An Empirical Examination of the Influence of Organizational Culture on Knowledge Management Practices

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ABSTRACT: Knowledge management to facilitate the creation, storage, transfer, and application of knowledge in organizations has received wide attention in practice and research in the past several years. Often cited as a significant challenge in knowledge management practices is the issue of organizational culture. Although many studies raise the issue of organizational culture's influence on knowledge management success,

few investigate the way in which this influence manifests itself. This paper aims to explore how organizational culture influences knowledge management practices. Using a case study method, we examine the cultural values and knowledge management approaches within a large global information services company and one of its knowledge communities. The findings highlight the influence of culture on the use of knowledge management technologies and the outcomes of such use.

KEY WORDS AND PHRASES: impact of culture on knowledge management, knowledge management, knowledge management tools, organizational culture, values in organizations.

THE KNOWLEDGE-BASED VIEW OF THE FIRM suggests that intellectual resources are key organizational assets that enable sustainable competitive advantage [17, 24, 71, 73]. Those firms able to effectively manage these knowledge resources can expect to reap benefits such as improved customer service, reduced costs in people and infrastructure, better decision making, innovation, improved corporate agility, rapid development of new product lines, quick and efficient problem resolution, and efficient transfer of best practices [9, 24, 68, 69]. While contemporary literature provides numerous examples of knowledge management (KM) success stories [23, 31, 54], firms seeking to engage in such efforts also face a variety of challenges [19]. Among the most difficult of these challenges is organizational culture [19, 20]. Regarding this challenge, Janz and Prasarnphanich write, "Organizational culture is believed to be the most significant input to effective KM and organizational learning in that corporate culture determines values, beliefs, and work systems that could encourage or impede knowledge creation and sharing" [33, p. 353]. Others reflect similar arguments [15, 26, 36, 42, 66], however, few studies have attempted to systematically investigate the types of cultural values that exist in organizations and how these values might be associated with certain types of KM activities, technology choices, and related outcomes. Therefore, the objective of this research is to explore the relationship between organizational culture, KM technology, and KM outcomes. More specifically, we seek to address the following question: How do the organizational values influence the use and outcomes of the use of KM tools? To address this question, we employ a case study of a large global IT service company's KM initiative.

Background on Knowledge Management

KM IS "THE GENERATION, REPRESENTATION, storage, transfer, transformation, application, embedding, and protection of organizational knowledge" [67, p. 218], where knowledge can be defined as information possessed in the minds of individuals [2]. Knowledge can also be defined as individual's experience and understanding [48], or,

alternately, as "a high value form of information that is ready to apply to decisions and actions" [10, p. 43].[1] The goal of KM is "for an organization to become aware of its knowledge, individually and collectively, and to shape itself so that it makes the most effective and efficient use of the knowledge it has or can obtain" [5, p. 440].

Increasingly, firms are using information and communication technologies (ICTs) as strategic enablers of formal KM initiatives. These knowledge management systems (KMS) incorporate various technologies (e.g., information repositories, data warehouses, intranets, search engines, data filters, collaboration tools, intelligent agents) to facilitate the creation, storage, transfer, and sharing of knowledge both within and outside the firm's boundaries. There is evidence that use of such KMS tools leads to enhanced communications and increased levels of participation among staff members, efficiencies in problem solving and time-to-market, improved financial performance, better marketing practices, and improved project team performance [1].

While there seems to be agreement regarding the general concept, relevance, and goal of KM, it is also clear that a firm's KM practices may differ with respect to the types of processes emphasized [30], the approaches taken [25], as well as the ICTs used to facilitate KM efforts [21, 45, 48, 55]. In fact, KM is largely influenced by the social context in which it emerges. Sussman and Siegal [70] suggest that in order to understand KM, one must consider the source, channel, and recipient of knowledge and how these influence the ways in which individuals learn and behave in organizations. As such, the usefulness of knowledge for adoption will depend upon peripheral cues, such as the credibility and likability of the source. This suggests that KM is not an objective, discrete, and independent phenomenon occurring within organizations. To the contrary, KM processes are heavily influenced by the social settings in which they are embedded and are subject to various interpretations based upon organizational norms and social interactions among individuals.

Whereas Sussman and Siegal [70] examined social interactions surrounding the knowledge adoption process, Miranda and Saunders [51] employed social construction, social presence, and task closure theories to explain information sharing. In their study, information is viewed as embedded in a social context that determines both how the information will be shared and how it will be interpreted. Others propose that factors such as the degree of virtualness among individuals collaborating on a team will influence the knowledge transfer processes among team members [22]. Moreover, a team's transactive memory is expected to be influenced by the degree of virtualness in which it must function [22]. The above studies well illustrate the view of KM characterized by Alavi and Leidner as "a dynamic and continuous set of processes and practices embedded in individuals, as well as in groups and physical structures where at any point in time in a given organization, individuals and groups may be involved in different aspects of knowledge management processes" [2, p. 123]. The implication of these findings is that organizational forces—namely, the social context—may exert powerful influences on the KM needs and subsequent KM-related behaviors of individuals. Among the important social context factors is that of organizational culture.

Organizational Culture and Knowledge Management

ONE OF THE CHALLENGES TO STUDYING organizational culture lies in the very breadth of this construct. Whereas some have defined culture in terms of ideologies, sets of beliefs, basic assumptions, share sets of core values, important understandings, and the collective will [63], others suggest that culture includes more explicit, observable cultural artifacts such as norms and practices [12, 29], symbols [7], as well as language, ideology, rituals, myths, and ceremony [57]. On one hand, the very richness of this construct provides organizational researchers with a multitude of ways to explain social group behaviors. However, this same richness often leads to much confusion and misunderstanding in organizational culture research due to the sheer range of conceptualizations of culture [38]. To put some bounds around this concept without sacrificing its richness, we draw from Schein's [64, 65] three-level model that depicts culture in terms of basic assumptions, values, and artifacts.

Organizational Culture Framework

According to Schein, culture exists at three levels: basic assumptions, values, and artifacts. At the deepest or core level, culture consists of basic assumptions. These assumptions or beliefs represent interpretive schemes that people use to perceive situations and to makes sense of ongoing events, activities, and human relationships, thereby forming the basis for collective action [72]. They are formed over time as members of a group develop strategies to cope with problems and pass along the strategies to new members [72]. Specific cultures exist when groups, regardless of size, embrace similar interpretive schemes.

At the next level, values represent a more visible manifestation of culture that signify espoused beliefs identifying what is important to a particular cultural group. While assumptions may be preconscious and invisible, values are more visible, even debatable, with individuals having a greater awareness of them. Even so, Schein makes it clear that values alone are merely a reflection of underlying cultural assumptions. These values provide a mechanism through which organizational members interpret signals, events, and issues and represent an enduring belief that a given norm of behavior is preferable over an opposite norm [3]. In this sense, values can be seen as a set of social norms that define the rules or context for social interaction through which people act and communicate [12, 52]. These social norms have an impact on subsequent behaviors of firm members through acting as a form of social control that defines which behaviors and attitudes are appropriate for members to display [56]. Thus, a recurring theme in the organizational literature has been to suggest a tight linkage between organizational values and social group behaviors [52].

At the third level, culture is manifested through artifacts that are the most visible manifestations of culture. These artifacts may include things such as art, technology, and visible and audible behavior patterns as well as myths, heroes, language, rituals, and ceremony [57]. For example, a firm's KMS (e.g., knowledge repository) could be conceived of as a cultural artifact that is the realization of a given set of cultural

values that, in turn, are manifestations of underlying assumptions about information technology (IT). According to Hatch [27], use of these technology artifacts might also act to either reinforce or reshape existing values and, over time, such changes in values might alter basic assumptions. Thus, organizational culture is portrayed as an ongoing, dynamic interaction among basic assumptions, values, and artifacts.

