledge sharing practices of employees, its importance and effectiveness is rather limited compared to what was envisioned by the company's management. They complement the codification approach promoted by the management with a personalization approach. In pursuing a personalization approach in knowledge sharing, employees at Omni emphasized the importance of knowing reliable people whom they can trust over obtaining codified contents. For example, one employee noted:

> "When I need knowledge and I don't know where to locate it, I always rush to a bunch of people who I think are experts. To me, it is much easier and saves time in most cases. Since the knowledge I need is more general and context dependent, searching the systems and documents does not give me a direct answer to my question. So, even though I expect I can find some related knowledge from the files and documents, I first go and ask other people about it."

Similarly, another manager commented:

> "When I don't know who the expert is, I use my connections of colleagues. … From my past experience, I know that it has been effective in most cases and that's why it's my favorite."

The importance of the knowledge about people became critical when employees were not sure about the quality or context of the codified knowledge stored in the central knowledge repository. Thus, they often relied on human connections in order to judge the credibility and importance of the content. Following are three comments that illustrate this point:

> "If I want to get an important, long document from this guy, I will not just throw an email. I will probably show up and ask for his thoughts on that document."

> "In a sense, well-specified knowledge can be dangerous because documentation simplifies the whole picture of things, and almost always omits some possibly important components you should know. You know, things are not that simple and clear in reality. Besides, things keep changing. … So, to me, knowing what really happened and how it happened is much more important than getting some nice descriptions."

> "I think knowledge from written sources is cold and factual in nature and does not let one know the depth of understanding of the knowledge in the organization nor does it show how deeply in the organization a practice is deployed. For example, I may read that it is a practice to verify all

> incoming raw materials against established specification. However, it is only when I get fresh knowledge directly from the site that I can find out whether people know how to find specifications, whether they understand what they are looking at, and how often an issue arises. In this regard, face to face contact or hands-on experiences are more credible sources of knowledge."

It is interesting to note that many employees do not use the centralized knowledge repository to enact the codification approach, but rather use it to enact the personalization approach. For example, one member of the Omni's quality group explained the following:

> "We have Quality Web in our group and there we post questions and exchanges what we know through a discussion board. To me, this site and these people have been the most important knowledge source because I can get almost any knowledge, which I can't get from the manual from here. It's like a small community. I make a phone call or sometimes I visit their offices for my tough questions. In this way, we help one another."

It is critically important to note that employees' reliance on the personalization approach is particularly dominant when they seek knowledge across the boundaries between Alpha and Beta. Many employees noted that they could "access the Intranet and CTF less than before," or "frequently resort to face-to-face interaction," or "double check the meaning of the document through face-to-face interaction or phone calls," when they seek the other's knowledge. A former Alpha employee reports the situation as follows:

> "I think I am pretty much confident that I can find Beta knowledge from the [knowledge management] systems. However, I hardly tried it. … Rather, I call the (Beta) people or go to them and get what I want to know directly. That's not because I don't trust their documents and files. I trust them. Why? I don't know. I have never thought about it"

Another interview with a former Beta manager also reflects the same situation:

> "Oh, [the importance of having face-to-face meetings] is for having the knowledge from the Alpha side… Actually, in many cases, using the knowledge management system is faster. I can access it any time, and can get what I want in a standardized form. I like it… Well, when I seek the Alpha side knowledge, I need more information. And, usually, it's not on paper.

The above comments seem to indicate that employees felt that codified knowledge created from the other side was somewhat incomplete and uncertain and tried to complete it by having direct interactions with other knowledgeable people. For example, two employees noted:

> "Even though I got the document I needed, maybe I would think that there's still something out there I need to know… and, until I get the information about what's really going on, I would think that it is not the whole thing"

> "Every time you try to get information from the systems or this new group of people [Alpha people] who you never had any contact with, you can't accept that information at face value because you should consider what the context behind the knowledge is and what the assumptions are. Then you need to be clear about what your situation is. And finally, you should compare these two sets of contexts to figure out whether it really fits you or not. It's a more time-consuming task than you had expected and it's not that easy."

