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One Size Doesnâ€™t Fit All: Knowledge Management Systems and Knowledge Sharing Practices in Global Learning Organizations

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Abstract
An increasing number of global organizations have adopted knowledge management practices and implemented worldwide knowledge management systems utilizing global communication networks and collaborative technology. The existing literature on knowledge management has focused on a common, firm-wide approach to knowledge sharing. Substantial differences exist, however, among the sub-units within many global organizations in terms of strategic, operational, and socio-cultural contexts. Such differences in the environments lead to internal differences in knowledge sharing practices. A field study at four offices of a large, global management consulting firm revealed that knowledge sharing practices at local offices were shaped by the unique strategic roles of the offices. The results suggest that global organizations must, contrary to the frequently-suggested uniform approach, understand the the strategic roles of the local units, and consider these in designing knowledge management support tools and practices.

Keywords: Knowledge Management Systems, Multinational Corporations, Global Information Systems, Field Study.

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Introduction

Knowledge is increasingly recognized as a critical organizational resource, and in recent years many organizations have engaged in the development and implementation of systems to manage it through *knowledge management systems* (KMS) (Alavi and Leidner 2001). A frequently mentioned prescription for effective knowledge management is that an organization should adopt a standardized, homogeneous approach to knowledge management across the units of the organization (Hansen et al. 1999). Sub-units of global organizations, however, often operate in very different strategic, operational, and socio-cultural contexts. As a result, from the perspective of contingency theory, one can expect that internal structure within a global organization will not be homogeneous, but will be differentiated to match the contexts of local sub-units (Lawrence and Lorsh 1967; Thompson 1967).

Among scholars studying organizations, it is generally recognized that global companies are internally differentiated in their structure and coordination processes (Doz 1978; Ghoshal and Bartlett 1990; Ghoshal and Nohria 1989; Gupta and Govindarajan 1986; Gupta and Govindarajan 1991). Past research on global organizations has examined inter-unit communications, coordination and control, as well as integration among sub-units (Cray 1984; Ghoshal et al. 1994; Ghoshal and Nohria 1993; Gupta and Govindarajan 2000a; Jarillo and Martinez 1990). How differentiation among sub-units influences the local knowledge sharing practices, however, has not been carefully examined in the literature. Given the growing strategic importance of knowledge resources and the increasing use of information technology in organization-wide approaches to knowledge sharing in global organizations (Alavi 2000; Davenport and Prusak 1998; Zack 1999), it is imperative to study the knowledge sharing practices within global organizations and to assess the impact of internal differentiation on these practices.

The objective of this paper is to examine how inter-unit differences in a global organization influence the knowledge sharing practices of local sub-units. In particular, we examine how sub-units of a global company differ in their adoption of the firm's standardized knowledge sharing approach. Thus, our study addresses the following research question: Do strategic differences among sub-units of a global company influence the local adaptation of the firm's standardized knowledge sharing approach? If so, how?

In this paper, we report on a field study of knowledge sharing practices at four local offices of a global management consulting firm in three different countries—the U.S., Korea, and Japan. The company successfully implemented a global knowledge management system and standardized knowledge sharing practices for its worldwide consulting practice. Our study reveals, however, that local offices developed unique knowledge sharing patterns by differently appropriating the firm's global knowledge management systems and knowledge sharing approach

Background

Knowledge Management

The core idea behind knowledge management—sharing knowledge for reuse by other members of the same organization—has been discussed in the literature of organizational learning (Cohen and Levinthal 1990; Senge 1990), diffusion of innovation (Rogers 1983), management of technology (Attewell 1992; Leonard-Barton 1995), and strategic management (Gupta and Govindarajan 1991; Gupta and Govindarajan 2000b; Hansen 1999; Szulanski 1996). One dimension of the current interest in knowledge management is the extent to which information technology is being used to store and transfer knowledge. Recent developments in information technology, particularly in communication and collaboration technology, allow companies to store and share knowledge at an unprecedented level (Alavi and Leidner 1999; Davenport and Prusak 1998).

According to Schultz and Leidner (2002), the large portion of past research on knowledge management has focused on formal and organized activities (Alavi and Leidner 2001; Davenport and Prusak 1998; Hansen and Haas 2001; Jarvenpaa and Staples 2000; Markus 2001; Zack 1999). Drawing on an *information theoretic perspective* of knowledge (Shannon and Weaver 1949), these researchers conceptualized knowledge in organizations as something "out there" to be created, stored, retrieved, and re-used. These studies also tend to emphasize different types of knowledge in organizations. Typically, they draw on Polanyi (1966) to make a distinction between tacit and explicit knowledge (Davenport and Prusak 1998; Nelson and Winter 1982; Nonaka 1991; Zack 1999). Such a perspective often leads to managerial recommendations that emphasize the codification and transfer of "best practices" in the organization.

Some researchers have, however, been critical of such approaches. Drawing on a *social constructivist perspective* of knowledge (Latour 1987; Lave and Wenger 1991), they note that formalized approaches may not mirror exactly what is going on in the organization in its daily knowledge management practice (Nidumolu et al. 2001; Orlikowski 2002; Wenger 1998). They note that knowledge in organizations is distributed among people and artifacts, and socially embedded in on-going practices (Cook and Brown 1999; Hutchins 1995; Lave 1993; Lave and Wenger 1991; Orlikowski 2002; Wenger 1998). Knowledge in organizations is malleable, uncertain, ambiguous, and emergent in actions taken by actors. Thus, organizations' formalized efforts to introduce standardized knowledge management approaches, in many cases with information technology, may not produce the intended outcomes, because such approaches assume that a stock of knowledge exists in organizations (Nidumolu et al. 2001). While an information theoretical perspective suggests the importance of a standardized approach to knowledge management that typically includes a centralized knowledge repository in which codified knowledge will be stored for future reuse, a social constructivist perspective suggests that even if the company implements standardized knowledge sharing tools, local sub-units will adopt the tools to their unique contexts (Schultz and Leidner 2002).

