United States Agency for International Development

Knowledge Management and Communities of Practice

Included Materials:

- *Knowledge Management: A Tool for Improving Government Performance,* by Brian Murrow
- *Communities of Practice and Organized Performance,* by E. L. Lesser and J. Storck

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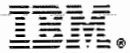


Knowledge Management: A tool for Improving Government Performance

by Brian D. Murrow

What is Knowledge Management?

Internet centers in Afghanistan, Judge Advocate General Officers sharing common legal templates, training officers and their participants sharing information before going into battle -- these best practices make up the essence of knowledge management in the Federal Government.

The tools and methodologies that connect these men and women around the globe and facilitate efficient interactions is knowledge management (KM), the process by which an organization's information or knowledge is captured, organized, stored, accessed, and used.

To meet the objectives of the President's Management Agenda, and the needs of the twenty-first Century, the Federal government's ability in effectively managing and leveraging this knowledge is critical. With the ever-shrinking Federal workforce and government regulators such as the Office of Management and Budget and Congress budget requiring increased budget justifications and program reviews, KM enables small Agency's and large Departments alike to access critical and sensitive information securely and efficiently.

To better understand KM and determine how formal KM methodologies and systems are implemented, we divide KM into the following four areas:

- Strategy & Leadership
- Organization & Process
- People & Culture
- Technology & Systems

Knowledge is . . .

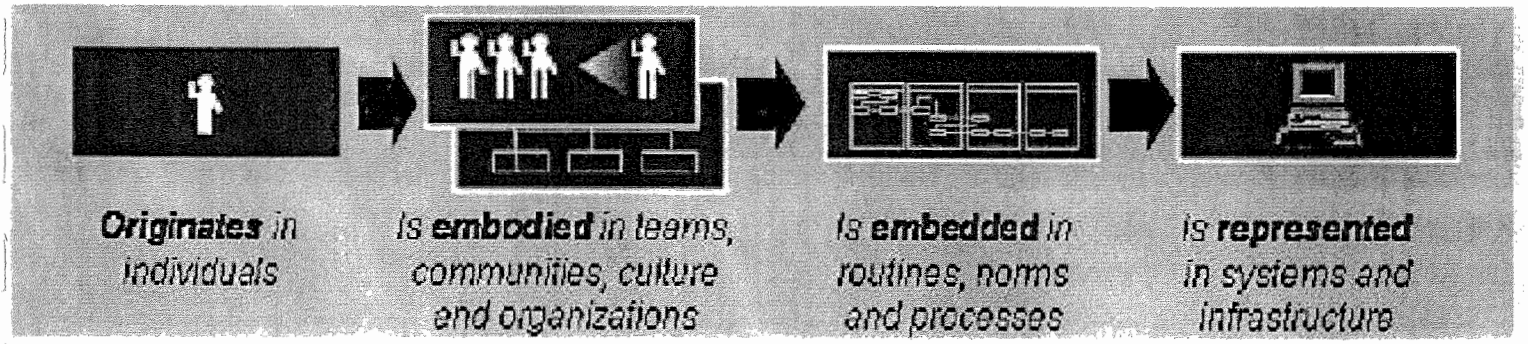
- Knowledge **originates** in individuals
- Knowledge is **embodied** in teams, communities, culture and organizations
- Knowledge is **embedded** in routines, norms and processes
- Knowledge Is **represented** in systems and infrastructure

Knowledge can be . . .

- **Explicit**: Documented information that can facilitate action
- **Tacit**: Know-how and learning embedded within the minds of the people in the organization

Knowledge Management is . . .

- Key to establishing an organization as the leader within its community
- Successful knowledge organizations must continue to build its internal knowledge base and leveraging knowledge to make decisions and communicate lessons learned and mission success



- Makes work more efficient, effective and innovative
- Is a method to share knowledge stored electronically, on paper, or in people's heads