Taken together, the data suggest that while Omni's deliberate knowledge sharing is developed around a codification approach, its emergent knowledge sharing includes both the

codification and personalization approaches as shown in Figure 2. In particular, the personalization approach is actively used when individuals seek knowledge from the other side. Table 2 summarizes contrasts the differences between the deliberate and emergent knowledge sharing practices observed at Omni.

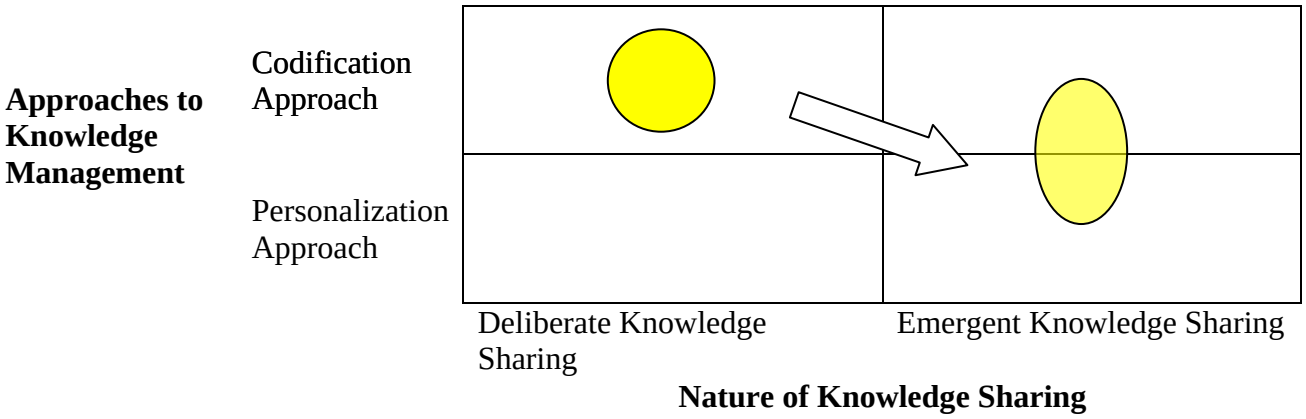


Figure 2. Deliberate and Emergent Knowledge Sharing at Omni

	Deliberate Knowledge Sharing		Emergent Knowledge Sharing	
	Characteristics	Data from Omni	Characteristics	Data from Omni
Focus of Knowledge Sharing	Creating, managing, and distributing codified contents promptly and reliably	"It is so important for us to share the same understanding on each issue that we handle. We also need to keep all the records for our future use. … So every time we (he and his staff) discuss the project, we try to document our idea about what the goal of this project is, how to approach the issue, what the possible solution is, and what the expected problems are. … And, next time we discuss or work on the same issue, we always go back to what we had documented first and then build on it. …" "I believe commodity knowledge sharing such as matching colors and products for our customers is very important. So, I hope to use our Intranet for this purpose.	Sharing the comprehensive knowledge reflecting fluid contexts.	"Even though I got the document what I need. Maybe I would think that there's still something out there I need to know … and, until I get the information about what's really going on, I would think that it is not the whole thing" "To me, having thorough understanding what really happened and how did it happen is much more important than getting some nice descriptions."
Knowledge Processing	Coding and Storing	"… Our knowledge management process follows three steps; first, we gather ideas and opinions from people. Then, we put these together. And finally, I think that this is the most important step, we generate reports for the decision-making or future use. … We have a standardized format to store knowledge in our Intranet. So, all the reports follow this standardized format." "Documentation is so important to us. It is the only way we can preserve the valuable research knowledge for the future projects. …"	Processing of knowledge is not necessary; Unprocessed knowledge is often favored	"In a sense, well-specified knowledge can be dangerous; because documentation simplifies the whole picture of things, and almost always omits some possibly important components you should know. You know, things are not that simple and clear in reality. Besides, things are keeping changing. …" "I think, knowledge from written sources is cold and factual in nature and does not let one know the depth of understanding of the knowledge in the organization nor does it show how deeply in the organization a practice is deployed. … In this regard, face to face contact or hands-on experience is more credible source of knowledge."
Important asset of	Knowledge repositories	"The greatest part of Knowledge Web is pulling things together in one place. In other words, all	Network of knowledge holders	"If I don't know who's the expert, then I will use my connections of colleagues. … From my