In the present study, we have chosen to conceptualize organizational culture in terms of values. There are several reasons for this. First, values are more easily studied than basic assumptions that are invisible, whereas artifacts are hard to decipher [65]. Second, the majority of prior theoretical work aimed at exploring the linkage between culture and social group's behaviors and actions has done so in terms of values-based theories of culture [58]. Two prime examples of this are Quinn and Rohrbaugh's [60, 61] Competing Values Framework and Cooke and Lafferty's [8] Organizational Culture Inventory. Finally, prior work examining organizational culture's influences on KM have done so primarily using a values-based conceptualization of culture. It is our intention to build upon this prior work by exploring further the relationship between organizational values and KM practice.

Organizational Culture: At What Level?

A major debate among cultural theorists has been the question of whether organizations have uniform, homogenous values or, instead, various local cultures, each with their own distinctive values. This is an important question for the current study since, depending on one's views, there could be either multiple local cultures at work influencing KM practices within a firm or, instead, a single dominant corporate culture driving KM choices, decisions, and outcomes.

Meyerson and Martin [49] draw this distinction in their discussion of the *integration* and *differentiation* perspectives of organizational culture. The integration perspective regards organizational culture as a homogeneous collection of values that act as "an integrating mechanism or social or normative glue that holds together a potentially diverse group of organizational members" [49, p. 624]. Such a view is "characterized by consistency across cultural manifestations, consensus among cultural members, and usually a focus on leaders as culture creators" [49, p. 625]. Proponents of this view [11, 46] tend to be cultural pragmatists who argue that organizational culture is something that can and should be managed. Such efforts usually center on developing strategies to create unifying organizational cultures where people will be motivated to a common basis for action [47]. One of the drawbacks to the integrationist perspective is its inability to explain cultural conflict and ambiguity in values [49]. Thus, organizational values are valid only to the extent that they are widely shared across the enterprise.

In contrast, the differentiation perspective portrays organizational culture as a mix of various local cultures each with their own distinctive values [13, 16, 29, 44, 49, 63, 65, 72]. So, although there may still be an underlying dominant organizational culture, various other local cultures may exist within the firm. Rose [62] notes that this view of organizational culture may be more realistic particularly in large complex

organizations where the ongoing recruitment of personnel from the outside, the intro-
duction of new technology, and the existence of departmental and other group per-
spectives all make a unitary culture unlikely. Thus, a more realistic view may be one
that considers organizations as minisocieties, multicultural in nature, each with dis-
tinctive, competing, and potentially conflicting local cultures formed along functional
lines, shared fate, professional occupation, ethnic background, or job rank [6, 16, 35,
59, 60, 61, 65] According to this differentiation view, organizations are umbrellas for
collections of subcultures where leaders are not the only ones who generate values
and "the content of a given culture can be influenced by the task or technology used
by employees, by the constraints of the organization's stage in its life cycle, or by
external factors such as major changes in a firm's environment" [47, p. 101].

Knowledge Management–Culture Research

Initial research on organizational values and KM suggests that organizational values
are important to facilitate effective knowledge sharing practices among firm mem-
bers [4, 10, 15, 33, 37, 43, 50]. One example of this, by Gold et al. [20], demonstrates
the relationship between certain organizational values, KM capabilities, and subse-
quent organizational effectiveness. They conclude that organizations with more open
and supportive value orientations are predisposed toward constructive knowledge be-
haviors such as firm members sharing insights with others. These values, they argue,
form part of the firm's knowledge infrastructure capability, which may influence or-
ganizational abilities to innovate, to respond rapidly to change, and to be responsive
to new market demands. Another study, by Delong and Fahey [12], identifies specific
value orientations believed to facilitate or hinder knowledge sharing. They argue that
value orientations such as trust and collaboration will lead to greater willingness among
firm members to share insights and expertise with each other. In contrast, value sys-
tems that emphasize individual power and competition among firm members will
lead to knowledge hoarding behaviors. Consequently, they argue that firms should
seek to reinforce and mold those cultural values most consistent with knowledge
sharing behaviors. Similarly, Jarvenpaa and Staples' [34] study of university person-
nel shows that shared organizational values influence individual's perception of own-
ership of knowledge and subsequent tendencies to share knowledge with others. Their
study concludes that a propensity to share and perceived organizational ownership of
information leads to greater use of collaborate media to share information.

Other research focuses on the related concept of knowledge creation (as opposed to
sharing) and its relationship to various values. For example, Lee and Choi [41] exam-
ined various enablers of knowledge creation, among them the organizational values
of collaboration, trust, and learning. They found support for their hypothesis of a
positive relationship of organizational culture (defined by collaboration, trust, and
learning) and knowledge creation processes and conclude that shaping an organiza-
tion's cultural factors are key to a firm's ability to manage knowledge effectively. In a
similar vein, Lee and Cole [40] found that the culture of the extended Linux commu-
nity was important in regulating the norm of open sharing, in addition to providing a

quality control mechanism. They discovered that culture acted as a social control mechanism to manage community members and to sanction those who deviated from norms. The freedom to express criticism was found to be a significant underpinning of the development process that enabled knowledge to expand.

In these studies, the underlying theme has been that certain types of organizational values will lead to different types of KM behavior and that these behaviors will lead to varying outcomes. Thus, "good" cultural values such as sharing, openness, and trust will lead to positive KM behaviors (e.g., knowledge contribution and sharing), which will lead to innovation and efficiencies, whereas "bad" values will lead to dysfunctional KM behaviors (e.g., information hoarding) and, hence, undesirable outcomes such as inefficiencies. Therefore, organizations should seek to promote and build the types of cultural values that support their specific KM objectives [12]. These relationships among organizational values and KM behaviors and outcomes, as deduced from prior research, are conceptualized in Figure 1. As this figure illustrates, values have been found to influence specific KM behaviors, which, in turn, influence specific outcomes.

Although this initial body of KM–culture research has helped to validate the importance of cultural values for firm's KM initiatives and provided insights into some important values, it still lacks a detailed analysis outlining specific types of values and how these values might relate to KM technology choices and subsequent outcomes. Moreover, it focuses almost exclusively on the processes of knowledge sharing and creation. Other processes, such as knowledge seeking and use, the employment of tools to support KM, and the outcomes of KM, have yet to be carefully examined. In addition, the literature to date has not considered the choice of technologies in support of KM and how the technology choices may be influenced by organizational values. Our study will attempt to fill this void.

The above discussion on organizational values and KM leads us to expect that within a given firm, numerous values may exist simultaneously, attributable to both local as well as organizationwide cultures. These cultural differences may influence value preferences related to knowledge and its applications and use in their respective settings. Therefore, a different set of KM values may lead to different KM outcomes as well as the means to achieve them. Moreover, given that organizational members tend to attend to events that either affect or are affected by a core value [3], we would expect individuals to respond more favorably to KM technologies whose use supports one or more of the organization's underlying values. As such, their values would influence directly, or indirectly, their use of KM tools in addition to their KM-related behaviors and the outcomes of those behaviors. Our subsequent case analysis and discussion will seek to further refine and explain these relationships.

Research Methodology

WE CHOSE A CASE STUDY METHODOLOGY to explore our research question. Case research is particularly useful when the phenomenon of interest is of a broad and complex nature and, hence, is best studied within the context in which it occurs [18,
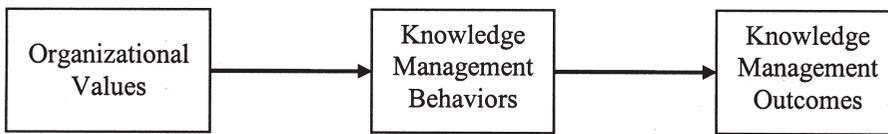
Figure 1. Conceptual Model: The Relationship Between Organizational Values, Behaviors, and Outcomes

74]. We take a positivist approach to the case, which implies that we assume, a priori, that there are discoverable relationships between organizational values and KM behaviors and outcomes. However, our case is also exploratory in the sense that the literature to date does not lend itself to the development of precise hypotheses concerning the specifics of these relationships. As such, we begin our inquiry at a broad level of analysis and seek to analyze the case data in such a way as to provide us insights into the more specific nature of the relationship between organizational values and KM.