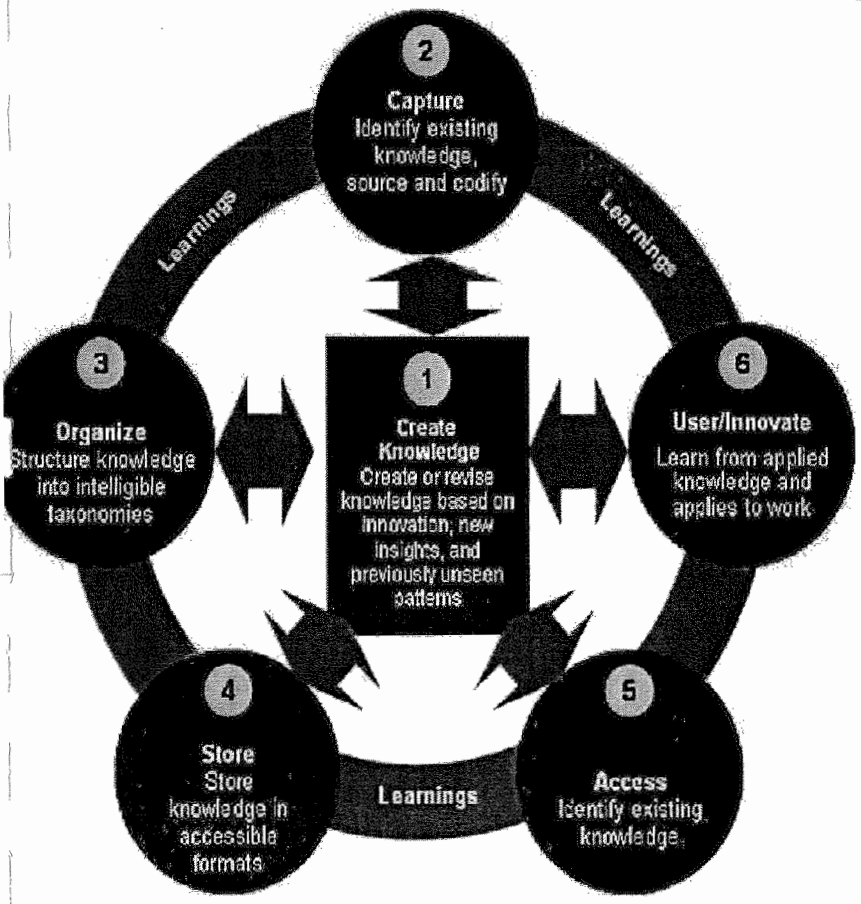
Knowledge Management is not . . .

- Technology driven – it is technology enabled
- Measured in the volume of data, but in the quality and use of the shared knowledge
- Something separate from our work – it is integrated into our work

Knowledge Creation and Generation

Knowledge management consists of the following six processes:

- Knowledge creation
- Knowledge capture
- Knowledge organization
- Knowledge storage
- Knowledge access



- Knowledge use

Strategy & Leadership

The essence of strategy and leadership, in the context of knowledge management is defined as the articulation of KM strategic goals and the linkage between this strategy and overall organization-level strategic goals and objectives. KM strategy and leadership, can be divided into the following:

- **Formal KM Strategy Articulated**: A strategy for KM has been developed through a structured, formal process and has been clearly and unambiguously communicated to key stakeholders.
- **KM Strategy Linked to Overall Strategy**: The KM strategy has been integrated into the overall organization strategy.
- **Leadership Sponsorship and Participation**: The organization has publicly and unambiguously signaled support for KM and the KM strategy to key stakeholders.

Organization & Process

Organization and Process plays a critical role in moving an organization forward in the transformation into a knowledge organization. We have divided the elements of organization and process into four main categories:

- Formal KM Unit and Process: The organization has established a formal group with KM responsibilities, staff, budget, and facilities.
- CoP Operation and Supported: Communities of Practice are formally recognized by the organization, functioning, and has budgetary, technical, and staff support.
- Learning Reviews Operational and Supported: The organization has established a formal process for conducting learning reviews that is functioning and has budgetary,

technical, and staff support.
- Story Telling Supported: The organization has established a process for identifying, codifying, storing, managing, and communicating narratives that describe organizational operations and outputs.