KM		the contents and the applications can be integrated in Knowledge Web." "What we saw from Beta was that they were not storing any documents anywhere. …They didn't have library. There's no centralized facilities searching and storing knowledge. … Their knowledge was scattered all over the company. And they didn't share the knowledge between operations for whatever reasons."		past experience, I know that it has been effective in most cases and that's why it's my favorite." "We have Quality Web in our group and there we post questions and exchanges what we know through a discussion board. To me, these people have been the most important knowledge source because I can get almost any knowledge, which I can't get from the manual from here. It's like a small community. I make a phone call or sometimes I visit their offices for my tough questions. In this way, we help one another."
Technology used	Database, Data warehouse, ERP system, and Intranet	"As a result of our consistent efforts on knowledge management, we can now manage a huge amount of knowledge. For example, we have many databases and ERP modules storing knowledge … I can't even begin to name all the sites on the Intranet. …" "Intranet is a repository for knowledge in Omni, like a library. People go and find information there"	Database (knowledge map), Intranet (discussion board), and other collaborative systems	"We (Omni) don't' know who's where, how to contact them or who knows what, and I am sure that there's no database containing this information" "We have Quality Web in our group and there we post questions and exchanges what we know through a discussion board "I think that Intranet has evolved as a result of collective efforts to better communicate each other. But, I doubt that current Intranet is used as no effective tool for this purpose."
Knowledge Sharing practices	Searching, retrieving, and feeding knowledge repositories, documenting and circulating projects process and result	"I always emphasize the importance of knowledge sharing to my staff members. So, I keep telling my people that we should document and feed the Intranet with what we have done. And, I am sure that all my team members are pretty much good at how to generate, download, and upload the documents. "We normally send written document to the other staffs and production people, and [we] hardly use e-mail or videoconference, because these	Broadcasting e-mails, Searching the knowledge map, and leveraging face-to-face interactions and personal relations to search knowledge	"If I don't know who knows what, then I broadcast email. We have a technology email list. So I broadcast email to them when I have a question. … Discussion board would have been useful if we had one in Intranet, but we don't have it" "When I need knowledge and I don't where, I always rush to a bunch of people who I think are experts. …"

	methods cannot store and codify the knowledge at all."