The firm under study (Company A) is a large, global high-tech firm in the business of providing multiple lines of information-related products and services to a broad range of customers. Headquartered in the United States with operations throughout the world, Company A has approximately 316,000 employees and revenues in excess of $88.1 billion. While this company has traditionally been a leader in the information services industry, its initial venture into large-scale KM projects was not initiated until 1995.

We selected Company A for this study for a number of reasons. First, significant opportunities and challenges are often associated with KM approaches in large and geographically dispersed organizations. Therefore, this company offers fertile ground for studying forces such as organizational culture and how these forces might shape subsequent KM practice and outcomes. Second, considering the high levels of organizational resources required for implementation of large-scale KM projects, these types of initiatives are most likely encountered in very large firms such as Company A. Thus, the phenomenon of interest to these researchers could be best investigated in the context of a very large firm with an established track record in KM practice. Finally, past contacts that one of the researchers had with this firm facilitated its recruitment as a case study site. Although it is often desirable to have multiple cases, there are contexts in which a single case design is preferred [18]. Because a multicase design would introduce a complication that different organizations would be at different stages of development, a multicase design would possibly confound the influences of value with the mere influence of time.

Data Collection

Data for this study were collected through semistructured telephone interviews with 20 professional employees (informants) at the various company locations and through

white papers written by organizational members and other papers, such as case studies, commissioned by the organization but written by outsiders. Having data from these three separate sources enabled us to triangulate the results of our interview analysis. The interview informants were all from a large business unit (World Wide Services) of Company A focused primarily on the provision of consulting and information services. The interviews took between 45 to 75 minutes and were mostly conducted between January 2002 and May 2003. Informant's tenure ranged from six months to 17 years and included job titles such as consultant, program manager, senior consultant, vice president of industry program, project manager, and managing associate. Following the same interview protocol, all interviews were tape-recorded and then transcribed for subsequent analysis. During the interview sessions, informants were first asked to characterize their organization's culture and then to describe and characterize their units' particular KM approaches. The interviewer used a specific set of questions guiding the discussion of KM approaches. Each informant was first asked to describe the specific KM practices that he or she engaged in and to discuss the outcomes of these activities on him or herself or on the organization. Next, each informant was asked to describe the technical tools and capabilities used in support of various KM approaches and to describe any resistance and impediments to KM that he or she might have noticed in his or her business unit. The same interviewer, using identical data collection protocols, conducted all the interviews in Company A. At the completion of each session, the interviewer carefully read the transcripts to ensure their accuracy and completeness.

Data Analysis

Based upon the transcribed interviews, one of the three authors independently developed a profile for each of the 20 informants. These profiles described the informants' perspectives of their business unit's culture as well as their perspective of KM practices and outcomes. The profiles enabled us to build a broad picture of KM within the organization. The next step was a formal coding of each interview in order to gain insights into the ways in which values related to the KM practices in World Wide Services (WWS). To accomplish this, each author read each sentence in two-thirds of the transcripts (so that for each transcript, two authors were coding independently). We wrote down in a table each sentence that referred to a value in the organization, to KM-related behaviors, or to KM-related outcomes. We also looked for miscellaneous insights that did not necessarily fit into a given category and placed these in a separate column. The two codings for each transcript were then compared with any discrepancies discussed until we had a shared interpretation of each of the interviews. During this process, values were subdivided according to whether they were organizational or local. Organizational values related to those that were discussed by individuals spanning organizational units whereas local values referred to those that were discussed only by individuals within a given unit. Finally, the coded transcripts of informants for Company A were compared and contrasted with each other as well as with information we obtained from internal company reports and external reports of the

company's KM initiative. The case analysis, following the presentation of the case, was written based upon this analysis.

Case Description

Case Overview

OUR INTERVIEWS WERE CONCENTRATED within the WWS unit of Company A. WWS is a very large unit of the company and accounted for 45 percent of the total revenues in 2002. This unit has responsibility for marketing and delivery of a wide range of information systems, technology, and technology management consulting services to a large number of both profit and not-for-profit organizations worldwide. More specifically, WWS consists of five units: Business Consulting Services (BCS), Application Management Services (AMS), Outsourcing Services (OS), Integrated Technology Services (ITS), and Networking Services (NS). The BCS unit provides a wide range of business consulting services that includes business transformation and change management, business strategy, human resource management, and financial management. The AMS business unit provides services and consulting focused on planning and management of corporate IT application systems portfolios. Business services provided by the OS unit involve partnerships between WWS and client companies to manage and operate their entire IT resources, generally under long-term outsourcing contract agreements. In some situations, these outsourcing service agreements may involve the transfer of IT-related employees and assets from clients to WWS. The ITS unit has a much more technical emphasis providing a range of services to assist companies in technical planning and installation and maintenance of hardware and software resources. Finally, the NS unit provides consulting and support in the area of computer network implementation and integration as well as network maintenance services

As these business unit descriptions indicate, WWS operates in a highly knowledge-intensive business domain. To support its knowledge-intensive business, WWS launched a major initiative several years ago to link KM with corporate strategy and to build an infrastructure for support of knowledge creation and knowledge sharing.

Since WWS is a very large and independent unit within Company A, we will treat this entity as one of our levels of analysis. And, given our desire to examine the influences of values on KM at two levels (organizationwide and local cultures), we will examine a specific knowledge community within WWS (i.e., the Organization Change [OC] community) as our second unit of analysis.

Knowledge Management at WWS

The KM framework called Intellectual Capital Management (ICM) was launched at WWS in 1995. The objective of the ICM initiative at WWS was to institutionalize KM and to enhance organizational innovation, customer service, and responsiveness through the timely generation, sharing, and application of knowledge. ICM consists of two key elements: enterprise repositories and a technical infrastructure called

IntellectWeb.[2] The enterprise repositories consist of electronic documents and databases of codified knowledge from internal and external sources. Global access to these central repositories is provided through Web-based knowledge portals. The other element, IntellectWeb, consists of a set of integrated KM tools for support of collaboration and content management. Further details of these two technologies are outlined below.

Enterprise Knowledge Repositories and Portals

Four types of central repositories were made available to the WWS global workforce through knowledge portals: business research, best practices, market and customer knowledge, and general intellectual capital (codified organizational knowledge). The business research repository provides WWS consultants and professionals with knowledge from external sources such as the Economic Intelligence Unit and research centers affiliated with universities. The best practices repository was developed to provide descriptions of leading practices for selected key business processes from both internal and external sources as well as providing information about the business units and companies using these practices. The market and customer repositories provide market research and information on WWS customers and client organizations, including customer products, markets, suppliers, and financial performance. Finally, the general intellectual capital repository contains a variety of corporate intellectual assets, including software, methodologies, research and white papers, report and proposal templates, standardized contracts, and announcements of product offerings.

   WWS has developed and implemented a set of formal procedures to identify, extract, and structure intellectual capital for inclusion in these central knowledge repositories. Since contributions to these repositories could come from a variety of sources distributed throughout the global structure of WWS, these procedures articulate a detailed set of rules for quality control purposes to ensure that intellectual capital is thoroughly filtered, structured, and approved before being entered into the respective repository. Although these quality control standards are well intentioned, discussions with informants suggests otherwise—namely, that these procedures have been complicated by legalities and formalities. Consequently, these procedures have resulted in significant delays in posting submitted knowledge contributions thereby leading to relatively outdated content of some central repositories. As a result, these repositories are not used as widely as they could be, according to our informants.

Technological Infrastructure and Tools (IntellectWeb)

The technical infrastructure for KM, IntellectWeb, is a robust and secure application based on Lotus Notes and Domino[3] software systems. IntellectWeb includes two categories of KM tools: content management and communication/collaboration support. Content management tools provide capabilities for structuring, searching, and retrieving knowledge captured in electronic documents. They also provide navigation tools to provide access to the common and central knowledge repositories (described above)

as well as search tools to identify knowledgeable individuals by searching employee profiles, "yellow pages," and project directories.