Supporting this social constructivist view of knowledge, a recent empirical work by Orlikowski (2002) provides an account of five different practices—sharing identity, interacting face-to-face, aligning effort, learning by doing, and supporting participation—related to knowledge sharing in 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 of knowledge sharing in their ongoing and daily accomplishments. Nidumolu et al. (2001)similarly argue that understanding the ongoing and

situated knowledge practices at the organizational level is essential for the success of effective knowledge sharing in organizations. They studied a failed knowledge management project, and suggest that a disconnect between the ongoing situated knowledge sharing practices and the formal knowledge management efforts is a critical reason for the failure. However, these prior studies in knowledge management examined knowledge management at the organizational level. They did not observe knowledge sharing practices at the sub-unit level. In this study, we extend this social constructivist view of knowledge and examine local adaptations of the standardized knowledge management approach taken by several, diverse local offices of a single global company. Specifically, we examine the influence of sub-unit strategic roles on the local knowledge sharing practices.

Although avoiding geopolitical risks, financial exposure, and government export regulations were considered as major reasons for global diversification of multinational corporations in the past (Bartlett and Ghoshal 1989; Caves 1982; Stopford and Wells 1972), recent studies suggest strategic differentiation as a key driver for internal differentiation among local units in a global company (Doz 1978; Ghoshal and Bartlett 1990; Ghoshal and Nohria 1989; Kogut 1985; Kogut and Zander 1993; Poynter and Rugman 1982). Local sub-units face different local market conditions and global companies often seek to optimize their global strategic positions by pursuing diverse strategic goals in different local markets (Cray 1984; Ghoshal and Nohria 1993; Govindarajan and Gupta 2001; Kim et al. 1989). Different strategic orientations in local units will create different knowledge needs, and consequently different knowledge sharing practices. However, the current focus on knowledge management *at the organizational level* in the knowledge management literature may obscure our ability to see what takes place at local units of a global organization. Our approach of focusing on the local offices fundamentally departs from the current dominant approach in the literature.

Strategic Differences and Knowledge Sharing in Global Companies

Building upon Caves (1982) and Teece (1976), Gupta and Govindarajan (1991) argue that all global companies can be conceptualized as a network of knowledge flows, i.e., technology and/or skill transfer to and from various subsidiaries. According to them, all subsidiaries of a global company can be located somewhere in the following two-dimensional space: (1) the extent to which a subsidiary engages in knowledge *inflows* from the rest of the corporation, and (2) the extent to which the subsidiary engages in knowledge *outflows* to the rest of the corporation. Therefore, four generic subsidiary strategic roles can be identified in terms of directionality and magnitude of knowledge flows (see Figure 1): Global Innovator (high outflow, low inflow), Integrated Player (high outflow, high inflow), Implementer (low outflow, high inflow), and Local Innovator (low outflow, low inflow).

In this framework, the Global Innovator serves as the fountainhead of innovation for other units. The Integrated Player is also responsible for innovations that can be utilized by other subsidiaries. However, the Integrated Player and the Global Innovator roles differ, as the Integrated Player is not self-sufficient in the fulfillment of its knowledge needs. In an Implementer role, a unit seldom engages in innovation on its own and relies heavily on knowledge inflows from other peer units. Finally, the Local Innovator role implies that the unit has almost complete responsibility for the innovations to meet its local needs. The resulting innovations, however, are seen as too idiosyncratic to be of significant use in other subsidiaries.

One of the basic premises of our study is that an organizational unit's strategic role is not only the result of the strategic choice by management, but also the result of the diverse cultural,

socio-political, historical, and economic contexts in which it is situated. Thus, the strategic role of each unit is not explicitly designated by the senior management of the firm. Instead, it emerges through their practice. Gupta and Govindarajan's framework provides a useful tool to understand such emergent and implicit strategic roles, as it attempts to identify such roles indirectly through the direction and the quantity of knowledge flows in and out of the focal unit. Following this logic, we argue that the strategic role of a unit will influence its internal and external knowledge sharing needs. Therefore, we can expect systematic associations between units' strategic roles and the emergence of particular internal and external knowledge sharing practices. In the case study presented in the next section, we examine how strategic differentiation among units affected local knowledge sharing practices in four offices of a global consulting firm.

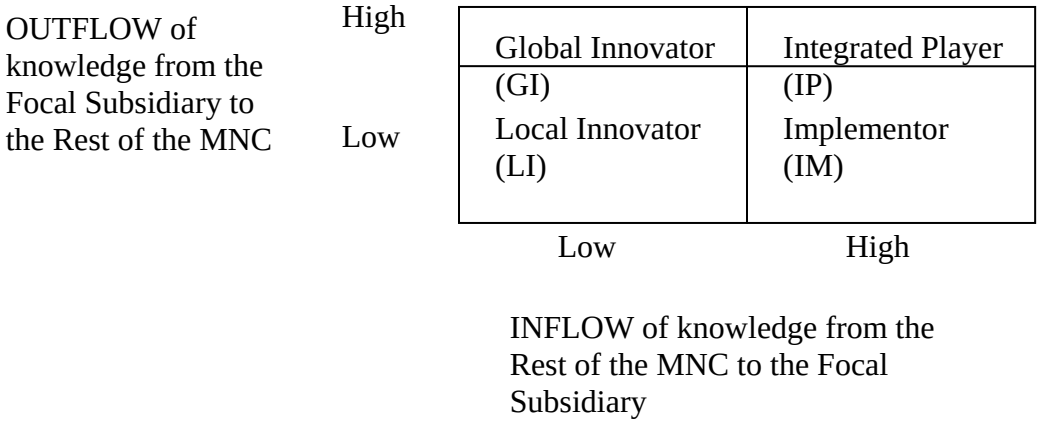

Figure 1. Alternative Subsidiary Strategic Roles: A Knowledge-Flows Based Framework[1]

Case Study

Site Selection and Data Collection

The case study involved a successful multinational management consulting firm (Alpha hereafter). In 2000, Alpha had offices in 80 countries and employed about 65,000 consultants. To support effective knowledge management and knowledge sharing at a global level, Alpha developed and implemented a global knowledge management system on Lotus Notes™ (referred to as the GKM system hereafter). The leadership of the firm consistently emphasized the importance of effective knowledge management and knowledge sharing among consultants for the firm's success.