Table 2. Characteristics of Deliberate and Emergent Knowledge Sharing at Omni

Discussions

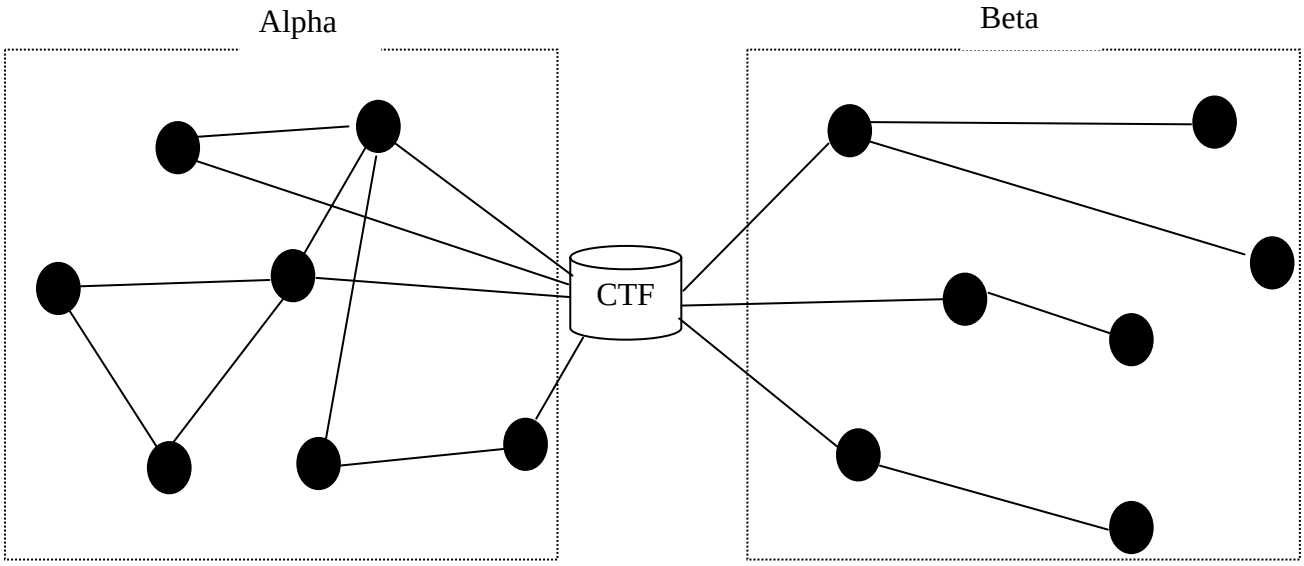
The purpose of our study was to examine deliberate and emergent knowledge sharing practices during post merger integration. In particular, we were interested in studying how codification and personalization approaches were enacted in deliberate and emergent knowledge sharing practices. We found that while a codification approach was predominant in deliberate knowledge sharing at Omni, in the post merger integration context, employees enact a hybrid of codification and personalization approaches in their daily practices. In particular, employees' efforts to develop direct and informal connections with knowledgeable people were evident when they needed to gain knowledge from the other side of the company. However, this hybrid approach enacted in emergent knowledge sharing at Omni did not diminish the importance of the centralized knowledge repository and the role of the Knowledge Center. Employees enacted the personalization approach in order to complement, rather than replace, the codification approach promoted by management.

Why did Omni employees enact hybrid knowledge sharing patterns that included both codification and personalization approaches? We believe that a distributed cognition perspective of knowledge in an organization can be a useful theoretical framework for understanding this. A growing body of literature suggests that knowledge in organizations is distributed and socially shared among the individuals who constitute the organization (Boland et al. 1994; Hutchins 1995; Weick and Roberts 1993). According to this perspective, individuals know only part of what an organization as a whole knows and knowledge in organizations is distributed unequally among members (Boland and Tenkasi 1995; Moreland et al. 1996; Tsoukas 1996). Thus, in order for an organization to perform, individuals need to carry out their own individual tasks, taking the interrelatedness among individuals into consideration. Knowledge in organizations thus represents the accumulated patterns of interrelating knowledge among individuals that emerge over time through repeated interactions and communications (Faraj and Sproull 2000; Nelson and Winter 1982; Tsoukas 1996) as well as through the knowledge that each individual holds. Furthermore, codified knowledge in the form of documents, business rules, and electronic files stored in databases makes up an important portion of knowledge in modern organizations.