The communication and collaboration support tools embedded in IntellectWeb provide capabilities for messaging (e.g., e-mail), calendaring, online chat (Same-Time tool), application sharing, and discussion forums. One such collaboration work tool highly popular with project teams is TeamRoom, which is a customized and private collaborative space for project team members where they can conduct project-related discussions, share information and electronic documents, and coordinate project activities. WWS has created standard and mostly automated procedures to facilitate the setup of TeamRooms by project teams. The goal of these procedures, according to one informant, is to facilitate the creation of new TeamRooms in ad hoc and quick ways. WWS has a service center that enables a team to fill out an online form, specify what its purpose is, and then have the TeamRoom automatically set up.

TeamRooms are widely used at WWS for support of virtual project teams. They have proven valuable in helping virtual team members keep track of team-related events as well as helping newly assigned members to integrate quickly into the team's environment. One informant gives the example of a recent project she was assigned to at the last minute that involved selling an information product to a government agency in another country. She was able to access all the documentation from the TeamRoom and was able to become a productive member of the group very quickly. She states, "I can go in and start getting information about a particular topic and work with colleagues almost immediately. It allows me to work more easily with colleagues across disciplines." Given the itinerant nature of the WWS consultant's life, these TeamRoom capabilities have proved invaluable in helping consults have easy access to needed documents in a manner that does not require sending and receiving files over a broadband network.

Some other TeamRoom features useful to consultants are databases and team metrics. The database capabilities of TeamRoom have been useful for new team members in handling certain administrative tasks such as ordering computer equipment and business cards. The TeamRooms also keep track of such metrics as utilization so that members of the team know "who is on the bench and who is not," which, in turn, helps in project assignments. Says one informant, "this helps to manage from a billable utilization point of view."

Knowledge Café

By drawing on various features of IntellectWeb, WWS has developed a Lotus Notes and Domino application called Knowledge Café. This application is used in support of content management, knowledge sharing, collaboration, and community management and coordination. Content management is provided at both the individual and team levels through a set of integrated capabilities for classification, search, and document and library management. Whereas a TeamRoom is a private collaborative space for a project team, Knowledge Café is a common collaborative space shared by multiple teams and members of the community. For example, team documents can be classified

and consequently retrieved by category, type, date, author, topic, or version number. Codified team knowledge is maintained in shared central repositories and classification tools enable accessing the content from multiple views and with high efficiency.

Knowledge Café's collaboration and coordination tools consist of calendar and event management, online meetings (including screen sharing), and discussion forums including issue-based structured collaboration. The issue-based collaboration tool provides a structure for tackling new issues, presenting proposals to address these issues, as well as a facility for presenting arguments both for and against the proposals and finally coming to a resolution. The tool tracks the action items created in the collaboration to ensure that issues are moved toward closure and that follow-up actions are performed. Team discussion forums can be saved and later retrieved by issue (topic), date, or discussion initiator. Other collaboration support features consist of tools for group brainstorming and development of collaborative documents.

Other features of the Knowledge Café include team configuration management and team coordination support. Capabilities include search and access to personnel profiles, calendaring, event posting and scheduling, and meeting agenda planning and tracking.

Knowledge Management Communities Within WWS

According to one informant, KM in WWS is an evolutionary process that began in 1995 with the view that KM was about "codifying and sharing information," leading to the creation of "huge repositories of procedures and documents." It was assumed that people would go to a central site, the ICM central repositories, pull information down, and "would all be more knowledgeable." According to another of our informants, this centralized top-down approach to KM initially had largely a technology orientation "with infrastructure support for the ICM and a tooling focus." What was discovered from this initial foray into KM was that the information was not being refreshed and that the approach was not complementing the way people really learned, which was through interactions with other people within their communities. Consequently, the KM initiative began to shift toward providing a standardized set of tools that individual teams and communities of practice could use to develop their own KM practices. Communities of practice (from here on referred to as "community") at WWS, referred to as "knowledge networks," are institutionalized, informal groups of professionals that manage a specific knowledge domain and share expertise and passion for that knowledge domain. One of our informants estimates that, today, there are about 70 knowledge network communities with members from around the globe. While many of these networks are relatively new, others have existed multiple years.

Communities serve members based not upon project or organizational position but upon shared professional interest and commitment. Whereas some communities emerge informally, others are formally developed, which appears to be the preference of WWS management. These formal communities are typically developed around one of three topics: WWS new service/product offerings, industries served by WWS, or internal competencies and expertise. The organizational sponsorship of formal communities

normally consists of a high-level executive sponsor, a community leader, a core community team, community members, technical tools, and often some operating funds. An example of a service/product community is the "Apollo" community.

Apollo (not the real name) is a new technology being marketed with no physical organizational unit corresponding to it. The Apollo community was established to disseminate marketing, sales, and technical knowledge and to encourage service innovations around Apollo. Core team members were recruited and funding was made available for the community development. The core team of about 20 people was recruited based upon their interests and passion on the topic as well as their expertise, reputation, and location. The remaining membership in the Apollo community was voluntary. The community was announced and advertised in the company media via Web pages and e-mails to thousands of people. On the first day alone, 500 people signed up for the Apollo community. In addition to Apollo, other types of communities have been formed. First, WWS management has decided that communities need to be launched for each of the 14 industries (e.g., banking, utilities, etc.) being served by WWS. So, within the past two years, WWS has assigned executive sponsors and community leaders to launch these communities. Also, competency communities have been established when WWS wants to develop a new organizational competency. For example, a community around the topic of biotech was developed to create and share biotech services knowledge.

Informants have noted differences in resilience of formal versus informal communities. For example, one informant observed that formal communities tend to be more vulnerable to organizational and structural changes (e.g., change in the executive sponsorship of the community). On the other hand, the emergent grassroot and mature communities tend to be more resilient to the changes in the formal structure of the organization. Leaders and core team members of these robust and strong informal communities tend to provide sustained support for their community in spite of any change in the community business sponsorship. For example, the OC community underwent a major organizational change involving an acquisition and merger with another firm. Not only was the OC community able to weather this change intact, they seemed to grow even stronger as a result of this change. In this community, the members were able to pool knowledge and work together to maintain the identity of the community and to align themselves with the change in the business environment.

One feature of WWS communities is that subcommunities are often formed from within individual communities to solve specific problems. One respondent gives the following example: "If there is a particular industry standard in system management and we really need to adjust our methodology to that particular industry, the community practice leader will go to the business leaders interested in that issue and seek funding. A project team from within the community would be put together." One community leader preferred to have his community operate solely on the basis of such specific organizational problem solving. He said, "if we have a common global problem, we will start up a subset of the community and ask them to get together and solve the problem. The word community sounds like a feel-good/group-hug kind of thing. Yes, indeed, there might be valuable information exchanged informally but it is

extremely difficult to justify the time spent by employees or the time spent on the applications without showing direct value back to the business. That is why I chose not to have informal communities or group-hug sessions. They [communities] are specifically targeted with specific assignments." Moreover, this informant suggests that "KM cannot be just something that is nice to get together and share knowledge with people. Any time you are not billing customers you are losing time, no matter what the reason."

In contrast to this problem-solving purpose, another informant believes that a primary function of communities is to help members find answers to questions. So, if someone poses a question to a Knowledge Café, whether or not they receive an answer depends, according to this informant, "on the strength of the community in terms of its social capital. The OC community will always give an answer. Other communities are much more focused on codified knowledge, so you could probably 'sit there' forever and never be noticed." These examples help to illustrate that, despite the common organizational procedures and technological infrastructures, communities operate independently and in accordance with their social norms.