Alpha was chosen for the study for three reasons: (1) it is recognized as an early and effective adopter of knowledge management practices and systems; (2) it has a strong global

[1]Adapted from Gupta and Govindarajan (1991).

presence and has implemented knowledge management globally; and (3) it has a strong organizational culture and policy that includes an in-residence program for all new recruits from around the world at its training campus in the US, as well as various standard methodologies used by consultants in different areas. Because of this organizational profile, together with the call often found in the KMS literature for a consistent and uniform approach to knowledge management across the organization, we expected to find very similar approaches to knowledge management across Alpha's offices.

Four offices in three countries—the United States (two offices), Korea, and Japan—were involved in this study. Data were collected primarily via 63 interviews with consultants, complemented by direct observations and examination of company archives, in each of the offices (see Table 1 for the number of interviews at each office).

	TRC	Office A	Office B	Office C
# of interviews	6	31	22	4

Table 1. The number of interviews at each office

Originally, data were collected at two offices—in the US and Korea—for another study. Upon the completion of the first study, however, we recognized that the two units studied appeared to match the profile of two of the four generic roles described in the Gupta and Govindarajan framework (1991) – integrated player and implementer, respectively. Thus, we approached our contact at the firm to recommend offices that might potentially match the profiles of the other two roles in the framework. One additional office in the US and one in Japan were recommended. We then asked six senior consultants who were familiar with the operations of these four offices to respond, via electronic mail or telephone, to a survey measuring the magnitude of knowledge inflow and outflow to and from the offices. They rated the volume of knowledge inflows and outflows as "Very Low," "Low," "Moderate," "High," or "Very High." Table 2 shows the results of our survey. The results clearly show that these four offices matched well with the knowledge flow patterns expected in the four generic strategic roles of the framework.

	TRC (US office 1) Global innovator		**Office A (US office 2)** Integrated Player		**Office B (Korea)** Implementor		**Office C (Japan)** Local innovator	
Raters	In	Out	In	Out	In	Out	In	Out
1					VH	VL	L	L
2					VH	VL	M	L
3					VH	VL	L	L
4	L	VH	M	M				
5	M	VH						
6			M	M				

VL: Very Low
L: Low
M: Moderate
H: High
VH: Very High

Table 2. Results of the survey on knowledge inflows and outflows to and from four offices

Data collection followed the interview guide presented in Appendix I. Most interviews were conducted face-to-face and lasted about an hour. Interviews were conducted in the native language of the interviewee, except for interviews with Japanese consultants, which were conducted in English. In a few cases, interviews were conducted via electronic mail or telephone. We conducted semi-structured interviews, using a critical incident method. Specifically, we asked each interviewee his or her most recent and significant experiences in knowledge creation, preservation and sharing, and seeking, and the role of information technology—including the GKM system—in the process. Thus, each interviewee reported three recent critical incidents, one for each phase of knowledge management. We probed the nature of the incidents by asking follow-up questions. We also asked consultants about their general perceptions of the system including usefulness, impediments to effective use, and the perceived usage of the system. Finally, we asked the interviewees about the general knowledge creation and sharing practice within their office and across the offices. All interviews were tape recorded and transcribed for analysis.

Data analysis

Following recommendations by Eisenhardt (1989) and Yin (1994), we read each interview transcript repeatedly taking thorough notes. One of the authors worked with two coders, one for transcripts in English and the other in Korean. For each interview there were two coders (the first author and a hired coder) working collectively. We summarized each interview into a few short phrases capturing the key aspects of the interviewee's experience in knowledge creation, knowledge preservation and sharing, and knowledge seeking. Further, we summarized the individual's perceptions of information technology and knowledge management practices in general at the local office where he or she worked. After the individual interviews had been analyzed, we began to seek common patterns within each office, using a thematic analysis method as suggested by Boyatzis (1998). This resulted in a short summary of knowledge management practices at each office. Finally, we began cross-case comparisons that involved listing similarities and differences across the four offices.

Results

Knowledge Management Strategy of Alpha

The GKM system was originally conceived in 1991 and was fully implemented by 1993 and rolled out across the global enterprise. An Alpha internal report, released in March 1992, contained the following statement:

> We will establish 'Knowledge Management' as a new function within [Alpha]. Key responsibilities will be to ensure the leading edge currency of our knowledge capital, and to keep [the GKM system] demand driven rather than supply driven.

The same document described the objective of Alpha's knowledge management as follows:

> Our primary program to establish sustainable differentiation in tomorrow's marketplace is [the GKM system]. It is designed to leverage the skills, knowledge, and experience of the individual with the cumulative knowledge and reusable experiences of the global community of [Alpha], connected electronically and culturally.

In 2000, the GKM system was a collection of 4500 databases containing both internal and external information in document repositories, special applications known as practice aids, discussion databases and directories. Over 500 full-time knowledge management professionals supported the system and all knowledge management practices within the firm.

Internal knowledge resources in the repositories consisted of such things as client deliverables, white papers, evaluations, presentations, proposals, methodologies, best practices and tools. External information included subscription databases provided by arrangement with content vendors, Internet news groups and Internet based services, news feeds and the like. The GKM system was available for all employees to access from laptop or desktop PCs over the firm's global wide area network, by dialing in to the network remotely, through the networks at client sites where connectivity arrangements had been made, or over the local area networks in each office. The GKM system was constantly undergoing development and revision to ensure that content remained current, to adapt to changing needs, and to reflect changes in the firm's organization and priorities. New technologies were applied as needed.

One of the most important functionalities the GKM system provided was the search feature. Each practice area had its "home page" which acted as gateway to many internal databases. Typically, consultants searched for documents from the practice home page with key words. When the consultants knew exactly which database to look for, they often went directly to those individual databases to perform the search. The search results included the document title, the name of the author, and a short synopsis of the document. Based on this information, consultants "ordered" the actual documents from the system, which delivered the document via e-mail. Internal knowledge management professionals who were dispersed through the world for different industries and geographical areas sometimes facilitated the search process by suggesting particular key word combinations or particular databases.

The GKM system also included the directory of past client engagements. The database included the basic information about projects that Alpha had done in the past for its clients. Often this database was used to search for both key consultants and client contact information by consultants.