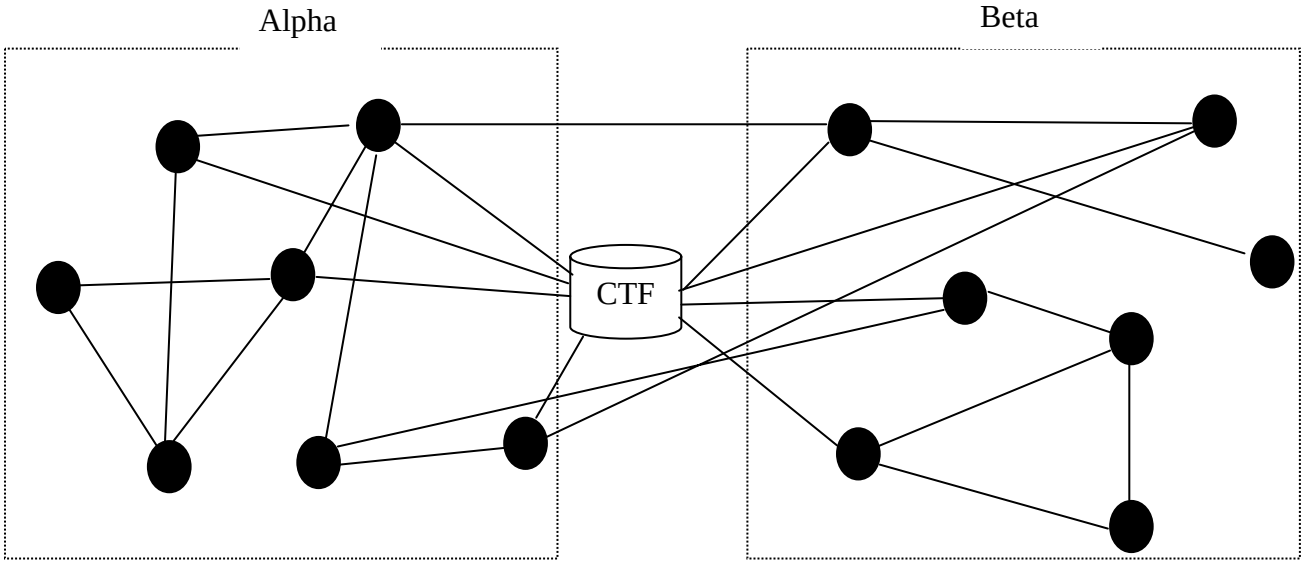
According to this distributed perspective, knowledge in organizations can be understood as a socio-technical web of individual knowledge (Yoo and Ifvarsson 2001), a reservoir of knowledge (Argote and Ingram 2000), or a series of organizational routines (Winter and Szulanski 2001). In such a distributed perspective, knowledge in organizations includes both contents (either tacit knowledge held by individuals or codified knowledge stored in artifacts) and connections among contents. Connections among contents include meta-knowledge of know-who and know-where (Moreland et al. 1996) and how to work together (Weick and Roberts 1993). It is the connections among contents that provide the meaning and context of contents. While contents, particularly when codified, can be easily transferred from one web to another, their meaning and interpretations can differ significantly depending on the pattern of the connections around and to it. Therefore, even if the codified contents can be easily transferred, if the context of the content is not shared, the meaning, value and credibility of the content can be uncertain and questioned (Karsten et al. 2001; Yoo 2001). From the vantage point of distributed knowledge in an organization, it is thus necessary for an individual who receives new codified contents to establish new connections to the web of knowledge from which she is importing the contents in order to establish the context.

In the case of Omni, Alpha and Beta represent a high-level web of knowledge and the

centralized knowledge repository can be understood as a primary link between the two webs. As individuals from each side try to learn the codified contents from the other side, they needed to make direct connections to the other web in order to make sense of the codified contents. As time goes on, one can predict that if the post merger integration is to be successful, the number of direct connections between these two webs will have to increase, making the centralized knowledge repository one of the many technology-enabled nodes in the web. Figure 3 shows this evolutionary model.



(a) Early stage of post merger integration



(b) Successful post merger integration results

Figure 3. Evolution of Web of Knowledge at Omni

Although this view is somewhat similar to and builds on the social network perspective of knowledge transfer and sharing (Constant et al. 1994; Constant et al. 1996; Granovetter 1973; Granovetter 1982; Hansen 1999; Hollingshead 1998; Nohria and Eccles 1992), it critically departs from it in two important respects. First, while in terms of the social network perspective, the emphasis is unequivocally on the structure of the network and the connection patterns among nodes, our framework equally emphasizes the importance of both contents and connections in understanding knowledge in organizations. Unlike the social network perspective that treats nodes in the network as a black box, thus treating them as "dummy" nodes, our distributed knowledge perspective tries to open up the black box and understand what is inside those nodes – thus treating them as "intelligent" *agents*. Another important difference is that our view of distributed knowledge in organizations explicitly includes technology artifacts as an important element of the network, while traditional social network perspective would only focus on human nodes. In this regard, our view is somewhat similar to Latour's (1987) Actor Network Theory perspective that treats both human actors and technology artifacts as nodes in a network of knowledge.