Knowledge Management Community Procedures and Evolution

Just as WWS has developed standardized technology infrastructure for communities and teams (Knowledge Café and TeamRoom) so have formal procedures been created to facilitate the management and ongoing functioning of communities. Community procedures prescribe a set of predefined, institutionalized, but informal, activities and roles[4] that members engage in. These activities include generating, managing, and disseminating the community's intellectual capital, facilitating communication and knowledge sharing among the members, expanding membership, and managing the community (developing norms and defining the identity, goals, and scope of community). Each community has a business executive sponsor and consists of a community leader and a core team.

Active participation in and contributions to communities are on a voluntary basis. One informant, who is a contributor to the OC community (described below), feels no obligation to contribute but does so because she wants to help other people. Another person, who is coleader of the OC community, comments that the formal performance evaluation system at WWS is primarily focused on billable hours and revenue generation. To enhance community activities, she hopes that, one day, active participation and contributions to communities will be included as a standard part of the firm's evaluation system. Yet another member of the community notes that the tools for community are "passion and commitment." These examples help illustrate that some core team members and community leaders continue to actively contribute to communities despite the lack of funding and formal incentives.

According to internal research reports at WWS, longitudinal data indicates that knowledge network communities follow a distinctive pattern in their evolution from initiation to maturity. Using this pattern, WWS has developed a five-stage community evolution model used to describe the characteristics of communities in one

stage of maturity from those in another. These five stages include potential, building, engaged, active, and adaptive. According to this model, at latter stages of community maturity, the functions and characteristics of the previous stage(s) are present. Although communities are primarily viewed as organic and live human institutions, this evolution model has been used to develop a "community developer kit." One of our informants says that the purpose of the development kit "is not to confine but to provide a road map in which to navigate and build." One such advanced community and its organization and activities is briefly described below for illustrative purposes.

Organizational Change Community

The coleader of the OC community describes it as among the most successful KM communities at WWS. By the year 2000, the community had 1,500 members cutting across all lines of business around the globe with an explicit mission, vision, and goals. The OC community has gone so far as to quantify the business return of such a community, in terms of cycle time reductions and sophistication of responses to clients. The leadership structure of the community consists of two coleaders, a senior global board (the core team) of 30 members, and a subject-matter expert (SME) council that regularly monitors the development, quality, and quantity of the intellectual capital of the community. This community has also formed what is referred to as the "health check" team. The health check team examines such things as how well members communicate and share knowledge with each other. For example, using the social network analysis technique, the health check team has examined the community interactions and communication patterns with an eye toward its improvement. This team also conducts periodic surveys to measure member perceptions of community activities and then does a gap analysis to compare these perceptions against what is actually happening in the community.

When an OC community member requests information or has a query to post to other members, they send their message to one of the community coleaders who first tries to forward the message directly to an SME. If an appropriate SME cannot be identified, the community coleader then posts the question to the entire group. In this event, the group members respond back to the coleader, rather than to the community, in order to avoid an inundation of messages. The coleader normally receives responses within an hour and then forwards the responses to the individual with the query. Later, she (the coleader) sends an e-mail to the person who initially made the inquiry, asking how the response was and how it might have benefited him or her (e.g., resulting in time savings or a higher-quality service to the customer). The coleader routinely receives multiple responses to queries; in one instance having received 28 responses to a particular inquiry. Over time, these member responses have been stored as intellectual capital in the community's database and then, subsequently, portions of this have been transferred to the corporatewide knowledge network repository. The informant indicated that, although she had loaded over 100 pieces of intellectual capital into the corporate knowledge network repository over the past seven months,

this represented only a portion of the intellectual capital she has received from OC community members.

Case Analysis

AS DISCUSSED ABOVE, WWS HAS PROVIDED a technology infrastructure and various KM tools for the use of KM communities. Although these technology capabilities have been centrally provided, communities still have discretion in their selection and use of specific tools. Our interviews suggest three distinct patterns in how different communities use KM tools. These patterns include using KM tools to make connections with others, to develop and accumulate intellectual capital, and to collaborate and learn. In the context of this study, the phrase *KM tool use* refers to how individuals may appropriate a given technology for their own particular purposes [14]. The following pages discuss the relationship between values, KM tool use, and outcomes in further detail.

Patterns of Knowledge Management Tool Use

Making Connections to Others

Considering the size and the dispersed and global nature of the WWS organization, connections to other "like-minded" employees in the firm and a sense of affiliation are not easily achieved. Such a work environment can easily lead to a sense of isolation since 30 percent of WWS employees do not have offices and work instead from home or the client sites. The availability and use of Knowledge Café has facilitated exchanges and making connections among individuals leading to the establishment of strong personal ties among some of the community members. This, in turn, has engendered feelings of belonging, identity, affiliation, and "being visible."

When asked to describe some of the major effects of the OC community, one informant stated that she "no longer felt so isolated—people feel they are affiliated, that they are part of the company." Another informant, a heavy user of e-mail and the firm's instant messaging system, sees the purpose of the community to be a knowledge sharing forum and to encourage a sense of belonging. She states that she would "not be at WWS any longer if it wasn't for this community." The reason is that most of her connections at WWS have been made through the community. Also, being in the community enhances her visibility and helps her to get assigned to interesting projects. For example, the leader of a new project will contact someone in the community and say that they are looking for an individual with a certain professional profile. The informant finds that she often gets asked to work on projects this way.

Developing and Accumulating Intellectual Capital

The use of content management tools embedded in the IntellectWeb (community portals, classification and categorization technologies, and document and library

management systems) leads to the accumulation and expansion of the community's codified knowledge base (intellectual capital). The intellectual capital captured in this manner can be efficiently shared and accessed by various community members and reused in the performance of organizational tasks such as new project initiations, planning, and proposal development.

In some cases, intellectual capital accumulated in one community is used by other communities. For example, the OC community has codified its experiences and "lessons learned" with its own community development process in the form of a community evolution model. This model has been shared with other interested communities and serves as a blueprint for their continued development. Furthermore, codification and preservation of electronic interactions among the community members (archives of e-mails, discussion forums, and real-time chat interactions) enhances organizational memory and develops a context for organizational decisions making and problem solving. This, according to some informants, reduces "reinventing the wheel" and "making the same mistakes."

Collaboration and Learning

Technologies such as expert locators and community yellow pages are used to learn about others' capabilities and skills and to identify potential collaboration partners, both within and outside a community. Knowledge Café tools for teamwork and communication are also utilized to jointly pursue business opportunities or work on client projects. Such inter- and intracommunity collaborations often lead to innovations and learning. For example, one informant commented that one of the KM outcomes is "accidental knowledge" or "spontaneous innovation." He shared the instance where some consultants realized that some of the techniques used in business consulting could be adapted for technical consulting. The two KM communities, one focused on the management of technology and the other focused on the networking technology domain, then pooled their expertise to develop a new methodology for computer network management.

Organizational Level Values

In addition to uncovering these patterns of KM tool use, our analysis of transcripts revealed several dominant values that appear to be linked to these various uses. These values, as perceived by the informants, included expertise, formalization, innovativeness, collaboration, and autonomy. Of these five different values, three of them (expertise, formalization, and innovation) were perceived to be organizationwide values, whereas the remaining two (collaboration and autonomy) represented localized values specific to the OC community informants. These findings are consistent with Meyerson and Martin's [49] differentiation view of organizational culture emphasizing the existence of numerous, often competing, cultural influences at multiple levels within firms. The implication of this is that different types of values may result in

different uses (appropriations) of KM tools and subsequent outcomes. We now discuss each of these value systems in further detail.

Expertise

Among the words most often used to describe WWS by our informants was *hierarchical.* The term was used to describe both a perceived hierarchy among organizational members as well as a formalization of procedures. The hierarchy at WWS as described by informants was less a matter of structure than of expertise. Organizational members perceive WWS to place a high value upon subject-matter expertise. Both the community leaders and community members appeared to value expertise, but for different reasons. Being recognized as an expert was considered "an intrinsic motivator": there was no financial reward for such recognition. For organizational members, being recognized as an expert by organizational members of WWS was not so much a matter of appreciating the inherent worth of knowledge but, rather, achieving a reputation as an expert had a pragmatic aim as an avenue to desirable projects. Hence, such expertise contributed to the achievement of an employee's utilization rate.