While much of the content stored in the GKM system was created from client engagement by consultants in the field, some was created by the "thought leaders" in different practice areas in order to provide future engagement guidelines. These contents included templates and white papers, which were particularly popular in "emerging" practice areas. Consultants often browsed through these databases to explore new concepts and ideas in their spare time.

In addition to the GKM system, Alpha developed unique methodologies for system integration and development. The firm had embedded such methodologies in system development tools that its consultants used in the field. The firm also had a strong initial in-residence training program through which new consultants were "indoctrinated" to the "[Alpha] way". All new recruits worldwide went through this training. The "[Alpha] way" not only refers to their system development and integration methodology, but also to the way consultants conduct themselves at the client's site. Such a strong global corporate culture enabled the firm to pursue an ambitious global knowledge management strategy that was based on a central repository for the standardization and reuse of codified knowledge. Electronic document communications (including e-mail and documents repository) were pursued as the primary means to share knowledge.

Knowledge Management at Local Offices

Although Alpha had established a strong global standard for knowledge sharing that was centered on the GKM system, the four offices we observed developed quite distinctive patterns of knowledge sharing (see Table 3 for an overview of knowledge sharing patterns of four offices). Below, we provide a summary of knowledge sharing practices at these four offices along with the primary strategic roles that these offices play within the Alpha's global network.

	Country	Strategic roles	Knowledge sharing within the office	Knowledge sharing with other offices
Office A	US	Integrator Primarily serves external clients by integrating and modifying existing solutions to solve clients' problems	Used various electronic media including electronic mail, the GKM system, and voice mail.	Primarily relied on the GKM system, electronic mail, and voice mail. Locally developed solutions were frequently shared through the GKM system
TRC	US	Global innovator Alpha's internal research laboratory to invent new technology solutions	Relied on frequent face-to-face interactions (both formal and informal) and videoconferencing to share knowledge.	Primarily relied on rich face-to-face interactions with both internal and external clients, complemented by other means of publications including the GKM system and external publications.
Office B	Korea	Implementor Primarily serves local clients by modifying the "imported" solutions	Social networks via face-to-face meetings were the primary means of knowledge sharing complemented by electronic media including electronic mail and the GKM system Few local knowledge repositories are used.	Heavily depended on the GKM system as a source of solutions, complemented with direct face-to-face interactions with foreign experts. Local solutions were rarely shared with other offices.
Office C	Japan	Local innovator Primarily serves local clients by inventing its own solutions	Knowledge sharing was intense among internal consultants via various means of media. Local knowledge management system was actively utilized.	Although the GKM system was used, the solutions from it were not privileged. Local solutions were rarely shared with other offices.

Table 3. Knowledge Sharing Practices in Four Offices

Office A: Integrated Player. Office A was located in the Midwestern US and employed about 200 consultants. As a typical office of Alpha, its primary function was to serve external clients through various consulting engagements. Two senior consultants who were familiar with Office A described the magnitude of the knowledge flow both into and out of the office as moderate. Consultants who were staffed at Office A felt that the ratio between knowledge inflow and outflow was roughly 60:40. Only a few consultants in this office engaged in "cutting edge" projects. In many cases, their jobs required integrating and modifying existing solutions in order to solve the clients' unique problems. The following two accounts of "knowledge creation" were typical examples from the consultants working in Office A:

> We borrowed some. I mean the basic methodology behind the structure was nothing new. You have a fixed team, you have a test team, you have an analysis team. That concept is not really new. But what was new about it was that we did it on a performance team. That perspective was new. And that introduces a lot of challenges when you're dealing with the kind of client that we had to deal with.

> Well it's not necessarily new knowledge but it is, I guess you would say the details are new in that we have, this is our custom … it's a system that we're building. It's customized to meet the needs of our specific client and we have never necessarily done this specific system before. So therefore the tasks are new. The concepts are not new, in other words, each estimated time to complete each task, start dates, end dates, people who are responsible and description of the task, that concept isn't necessarily new, but putting it all together, to say that this is the components that we need to build this particular system, that's new. We have not built this system in the past.

Thus, Office A can be characterized as an Integrated Player in Gupta and Govindarajan's (1991) framework.

Consultants we interviewed said that they were actively encouraged to use standardized methodology and best practices so as not to "reinvent the wheel" every time they solved a new problem. However, in reality, they had to create new solutions by integrating existing solutions and combining them with their own new insights and ideas. Often, these new solutions and ideas were shared with the rest of the firm through the GKM system. For example, one consultant from Office A said:

> I would fall over if I found a 100 percent ready solution. Because every client is so different and the variables that just go into the project, I mean, there's so many things that can change or be a little bit off here or a little off there and even if your situation's the same, you could have two clients with the same situation and their management will ask for something different. So I would never expect to find a 100 percent solution. Usually what I'm looking for is a good starting point. I'm looking for a good basis to go forward from.

At Office A, there were not many differences between internal and external knowledge sharing patterns. Consultants at Office A heavily used e-mail, the GKM system and voicemail for knowledge sharing with other consultants from both Office A and other offices. Consultants in Office A viewed the GKM system as the primary vehicle for knowledge sharing, although they sometimes supplemented it through informal face-to-face conversations (particularly among consultants working in the same office or for the same client) and telephone conversations. Their use of the GKM system quite closely matched the firm's global "standard." The consultants actively used the search feature of the GKM system in order to find the documents that suit their needs. Often, the most active search took place during the pre-engagement stage in order to develop a proposal for the client. Since most consultants in Office A worked at their

client's site, few opportunities existed for direct knowledge sharing among those who worked on different projects. Most consultants spent approximately one day (typically Friday) a week at Alpha's office. That time, however was used to handle various administrative tasks. This also forced them to rely heavily on the use of electronic mail for knowledge sharing with other consultants. When consultants in Office A attempted to work with experts in other offices, they often found these experts through the GKM system and worked via electronic mail. For example, one consultant said:

> This last project we're doing [was] interfacing controls to a manufacturing system of SAP…so I needed to get a better working knowledge… I use [the GKM system] quite extensively. I've gotten hundreds of documents that I was able to glean off there. But also it's resource, people to contact. This past week, all I've been doing is talking to these people that I've gotten their names off of [the GKM system].