Our results challenge the traditional separation between two perspectives of knowledge in organizations that exist in the literature. Our empirical results and theoretical analysis suggest that much of the separation between knowledge-as-objects and knowledge-as-relationship is spurious. In reality, both types of knowledge coexist in organizations and individuals need both types in order to be effective. Yoo and Ifvarsson (Yoo and Ifvarsson 2001) have argued that the relationship between contents and connections are in fact quite dynamic, and that they transform each other as knowledge is shared across different parts of the organization. Similarly, in Omni's case, as noted earlier, the central knowledge repository is sometimes used to find someone with whom to connect, thus serving as a bridge between individuals separated in time and space in different webs of knowledge. In other cases, the same knowledge repository serves as a place to hold codified contents. Thus, future research on knowledge management should focus on how individuals' skillfully enact different knowledge creation and sharing practices in their everyday lives in an organization in order to deal with different faces of ever changing dynamic knowledge in organizations.

Our study also provides additional empirical evidence regarding the growing body of literature that emphasizes the importance of emergent knowledge sharing practices (Cook and Brown 1999; Nidumolu et al. 2001; Orlikowski 2002). Managers who are responsible for knowledge management in organizations should not only create a deliberate strategy for effective knowledge sharing, but should also pay close attention to ongoing everyday knowledge sharing practices. The roles that they play will be, however, quite different. Instead of planning and pushing certain knowledge sharing patterns, management needs to take a much more facilitative role.

Our study also makes an important contribution to post merger integration literature by providing a clear understanding of the issues and challenges relevant to knowledge sharing in post merger integration. The literature in this area indicates that, in spite of increased success in mergers, many recent mergers still suffer a high rate of failures (Bleeke et al. 1993; Cartwright and Cooper 1993). For this reason, in the literature, synergy-seeking mergers were not considered to create more value than unrelated mergers (Seth 1990). In contrast to these arguments, Brush (1996) has empirically shown that the changes in the opportunities to share resources and activities could improve the post merger performance of synergy-seeking mergers. By demonstrating the patterns in which such knowledge sharing can occur, our study implies

how such sharing can effectively influence the success of post merger integration. In particular, our results demonstrate how providing ample opportunities for direct and informal connections among key knowledgeable employees can reduce the perceived uncertainties of the value, meaning, and credibility of codified knowledge.

As for the implications for management, the results of this study suggest that senior executives need to realize the importance of knowledge management in the post merger integration process. Through a series of mergers, Omni has developed a well-specified post merger integration plan and procedure and both Omni's merger case and its post merger integration methodology have been introduced as an exemplary case in several business magazines and academic journal articles. However, Omni's human resource department, which leads the post merger integration plans and implementations, has not considered knowledge integration as an integral part of its job. One of Omni's human resources directors stated the following:

> "Corporate knowledge integration is not our job. We have departments taking care of systems integration and their job is different from ours. … Although sometimes we work together for a certain thing, like employees' training programs, basically there's no systematic coordination between their systems integration plans and our general integration plans."

The management of Omni and other companies in similar situations needs to recognize the critical importance of knowledge sharing in the success of post merger integration. Furthermore, they will benefit from a clear understanding of the distributed nature of knowledge in an organization and how individuals in the organizations attempt to share knowledge. They also need to expand the scope of their technology coverage in order to support not only the codification approach, but also the personalization approach through the use of various new technological tools.

The findings of this study need to be interpreted in terms of the following limitations. First, as a single case study, this study lacks generalizability. Our findings need to be tested and confirmed in a variety of different merger situations[1]. Second, data was collected during a short period of time, mostly through face-to-face interviews after the merger. Since this study is about examining the patterns of knowledge management before and after the merger, data collection during the post merger period and especially interview data depending on recollections and self-reporting may be limiting. A longitudinal study with more direct observations will complement our findings.

Despite these limitations, this study provides an important first step toward understanding the knowledge sharing patterns in post merger integration. We believe that the distributed perspective of knowledge in organizations and its implication on knowledge sharing practices can be used in designing future knowledge management tools and policies that can be instrumental for effective knowledge integration in the post merger period.

[1] For example, there is a wide spectrum of mergers ranging from complete acquisitions to equal mergers depending on the relative sizes and powers of the involved companies.

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