As for the KM leaders, among their chief goals related to KM was to know who the experts were so that they could act as an intermediary, connecting members with questions to experts with answers. The leaders believed that their serving as gatekeepers between members and experts was important so that "everyone did not send out inquiries to everybody else" resulting in both experts and members "being overwhelmed." At the same time, the leaders became experts in their knowledge of who the SMEs were. Hence, the leaders themselves held an expertise that was considered essential to the functioning of the communities. This expertise was the basis of their power and influence in WWS.

Whereas the leaders needed their expertise of SMEs to help their communities function smoothly, the members who already were recognized experts had little incentive to contribute to the community except out of a sense of duty. On the other hand, those members who were not widely recognized as experts but who wanted to establish such a reputation, had the incentive to actively contribute to the community in order to be recognized by the leaders as experts and, consequently, to be attractive for assignments in need of their expertise.

In summary, the value placed upon expertise can be seen as motivating community leaders to use the tools to connect themselves with as many organizational members as possible in order to build their own social capital and knowledge base that is necessary to the effective functioning of their communities. The value placed upon expertise can also be seen to motivate less well-known organizational members to join communities and share their knowledge in order to gain recognition as an expert and, hence, advance their progress in the hierarchy of expertise.

Formalization

It came as no surprise to our informants that WWS enacted methods to foster community maturity after one community, the OC community, became recognized in a sense

as an expert in community development. Informants indicate that, at WWS, "there is very much a correct way to do things," and if something is viewed as critical to the organization's success, "it has to be built into the procedures." So entrenched were some informants in the formalization at WWS that they seemed unable to act outside of predefined procedures. These types of values espousing adherence to procedures did not appear to be localized in nature; rather, informants perceived such values to be organizationwide across WWS. Even while informants used the word *bureaucratic* in a negative sense, they favorably described initiatives to develop a set of standardized tools for teams to adopt for their projects, to monitor the development of communities by stages, and, indeed, to automate KM procedures. One organizational member expressed the view that "KM procedures have to be automated if KM is to prosper." The KM leaders likewise valued a procedural approach to KM. The leaders worked arduously to develop a model of community maturity complete with an assessment test to determine in which stage a community currently operated and a guidelines document to help a community develop a plan to move up in the stages of maturity. Rather than ad hoc communities that are entirely organic, the value placed upon formalization appears to engender a relatively structured model of community emergence at WWS.

Innovativeness

In speaking of their organization, our informants were always quick to note that WWS was in "a state of change" and "becoming innovative." In fact, the words *hierarchical* and *bureaucratic* were mostly used in a negative sense, whereas *innovativeness* was perceived as quite positive. Thus, even though many informants did not yet feel that the organization displayed innovativeness, it was clear that, across all units within WWS, they perceived that the organization valued innovativeness. Oftentimes, the very hierarchy they spoke of hindered the innovativeness they desired. Yet, while the hierarchy often bound their behavior, senior managers held the key to setting them free to innovate. Informants describe an organization in which members are anxious to explore various solutions to problems but in which members wait until senior managers have "given the green light to an idea," at which point "everybody jumps on it." Thus, even without much funding to back their verbal support of KM, once senior management indicated its interest in KM, the communities grew and spread.

   The value placed upon innovativeness is concurrently a value placed upon being in a nonstatic state of "becoming." The informants unilaterally agreed that WWS was not where it needed to be, but that it was en route. They valued the sense of progress that came from striving to be more innovative. There were at least three ways in which the value placed upon becoming innovative revealed itself in the context of KM. First, the KM tools were viewed as vehicles to aid in this becoming process. Second, KM leaders organized cross-community gatherings with the idea of encouraging innovation via cross-pollination of ideas across communities. In these cases, the leaders chose face-to-face conference settings rather than relying upon the tools. The leaders used their own knowledge of the various communities emerging at WWS

to look for potential synergies among communities and then organize the cross-community gatherings. Finally, the value placed upon becoming innovative provided incentive for KM leaders to experiment with the tools at their disposal, even without being explicitly rewarded for so doing.

Local Values

Collaboration

Within the OC community, informants frequently spoke of the importance they placed upon collaboration. One informant spoke of the "street values" as being "win, team, and execute." Another emphasized that it was essential to "collaborate quickly," meaning that the nature of their work often demanded that members be able to readily identify and work with previously unknown organizational members. It was important to be able to quickly become knowledgeable of a team's past dealings in the event that a new member was added to the project team, which frequently happened. In spite of the billable hour requirements that each individual must meet, things are "always done in a collaborative spirit." An irony though is that, while collaboration appears to be valued within the OC community, the increasingly mobile nature of their work is forcing many members into a certain sense of isolation. It is important to note that mobility itself was not described as a value, but, rather, as a cost of doing business in today's highly competitive environment. Informants reported that the only way to recruit top talent was to ignore geography and chose the talent where it was, with the understanding that individuals would be allowed to reside wherever they desired.

An outcome of the mobility is that individuals no longer have the social capital that they had in the past. Moreover, while collaboration is valued, there is a strong sense that the constant state of exigency that the members find themselves in when working on projects precludes the development of relationships. Thus, even though OC community members value collaboration, their mobility is increasingly rendering them autonomous agents.

Recognizing this tendency, OC community leaders have actively promoted the use of KM tools to enable the formation of online communities. This extends well beyond the enabling of organic communities to emerge spontaneously; rather, the leaders actively work to identify areas where communities would facilitate collaboration and help build social capital. They then seek to identify a core group of community leaders to help establish the structure and functioning of the community. The leaders themselves make use of KM tools to help develop a rapport among the core members of a new community.

The leaders also display their own desire to build relationships as they participate in KM leader communities and develop relationships with other community leaders. The leaders considered it important to host face-to-face and teleconference events so that the community was not entirely virtual. In the minds of both members and leaders, collaboration was made more efficient through the use of the KM TeamRoom

tools, yet social capital was only built in concurrence with some opportunities to engage in socializing events, such as at community sponsored conferences.

The OC community is portrayed as the quintessential community. One member claims to not identify herself at all with WWS but, instead, to find her sense of belonging in the community. Another informant describes a sense of "connection" that resulted from her community membership and enabled an otherwise "big and scary" organization to feel like a caring family. In effect, one informant believes that the OC community attempts to shift a very technical, phone-oriented, work product–oriented way of communicating with each other into a more personal work-in-process movement toward what WWS refers to as "thought leadership." When asked why members take the time to participate in the OC community when there is no formal reward for so doing, one informant said simply, "it's just how we do business." In the absence of the value ascribed to collaboration, the KM tools are used to solve specific problems, but not with an aim to build a collaborative community. A member of a more technical community asserted that KM must be "operational" as opposed to "informational" to be successful and that there was no room for "spontaneous dialogue."

Autonomy

Another value that emerges at the local level surrounds the role of the individual. Even though organizational members within the OC community realize the importance of collaborating as they engage in project teams, they remain autonomous in the important sense that they control their own destinies, and they value having this control. One informant described a work environment in which "no one is looking over your shoulder" and in which "individuals are encouraged to make their own decisions." Another informant described how individuals are expected to take responsibility for finding new projects to work on once they have completed an assignment. The billable hours is a constant pressure that individuals feel and provides incentives for individuals to take as little time between projects as possible. Whereas the mobility of OC community members makes collaboration more difficult, this mobility makes autonomy a must. Not surprisingly, given the organizational value on expertise described earlier, the OC community tends to recruit individuals based upon their knowledge and potential rather than their location and availability to office in a given location. Thus, partly by design, the individuals working within the OC community are autonomous and view themselves as individual agents contracted to work on projects for the larger organization, WWS. Thus, the KM tools are used primarily as a means to make connections with others for placement on desirable projects and improvement of utilization rates.