In summary, Office A represents a typical office of Alpha that performs a knowledge integrator role in the firm. Thus, the consultants of the unit relied heavily on the GKM system as a primary means of knowledge sharing with other consultants. They also relied on other electronic media such as electronic mail, conference calls, and voice mail to share knowledge with other consultants both within and outside Office A.

Technology Research Center (TRC): Global Innovator. TRC was an internal technology research and development center of Alpha, occupying three different geographic locations. The largest of the three was in the Midwestern US (in a different city from Office A) with around 30 permanent staff members, several of them with PhDs in computer science, electrical engineering, software engineering or applied mathematics. The second office was located in the Silicon Valley area on the west cost of the US, with approximately 8 staff members. The third office was located in France, staffed by two people. The primary role of TRC in the firm was to develop and test new technologies that could be turned into useful business solutions within 3-5 years. Another role of TRC was to present the firm's "technology visions" to their internal and external clients through various workshops and newsletters. They also see themselves as the last line of defense for technology support for the field consultants.

Two senior consultants who were familiar with TRC described the magnitude of the knowledge inflow as being fairly low and moderate. The senior consultant who rated the knowledge inflow to TRC being moderate qualified his statement by saying that the type of knowledge that they receive was often requests and questions, rather than solutions, which was different from other offices. However, both senior consultants described the knowledge outflow from TRC as very high. The members of TRC focused on the development of deep expertise in technology, and conducted very little client work. They constantly worked on the next generation technology that might be used for future client engagements. The director of TRC commented that:

> [TRC] was set up because the firm was frustrated by the lack of ability to pursue its own technological innovations and ideas in the area of e-commerce… [Alpha] started an internal VC (venture capital) group to support the commercialization of such initiatives.

Thus, TRC fits the category of Global Innovator in Gupta and Govindarajan's (1991) framework.

Although TRC played a central role in developing the technological infrastructure behind the GKM system, the members of TRC showed a unique pattern of knowledge sharing— both

internally and externally—compared to other typical offices of the firm. Internally, TRC maintained a "research laboratory-like" atmosphere. One researcher said:

> It is very important for us to maintain a university-like environment here. We are here all the time. We see each other and we talk to each other. Through such on-going interactions, we bounce our ideas off each other and come up with new ideas. We have a very vibrant community.

As reflected in this quote, face-to-face interactions, both informal and formal, played very significant roles in knowledge sharing and creation at TRC. Unlike other offices, a "sense of stability" and a "sense of place" were regarded as very important at TRC to create such a vibrant knowledge-creating community. The leaders of TRC were very careful to develop this unique culture within the office in order to fulfill its strategic role in Alpha.

While the researchers within the TRC still used e-mail for knowledge sharing among themselves, they rarely used the GKM system to share knowledge with other TRC members. At TRC, several tools like instant message systems and a location sensor tool[2] were used to facilitate, not to replace, face-to-face interactions.

An important aspect of TRC's internal communication was the semi-weekly scheduled videoconferencing session between the office in the Midwest and the one in Silicon Valley. On every Wednesday, they had an informal "get-together" via videoconferencing without any particular agenda. They talked about virtually anything including new technologies, economic news, politics, etc. The conversations were free flowing and typically lasted about an hour. On every Friday, the two offices had a formal "research talk" via videoconferencing. Often they had an outside speaker at one side of the connection to talk about the latest issues and developments in information technology. When an outside speaker was not scheduled, a researcher from one of the two offices presented a current research project to his/her peers. Several researchers we interviewed noted the vital importance of these videoconferencing meetings for knowledge transfer and sharing among TRC researchers in different offices. They also emphasized the hands-on experiences with new technologies that they were developing. As one researcher put it, they continued to "play with" new tools as they developed them. They put those new tools and equipment in the public areas of the center and those areas provided opportunities for unscheduled knowledge sharing among researchers. Throughout the center, there were chairs and tables with management magazines and newspapers that invited people to sit and share their ideas.

In communicating with other offices of the firm, TRC used several different communication media. Two unique aspects of TRC's knowledge sharing with other offices were a heavy reliance on face-to-face interactions and relatively infrequent use of the GKM system to disseminate knowledge. One of the important functions that TRC performed was to bring in internal and external clients to share and demonstrate the latest innovations from its research. Often, the researchers flew out to other offices or a client's site to demonstrate new tools and concepts that they had developed. In some cases, the members of TRC engaged in very intensive

[2] Each member carried an electronic badge that communicates with an array of infrared sensors located on the ceiling of the office. Connected with an instant messaging tools and other Internet communication tools, researchers could quickly identify the whereabouts and the availability of other researchers in the office. Developed as an experimental prototype by TRC researchers, the tools were voluntarily embraced by the members of TRC. One researcher said, "we don't have to carry this badge if we don't like. But, as far as I know, most of us carry it all the time, because it really helps us to communicate quickly and share knowledge."

and extended efforts to transfer new technology to other groups in the firm. For example, a team of researchers at TRC developed a prototype of a standalone knowledge management application to prove a concept. By word of mouth, many consultants throughout the world learned about the application and started using it. Since TRC did not have the capacity for ongoing support of this very popular prototype, the internal information systems department of the firm decided to take it over. This transfer took more than 18 months with numerous face-to-face meetings and intense collaboration among people from various departments in the firm. Finally, although the researchers at TRC produced white papers that were often posted on the GKM system and they frequently responded to the inquiries posted on the systems, they viewed those activities as peripheral knowledge sharing activities.

In summary, in performing the role of a global innovator, TRC showed a unique pattern of knowledge management practice that was different from other offices. Internal knowledge sharing relied heavily on spontaneous and ongoing interactions among researchers in the same building. Their frequent use of videoconferencing among researchers in three different locations and the informal atmosphere at the center supported and reinforced such knowledge sharing practice. Similarly, external knowledge sharing relied on face-to-face meetings; computer-mediated communication was less important compared to other offices of the firm. Printed materials were often used to raise the awareness of new innovations and developments in other parts of the firm and among its clients.