To summarize, we have uncovered three distinct ways that individuals use KM tools within WWS: to make connections, to develop and accumulate intellectual capital, and to collaborate and learn. The analysis of informant transcripts shows an association between these various KM tools uses and specific values—at both the organizational and local levels. These relationships, summarized in Table 1 show the links among the different values, respective KM tools uses, the actual KM tools being used, and subse-

Table 1. The Relationship Between Value, KM Tool Uses, and KM Outcomes

Type of value (level of analysis)	KM tool use (appropriation)			Approach to KM
	Making connections	Developing and accumulating intellectual capital	Collaboration and learning	
Expertise: expertise in subject matter (organizational)	KM tool focus: e-mail, chat rooms, online forums, online directories. Outcomes: • Enhanced individual visibility and social capital. • Recognition as SME experts. • Placement on desirable projects. • Improved utilization rates. • Increased knowledge contributions.			
Formalization: adherence to procedures (organizational)		KM tool focus: KM repositories, portals, content classification and categorization, document and library management and archival information (e-mails, discussion forums, chat).		Top-down approach to KM: • Formal procedures to identify, extract, and structure intellectual capital for inclusion in central repositories. Detailed rules for quality control purposes.

(continues)

Table 1. Continued

		KM tool use (appropriation)		
Type of value (level of analysis)	Making connections	Developing and accumulating intellectual capital	Collaboration and learning	Approach to KM
		Outcomes: • Lack of use of knowledge repositories. • Knowledge base not being regularly refreshed. • Delays in posting new knowledge.		• Formalized community structures and processes: corporate sponsor, SME council, health check team, surveys, and gap analysis. • Standardized and automated procedures for establishing new team rooms. • Formalized process for knowledge seeking and sharing. Community developer's kit: institutionalized evolutionary model (five stages) for development of communities

Innovativeness: sense of progress (organizational)		KM tool focus: portals, search engines, expert locators, "yellow pages," Knowledge Café team room's e-meetings and calendaring. Outcomes: • Spontaneous innovation. • KM tool experimentation. • Learning new methods. • Higher productivity. • Enhanced problem solving.	Grassroots emergence of new, ad hoc team rooms, Knowledge Cafés, and collaborative technologies. Experimentation with KM tools and community development techniques (e.g., face-to-face meetings).
Collaboration: cooperation, support, caring (local): OC community	KM tool focus: Knowledge Café, e-mail, chat rooms, instant messaging, online forums, online directories. Outcomes: • Increase sense of identity, belonging. • Increased social capital. • Community participation.	KM tool focus: Portals, content classification and categorization, and library management tools. Outcomes: • Accumulation and expansion of community knowledge base. • Effective knowledge sharing and reuse.	Grassroots emergence of new, ad hoc team rooms, Knowledge Cafés, and collaborative technologies. Periodic face-to-face community meetings designed to strengthen personal ties of membership community.
Autonomy: self-direction (local): OC community	KM tool focus: e-mail, chat rooms, online forums, online directories. Outcomes: • Improved utilization rates. • Placement on desirable projects.		

quent outcomes. For example, local values embracing collaboration were most closely associated with OC community members who used KM tools (a combination of e-mail, chat rooms, instant messaging, online forums, and directories) primarily for the purposes of establishing social connections with others. Through establishing these social connections, OC community members experienced a greater sense of belonging and affiliation within their community, they were less likely to leave, and, finally, they were more likely to participate in knowledge sharing activities.

Discussion

THIS PAPER HAS EXAMINED THE WAY that organizational culture, as evidenced in perceived organizational values, influences KM practices. The paper extends the early KM notions of organizational cultures as either abetting or contravening knowledge sharing, by identifying specific, often competing, organizational values and how these influence a broad array of KM-related behaviors. The following points, summarized in Table 2, outline our conclusions.

First, our findings indicate that organizational members' values influence the ways in which they use KM technology. Evidence of this influence was observed among several communities within WWS, all of which had access to the same basic array of knowledge repositories, Knowledge Cafés, TeamRooms, collaboration tools, and training/support. For example, the OC community, with dominant local values embracing collaboration, demonstrated a much greater propensity to use TeamRooms/communities for more informal, unstructured sharing of tacit knowledge and to infuse new members into the community. However, in the absence of such collaborative values, community use of KM tools tended to reflect the general organizational values of WWS for solving explicit problems and for making connections for self-improvement, recognition, and access to favorable project assignments.

Consistent with Hatch's [27] view of cultural dynamism, these findings suggest that individual communities' perceptions of KM technology are shaped by their embedded values, which, in turn, leads to different patterns of technology use.[5] The implication for practice is that managers undertaking large-scale KM initiatives cannot expect uniformity in how groups will use KM tools. Rather, these uses may vary based upon the assortment of local and organization-level cultural values that influence perceptions of how these tools should be used. Faced with such an environment, managers may need to set cultural change efforts in motion to achieve certain desired KM tool uses, particularly if prevailing values are not consistent with desired KM tool uses. The other strategy would be to encourage a broad spectrum of KM tool uses based upon the cultural richness of the firm.

Second, our analysis indicates that different patterns of KM tool usage will have implications for which features of technology figure most prominently in such use. For example, Table 1 shows that informants with organizational values embracing innovation employed a much different set of ICTs in developing and accumulating intellectual capital than did those (OC community) with more local collaborative values using KM for making connections. The former group placed a high emphasis on

Table 2. Conclusion and Implications for KM Practice

Study conclusions	Implication for KM practice
Deployment of standardized sets of KM tools will encounter diverse uses due to the presence of assorted local and organizationwide cultural values within firms.	• Management's options are to either (1) shape values to influence how groups use KM tools or (2) encourage various uses based upon cultural richness of the firm.
KM tool users may employ diverse features of the technology based upon their embedded cultural values.	• Design KM systems with features and functionality fitting to the cultures they are to be embedded in. • Develop KM systems with broad technical capabilities to appeal to various cultural values.
Differences in cultural values within firms will lead to divergent organizational and individual outcomes from KM system use.	• In conjunction with deploying KM systems, management should seek to develop the proper social environments to facilitate effective knowledge-related behaviors. • Identify and develop community leaders with values that foster collaboration. • Encourage use of KM tools to facilitate making connections in conjunction with uses related to developing and accumulating intellectual capital. • Avoid KM initiatives to achieve uniform targeted outcomes across the firm. Rather, facilitate KM initiatives that appeal to a wider range of more favorable outcomes.
The presence of multiple cultures within a firm suggests that both formalized (top-down) and organic (bottom-up) approaches to KM may occur simultaneously within the same firm.	• Avoid a big-bang approach to KM. • Foster organic growth of KM communities consistent with local cultures within the firm.

portals, search engines, and expert locators than did the latter, which focused more on KM tools facilitating social connections such as e-mail, chat, instant messaging, and online forums. The implication for KM practice is that different features of KM technologies may be more or less important depending on the various purposes for which KM tools are used (e.g., making connections with others). This could have potential implications for designers of KM systems that might need to emphasize certain features of technology over others depending on the cultural context. This could be particularly true for KM technologies being deployed across various national boundaries where values may differ considerably [28].

Third, these findings show that groups with different values using KM tools for different purposes are likely to experience diverse KM outcomes. For example, we observed differences among community behaviors related to knowledge sharing as

well as overall response rates to queries by individual members. Whereas members of the OC community felt that their high response rate to individual queries could be attributed to the strength of the community in terms of its social ties or sense of connectedness among individual members, informants from communities with weak social connections tended to be less willing to respond to individual requests. These results support the notion that development of the proper social context is a vital precursor to positive KM behaviors (e.g., sharing, responding to inquires, and making contributions to repositories). We would argue that initial attempts by WWS to foster more effective organizationwide knowledge behaviors failed, due, in large part, to the lack of social context to facilitate these behaviors.