Office B: Implementor. Office B was located in Seoul, Korea, with about 140 consultants employed. Like Office A, its primary function was to serve local clients through various management consulting engagements. Three senior consultants who were familiar with the operations of Office B described the magnitude of the knowledge inflow to and outflow from Office B being very high and very low, respectively. One senior consultant said, "[Office B] doesn't put out much, because they are a little less sophisticated practice." Consultants in Office B felt that the ratio between knowledge inflow and outflow is roughly 90:10. Some consultants even believed that the ratio was 100:0. In Office B, for significant projects, about 20-30% of the team was staffed by experts from foreign offices. One consultant in Office B said:

> It has been five years since I joined [Alpha]. For every project I did, I got help from foreign offices… Almost in every case we had foreign experts in our team and we also received solution support through [the GKM system].

Thus, Office B fits the description of Implementor in Gupta and Govindarajan's (1991) framework.

The internal knowledge sharing pattern at Office B was quite different from the firm's global standardized approach to knowledge sharing. While the GKM system was central in the firm's standardized knowledge sharing approach, the internal knowledge sharing in Office B often revolved around existing social networks within the office. Thus, personal and face-to-face interactions were recognized as the central aspect of knowledge sharing. For example, consultants in Office B often started their search with face-to-face interactions with their superiors. In Office B, vertical communications between the superior and subordinates were the primary means of knowledge sharing. The following comments from two consultants are illustrative of their pattern:

> I typically search among domestic workshop materials and books first. But, I also ask people that I know. Typically, I start with a senior colleague that I know very well. 'Am I right on this?' 'Do I need to try this?' If the answers to these questions are yes from him, then, I start moving on.
>
> Often I search for "A" if that is what I need. However, my boss can think of concepts that are related to "A". Since he is more experienced, he suggests 'Try A1, A2, A3, etc.'… For example, if I am searching for 'knowledge management,' he would suggest to try 'organizational learning,' 'learning', 'intellectual capital', etc. That's very helpful.

The use of technology for internal knowledge sharing at Office B was often limited among consultants working on the same project. Although the knowledge sharing within Office B did not occur through the GKM system, many consultants felt that knowledge sharing in Office B was quite active through other means. While e-mail was frequently used to communicate within Office B, in most cases it was used only among consultants working on the same project or among those who knew one another well. Although some engagement teams set up their own "lessons learned" databases to capture knowledge, those databases were not widely used. In fact, many consultants at Office B were not even aware of such databases. Instead, knowledge was "directly" shared among people who knew each other. One consultant commented on this:

> Compared to other offices in the US, we don't use the GKM system that much to share knowledge. Within the office, we don't use the system that much…I would say it [knowledge sharing in Office B] is *different*, not worse or better than other offices. We do share knowledge. It is just that we don't use technology that much to do it…The problem is that it is biased. Not everyone in our office knows everyone else…I have a few close colleagues and I know what they know. However, that person may know this person knows this, but I don't know that. Then, how can I share knowledge with him?

For the external knowledge sharing at Office B, much more emphasis was given to using knowledge imported from other offices of the firm. All three senior consultants who evaluated the magnitude of knowledge flows to and from Office B noted the concerted efforts made by Office B to "import" knowledge from the US. All consultants at Office B heavily used the firm's global knowledge management systems to obtain information on "best practices". One consultant said:

> The biggest benefit of [the GKM system] to me is to be able to say that I know that there is the best practice for such a case. If I cannot show the best practice and have to make it up by myself, I cannot even speak in front of the client.

Another consultant commented:

> Of course, there are local GKM servers, but there isn't much in them. Most of the contents of those servers are in fact copies from the worldwide [GKM] system that have been reclassified for our own purposes. Thus, it makes more sense to go directly to the worldwide [GKM] servers because you can find more volumes, and [worldwide GKM servers] have more recent contents. So, I don't use the local systems much recently.

Another important medium of knowledge exchange with other offices was face-to-face interactions. Office B used organized trips to Alpha's central training center to acquire new knowledge. One senior US consultant noted that:

> People from [Office B] have had several organized trips over [to Alpha's central training center] for their clients so we've had presentations by our clients to their clients. A lot of knowledge sharing is going on that way.

On the other hand, there were very few efforts in Office B to share with other offices the knowledge created in the office. Some consultants attributed such lack of knowledge outflow to a language barrier. However, many consultants felt that it was primarily due to the nature of knowledge created in Office B. That is, as noted earlier, as an Implementor, Office B focused on modifying existing solutions developed in other offices for its local market. One consultant commented:

> We worked for [a local wireless service provider] recently. We customized a package for them…The original solution has been used for big telephone companies like [two large long distance carriers in the US]. You need to customize the architecture or design to fit the local needs. Once we finish our project, we may post our final deliverables to the GKM system. It may be helpful for other developing or less developed countries.

Another consultant reflected similarly on his experience using the GKM system to import knowledge from other offices:

> Our solution is not completely new. We had to localize the promotion material we found in the GKM system… Translation is a big part of the localization. Other than that, from a worldwide standpoint, I am not sure what is really new in what we did… Clearly, our solution can be used again in our own market. Then, maybe it can be used in other Asian countries. Beyond that, I don't know.

In summary, Office B responded to its unique market needs and cultural context as an Implementor in the global network of knowledge of the firm. Recognizing the needs of its local clients who wanted to import advanced management solutions developed in more developed countries, consultants in Office B actively sought knowledge from external sources using various means, including face-to-face meetings and the GKM system. On the other hand, its internal knowledge sharing relied heavily on the existing social network and face-to-face interactions. The GKM system and e-mail played only a complementary role for internal knowledge sharing in Office B. There were relatively few efforts to systematically document and accumulate knowledge assets within the office.

Office C: Local Innovator. Office C was in Tokyo, Japan, and has about 2,000 consultants. Although, like Office B, Office C primarily served its local clients, its knowledge sharing pattern was quite different from that of Office B. Three senior consultants who were familiar with Office C rated the magnitude of the knowledge outflow from Office C as being low. Two of them also rated the magnitude of the knowledge inflows to Office C as being low, while one of them rated it being moderate. One senior US consultant commented on Office C:

> They have over the course of time created some of their own databases that mirror the global databases, global libraries. That is where a lot of things get contributed, and where a lot of things get used. So, while they take advantage of the English-language stuff, they do spend more time in their local language, mirror images, if you want to think of it that way.

Strong local market orientation was also reflected in the office's official web site. The web sites of both Offices B and C followed the basic design template of Alpha's global web site. However, unlike Office B's web site, which was written completely in English, the entire web site of Office C was written in Japanese. This fits with the description of Local Innovator in Gupta and Govindarajan's (1991) framework.

The internal communication within Office C was often described as intensive, leveraging a range of different media. One consultant in Office C described the communication interactions within the office as "over-reporting". While some consultants said they didn't use much technology in communicating, the office had developed its own databases of documents that were, in most cases, written both in Japanese and English. Several consultants in Office C emphasized the importance of creating their own solutions—not ones that were imported from other countries—in dealing with their clients. One consultant who had worked both at Office B and Office C said:

> There are many interesting and neat things going on in [Office C]. Sometimes, they have something really innovative. However, it is very difficult to get those from other offices… Both of them [Offices B and C] do not post whole lot on [the GKM system], but for different reasons. [Office B] doesn't have enough people and not enough time. They don't have much to offer. [Office C], on the other hand, is much larger. But they are somewhat protective.

Knowledge sharing with other offices was often described as limited at Office C. While consultants used the firm's global knowledge management system to obtain necessary knowledge, in most cases, they substantially changed and modified "best practices" in their own projects. They used the GKM system in order to find a "starting point" for their projects. However, a strong emphasis was given to designing their own solutions for their local clients. One consultant commented:

> In most cases, I borrow knowledge developed in Japan… It is not just because of the language. I feel comfortable with English. And, yes, I am still looking for materials in English [from the GKM system]. However, I am still working for Japanese companies. Our clients like Japanese solutions.

Unlike Office B, Office C did not have frequent organized trips to the Alpha's training center for the purpose of knowledge sharing. As noted earlier, access to the local databases at Office C was heavily restricted to those outside the office, and outputs from the projects carried out by consultants in Office C were rarely shared through the GKM system. A senior consultant who worked at both Offices B and C commented:

> I can remember late '70's, the Tokyo mentality. Thirst for overseas information was stronger in the late '70s when they felt they were trying to catch up and more reflects the mentality of Seoul during the '90's. That mentality has changed in Japan, where by the late '80's and early '90's the Japanese still studied, interestingly enough, overseas information, but were less likely to accept overseas answers and knowledge capital and so forth. The fact that there were an awful lot of American servicemen running around Korea makes it, I believe, slightly more English-friendly, in my sense, than I found Japan. And so, probably a greater willingness to go to classes [at Alpha's in-residence training program] than the Japanese case. Their [Japanese] view is they just don't get enough detailed information in those courses and plus it's got the headache of translating from a foreign language.

In summary, it is clear from the data that Office C developed its own unique knowledge sharing pattern to respond to its local needs. Although both Offices B and C primarily served their own local markets, Office C emphasized its own innovation and knowledge creation. Such strong emphasis on local innovation resulted in relatively intensive internal communication and sparse knowledge sharing with other offices of the firm.

Discussion

The literature on knowledge management strongly recommends a common and consistent approach across all units of an organization, i.e., an organizational standard for knowledge management and knowledge sharing. Past research also has focused on knowledge management at the firm level. As Table 3 indicates, the case study reveals that there are substantial internal differences in knowledge sharing practices across local offices of a single consulting firm. Although Alpha has a strong corporate culture, strong global leadership in the area of knowledge management, and a worldwide technical infrastructure to support a single knowledge management strategy, the four offices studied in this paper showed distinctly different knowledge sharing behaviors—both internal and external—and their use of communication and collaborative tools seem to reflect these differences. These differences in knowledge sharing practices appear to be related to differences in the units' strategic roles.

We found that different strategic roles of local units are reflected in their internal and external knowledge sharing patterns. In particular, various electronic communication tools, including a firm-wide knowledge repository, electronic mail, voice mail and video conferencing, were used in diverse ways across organizational units to support these different knowledge sharing patterns. In the case of Office A, which represents the "typical" domestic client service office of the firm, we found consistency between internal and external knowledge sharing practices and between actual local practices and the firm's "standard." For both internal and external communications, consultants used a variety of electronic communication tools as their primary means of knowledge sharing, complemented by face-to-face interactions. The firm's global knowledge management strategy was most faithfully implemented in Office A.

For the TRC, which serves as the firm's technology innovator, we found that both internal and external knowledge sharing practices were modified to accommodate the equivocal and complex interactions that are necessary for dealing with complex, new ideas. Thus, consultants in TRC employ relatively rich communication media such as face-to-face meetings or videoconferencing for knowledge management, both internally and externally.

For Office B, the classic implementor, access to knowledge from elsewhere in the firm plays a far more important role than sharing knowledge internally. For this office, electronic communication tools played a relatively limited role in internal knowledge sharing. However, the firm's knowledge repository played an extremely important role for the external knowledge sharing, in particular for knowledge import. At the same time, this office relied heavily on face-to-face interactions to acquire the latest knowledge resources from other offices.

Finally, Office C showed almost an opposite pattern to Office B in terms of knowledge sharing. In Office C, which emphasized the importance of local innovation to serve its local market, we found a much stronger emphasis on internal knowledge sharing vis-à-vis external knowledge sharing. Internally, various electronic tools were used in order to facilitate knowledge sharing. However, external knowledge sharing was limited in its use and importance.

Each of these patterns of knowledge sharing is compatible with the strategic role that has been defined for the office (or that it has defined for itself). In summary, our findings suggest that just as global organizations are internally differentiated, knowledge sharing practices are similarly heterogeneous, reflecting the units' unique strategic roles. As a consequence, the use of information technology to support knowledge sharing is different across units.