The implication for practice is that, in conjunction with development of the objective, technical aspects of KM systems, managers must give close attention to developing the proper social environment to facilitate effective knowledge-related behaviors. This could include encouraging the use of KM features that facilitate social connections, engaging in periodic face-to-face community meetings to develop social capital, and in identifying particular community leaders who value relationship-oriented values such as collaboration, caring, and support. Furthermore, our results indicate that the establishment of social ties is required before groups will effectively use KM tools for the purpose of developing and accumulating intellectual capital.

Fourth, we found that groups using KM tools tended to experience outcomes consistent with their embedded values. For example, members of the OC community (with values embracing cooperation, caring, and support) experienced greater sense of belonging and affiliation as a result of their KM tool use. Others with innovative values dominating used KM tools to improve methodologies, to work more efficiently, and to experience a greater incidence of serendipitous innovations. In fact, different cultural groups may engage in the same manner of KM tool use but for different purposes. This was evidenced by those informants using KM technologies for making connections. Those with values embracing expertise in subject matter made connections in order to increase their own visibility and to get favorable project assignments. In contrast, those informants embracing collaborative values used the KM tools to achieve a greater sense of belonging and identify with their social group. Thus, both groups used essentially the same technologies (e-mail, chat rooms, instant messaging, and online forums) to establish connections, however, they did so for much different purposes. This suggests that even though groups may use KM tools similarly, their underlying motivations for such use may vary dramatically based on their cultural values. As such, those seeking to implement KM initiatives within firms should not expect that there will be a uniform set of outcomes of KM use across the organization. This will be particularly true if, as some argue, organizations are comprised of various local cultures. It may be unrealistic for top management to undertake KM initiatives to achieve specific targeted outcomes. Rather, a more realistic strategy may be to facilitate KM programs that appeal to the strengths of the various cultures within the firm.

Finally, our study suggests that cultural values seem to influence a firm's approaches to KM. As the last column of Table 1 indicates, the initial top-down approach taken

by WWS to KM as well as subsequent KM procedures and methods were highly reflective of values associated with formalization. Our findings suggest that firms do not decide in advance to adopt a repository or community approach to KM, but that this evolves. The interviewees consistently characterized WWS as valuing formalization. Given this cultural value, it is not surprising that the initial approach to KM was strongly supported by senior management and focused on the creation of a large centralized repository (ICM) of organizational knowledge to be shared across multiple units. This initial repository approach to KM, begun in 1995, can be characterized by heavy investment in IT and the focus on standardized procedures for submitting and approving new knowledge. We can see how the cultural values associated with formalization have been embedded into actual KM technologies consisting of large repositories treating knowledge as an "object" that can be codified in rules, tools, and processes [12].

From this initial repository approach, KM at WWS has evolved, over time, to more of a community approach as evidenced by virtual communities, team rooms, knowledge cafes, and a host of group collaboration technologies. This evolutionary process has taken place in a bottom-up fashion driven by both organizationwide values (innovation) as well as local values embracing collaboration (e.g., caring, sharing, supportive). Thus, we contend that since the large repository did little to assist the collaboration and innovation deemed so important, and highly valued, at WWS, the innovativeness and collaborative values provided the impetus for microlevel experimentation with community-based KM systems.

Together, our findings indicate that organizational culture has a more complex relationship to KM than has previously been thought. Not only does it influence such behaviors as knowledge sharing and seeking (the topic of prior research), but it influences technology selection and appropriation, the evolution of KM, the migration of knowledge within an organization, the role of KM leaders, and the expected outcomes from KM use. We use these insights to refine Figure 1 to produce Figure 2. As Figure 2 illustrates, an assortment of values (both organizational and local) may be at work within firms to influence individual KM tool use, KM approaches, tools made available, as well as both individual and organizational KM outcomes. Furthermore, this model suggests that individual and organizational KM outcomes may, over time, shape organizational and local values. Although this later relationship was beyond the scope of this study, future research should be undertaken to examine how KM tool use and outcomes may influence firm's values.

Limitations and Conclusion

AS WITH ANY RESEARCH, and, in particular, with case research, our research carries certain limitations, among the chief of which is that data were gathered from a single organization over a rather short period of time. Moreover, while our aim was to generalize from a single case to theory and not from a single case to other cases [39], the fact that all of our data comes from a single organization opens the possibility that the organization itself might be somewhat of an anomaly. However, our knowledge of
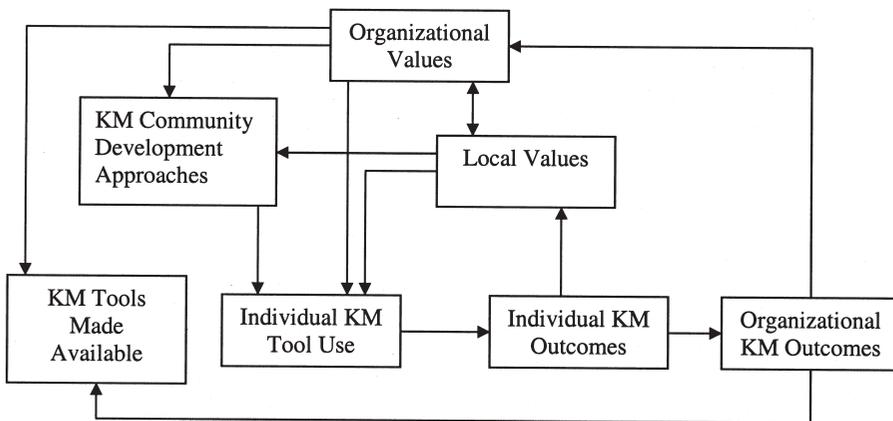
Figure 2. A Model of Organizational Values and KM

this firm leads us to conclude that it is among the leaders in using IT and that its initiatives are frequently emulated by other firms.

Notwithstanding these limitations, the research has some valuable implications. We set forth to address two questions: (1) What organizational values are crucial for KM initiatives? and (2) How do the organizational values influence the use and outcomes of KM tools? In addressing these two questions, the paper makes several contributions to our understanding of organizational culture's importance to KM initiatives. First, we have described the myriad of tools that can be incorporated into KM initiatives. The notion that there is a either a technology-based or people-based approach to KM needs to be discarded, as our understanding of how various tools can be appropriated to support either a content-based or collaborative-based system, or both, is advanced. Second, our analysis has examined organizational culture in terms of the dominant values influencing organizational members' behaviors. We have offered evidence that attempts to link specific values with the use of KM tools and with various outcomes of KM tool use. These values are not all consistent, nor are they related. In fact, it is the tension among values that enables such divergent outcomes of KM use. Future research can shed light on how to effectively manage the tensions created among competing values so that KM initiatives flourish rather than reach a stalemate.

Our study has also shed light on the important role of KM leaders and the role of top management in legitimizing and empowering the KM leaders. A major implication of the key role played by the KM leaders is that it is not necessarily imperative to have a corporate culture change initiative running concurrently with a KM implementation. A better strategy would be to focus attention on identifying and encouraging KM leaders who value expertise and collaboration, in particular. Moreover, this study has provided evidence that KM leadership is more essential to the success of KM than incentives and bonuses awarded to potential KM users. Future research can focus on the KM leaders and address issues such as what are the characteristics of effective KM leaders and how can an organization develop a committed team of KM

leaders. Finally, because this study is not longitudinal, it would be outside the realm of our data to make suggestions concerning the impact of KM on organizational culture. However, this is a fascinating question that merits future research.

NOTES

1. For a more comprehensive review of the knowledge construct, see Alavi and Leidner [2], Holsapple and Joshi [30], Huber [32], and Nonaka [53].

2. Not the real name of the WWS technical infrastructure.

3. Trademark or registered trademark of Lotus Development Corporation.

4. These are activities that fall beyond the scope of employees formal (e.g., evaluated) job responsibilities.

5. Hatch [27] holds the view that technology use will have a recursive relationship with values. However, examination of technologies' impact on values is beyond the scope of this study.

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