One might argue that our findings can be explained through cross-cultural differences. For instance, it seems that two Asian offices put much less emphasis on knowledge sharing through documents and formal systems, particularly within the office. Instead, knowledge sharing through social networks was the primary mechanism in these offices. On the other hand, documents and formal systems play a significant role in knowledge sharing in Office A and the TRC. Such a tendency seems to reflect the different epistemology in these cultures. At the same time, we observed clear differences between Offices B and C, in particular in the way they share knowledge with other parts of Alpha. Despite the geographic proximity, Japan and Korea have distinctive cultures (Alston 1989; Hofstede 1991). Similarly, there were differences between Office A and the TRC in their knowledge sharing practices, even though both are in the US. In fact, the TRC represents its own unique culture (like a university campus) and maintaining its culture bears strategic importance. The four offices we observed not only represent four different strategic roles, but also four different cultures. Past research in global competition suggests, however, that national culture and strategic differentiation among subsidiaries of a multinational company cannot be separated (Kogut 1991; Kogut and Singh 1988). Furthermore, as noted in our data analysis, knowledge sharing patterns at local units are deeply embedded in their local practices and unique organizational sub-cultures, making it empirically difficult to distinguish knowledge sharing patterns from the rest of the local sub-culture. For instance, the fact that the employees at TRC did not engage in client work created a unique sub-culture at TRC of frequent and informal face-to-face interactions among researchers at the office. These frequent and informal face-to-face interactions were often recognized as an important aspect of their internal knowledge sharing patterns. Our findings are consistent with the recent work by Orlikowski (2002) who observed organizational *knowing* is a situationally enacted capability inseparable from the practices that constitute it recurrently over time (p. 267).

Limitations

The results from our study need to be interpreted in light of the following limitations. First, these results are based on a single case study at a large global management consulting company headquartered in the U.S. Knowledge sharing patterns in companies in different industries or headquartered in different country might show different patterns of internal differences. Second, our data were collected primarily through in-depth interviews. We were unable to participate in actual daily knowledge sharing activities by Alpha employees. More close-up ethnographic data would offer more grounded accounts of knowledge sharing practices. However, Orlikowski (2002) has used a method similar to ours to study knowledge sharing practices in an organization, based on the argument that people are knowledgeable and reflexive, and are better able to give a reasonable account of what they do than researchers give them credit for (p. 255). Finally, as noted above, we were not able to clearly separate the impact of the national culture and strategic orientation of sub-units on the knowledge sharing patterns. Past research on global organizations clearly shows the influence of national culture above and beyond organizational culture, policy, and norms (Hofstede 1984; Lam 1997). Future research

needs to examine how national culture influences the local cultures and knowledge practices of global organizations.

Implications

Our results provide an alternative to the popular view in the literature and practice that organizations need to implement and enforce a global knowledge management strategy in order to successfully harness the organization's knowledge. We suggest that organizations that are trying to develop and implement a knowledge management strategy must be sensitive to the local units' unique strategic and cultural contexts. This is not to suggest a complete anarchistic approach to knowledge management. Quite to the contrary, at Alpha, local units have *adapted* the firm's global knowledge management strategy centered around the use of the GKM system and its strong centralized training program, along with standardized solutions. Thus, Alpha's global knowledge management strategy provides a strong basis for the local units' knowledge sharing practices, although it does not dictate how knowledge should be shared nor does it replace the existing knowledge sharing practices in local units.

Our results contribute to a recently emerging line in the KM literature that emphasizes the importance of managerial sensitivity to local needs and practices in knowledge work (Cook and Brown 1999; Nidumolu et al. 2001; Orlikowski 2002). In implementing knowledge management initiatives, managers need to maintain the balance between the global design and local practices. If too much emphasis is given to the global design, the knowledge management system will fail due to its insensitivity to the local needs as demonstrated by Nidumolu et al. (2001). On the other hand, if too much emphasis is given to the idiosyncratic local practices, it can undermine the whole premise of knowledge management, of sharing knowledge in different units and contexts.

While local adaptation and structuration of technology-enabled management solutions may not be an entirely new issue in the literature (Barley 1986; DeSanctis and Poole 1994; Fulk 1993; Orlikowski 1992; Robey and Boudreau 1999), knowledge management poses unique challenges due to its social-embededness and appeal to the global logic. Future research in knowledge management needs to focus on how individuals and organizations can maintain a fine balance between the global design and local practices. Further, more research is needed to examine the role of information technology in maintaining such balance. The past discussion of information technology in knowledge management has been around its repository and communicative roles (Alavi 2000; Hansen et al. 1999). From the standpoint of maintaining the balance between global design and local practices, one important role of information technology that has not been extensively studied is its potential role as a boundary object (Carlile 2002; Karsten et al. 2001). Several consultants we interviewed mentioned the GKM system as an important way to find *experts*, as opposed to finding knowledge. In this regard, the GKM system acted more as a boundary object than a repository or a communication tool.

Finally, in the information systems literature, knowledge management systems are singled out as a primary means to support knowledge management. Our results suggest that although centralized knowledge management systems, such as Alpha's GKM system, can play an important role in knowledge sharing practices in organizations, individuals are very creative and skillful in finding means to effectively share knowledge in their specific contexts. When properly appropriated, for example, informal social interactions can be as effective as the formal knowledge management systems in supporting knowledge sharing practices, in particular if they fit with the local unit's context, as shown in Offices B and C. The focus must be not so much on

how to make people accept technology, but on understanding how to use the technology to create a condition under which knowledge is effectively shared within and across the boundaries of different units in an organization.

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Appendix I: Interview Guide

"Describe a recent incident where you were able to successfully create new pieces of knowledge (either alone or with other people) for Alpha."
- What was it?
- Why was it significant?
- How did you do it?
- What could have been an alternative method?
- What was the role of IT (and the GKM system in particular) in that incident?
- What other significant factors in that incident?

"Describe a recent incident where you were able to successfully preserve knowledge that you created."
- What was it about?
- Why was it significant?
- Why did you preserve it (for you or others)?
- How did you preserve it?
- What could have been an alternative method?
- What was the role of IT (and the GKM system in particular) in that incident?
- What other significant factors in that incident?

"Describe a recent incident where you were able to successfully gain/find useful knowledge from other sources in Alpha."
- What was it about?
- Why was it significant?
- How did you find it?
- What could have been an alternative method of finding such knowledge?
- What was the role of IT (and the GKM system in particular) in that incident?

What other significant factors in that incident?
Can you describe the process you followed to find an expert for the problem?
Can you describe the process you used the GKM system in this particular incident?
Which one was more useful, and why?

"Describe your overall usage pattern of the GKM system."
- Is it useful? Why?
- What are the major benefits of it?
- What are the difficulties associated with the use of it?

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