In studying best practice knowledge organizations, a standard approach to the knowledge management process emerges:

- **Knowledge creation**: Creat or revise knowledge based on innovation, new insights, and previously unseen patterns
- **Knowledge capture**: Identifying and codifying existing knowledge source
- **Knowledge organization**: Structure knowledge into intelligible taxonomies
- **Knowledge storage**: Store knowledge in accessible formats
- **Knowledge access**: Identify existing knowledge
- **Knowledge use**: Learn from applied knowledge and apply to everyday work to more efficiently achieve organization's objectives

People & Culture

People and Culture are divided into three categories:

- KM Incentives and Performance Standards: Best practice knowledge organizations have integrated knowledge creation, sharing, communication, seeking/using as a part of the formal description of the roles and responsibilities and gives credit for KM activities in performance standards and employee evaluations.
- KM Change Management Program: The successful knowledge organizations have established a program for communicating KM initiatives and encouraging and facilitating cultural change toward a more KM sensitive organization.
- KM Training: Best practice knowledge organizations have established training and education programs that enable staff to improve their KM skills and abilities.

When all organizations are considered, we have identified the following best practices:

- KM strategies are established to facilitate appropriate cultural changes
- The success of cultural changes are tracked and measured on a routine basis
- The organization is strongly aware of the need for knowledge management
- Staff is fully aware of the critical nature, relevance, and impact of KM
- Senior management supports a program whereby every organization member receives orientation training in knowledge management before starting work
- Cultural enablers and barriers are identified, reviewed (with supporting evidence), and acted on by senior management
- Senior management and HR support and measure ongoing KM training programs
- Staff or external consultants skilled in KM are utilized to educate staff on KM principles and to relate KM to day-to-day work activities and processes
- Information and knowledge silos are eliminated
- Client/customer - focused views prevail (cross-departments)
- Fragmentation is eliminated, knowledge and information separation is maintained under software control
- Knowledge flows are mapped and redesigned within the knowledge management framework addressing bottlenecks (over reliance on individuals) and dead-ends (who to contact or where to locate)
- Knowledge flows through to external stakeholders and business partners

Technology & Systems

Technology is a key enabler of knowledge management and communities of practice. But technology does not drive knowledge management. In the best practice organizations we studied, KM was led by the non-technology dimensions of KM. Nonetheless, it is technology that empowers the best practice organizations to transform into knowledge organizations. The key aspects of technology within knowledge organizations include:

- KM Technology Architecture Developed: Development of a formal plan and design for KM technology implementation and operation within an organization.
- KM Net Portals: A Web application that provides an entrance point into KM databases, systems, and tools.
- Online Expertise Directories: A web-based application that enables users to access a listing of staff that identifies their knowledge, skills, and abilities.
- Facilitated CoPs Online: Web-based portal that provides access to CoP and is monitored by dedicated staff.
- Electronic Document Management: Systems that manage the process of document production, revision, and release. Typically they incorporate a central database and networking software. Usually the document database is accessible over a local area network and is used to store all documents for a specific project, division, or organisation.
- Groupware Collaborative Software: Groupware refers to programs that help people work together collectively while located remotely from each other. Groupware services can include the sharing of calendars, collective writing, e-mail handling, shared database access, electronic meetings with each person able to see and display information to others, and other activities.
- Data Mining: Data warehousing, data mining, and data visualization are three interlinked knowledge management technologies.
- eLearning: Knowledge management can significantly enhance the organization's learning program and should be integrated together.

When all organizations are considered, we have identified the following best practices for this area:

- A formal integrated KM technology architecture and strategy is established and implemented for the organization
- Objectives and success criteria are agreed to across the organization
- Measures are in place to assess the impact of the technologies on the business, comparing anticipated performance measures against estimates
- Enabling technologies are implemented across the organization, within an enterprise integrated KM architecture
- Information Systems/KM strategy are clearly communicated, understood, and mutually dependent
- Both codified and tacit knowledge sources are identified and mapped within the organization, a formal knowledge map (this could include external sources as well)
- These knowledge sources are consolidated into a corporate knowledge repository within a knowledge management framework
- Search engine technology is deployed across the knowledge base
- Formal security controls are enforced on knowledge sources across the organization through electronic document management technology
- Formal segmentation and ranking of knowledge and information within the various sources is implemented within the overall knowledge management framework
- Policies and procedures are in place to ensure ongoing quality assurance through initiatives such as audits, sampling, subject matter expert validation, etc.
- The framework establishes a knowledge network linking knowledge seekers to finders.

Functional and Technical Requirements

In determining the KM systems functional requirements, it is a best practice to engage the Community of Practice. The five steps in identifying KM technology requirements includes:

- Step 1: Develop Strawman Functional Requirements and Use Cases. These are typically developed based on: organization experience and industry norms.
- Step 2: Conduct Focus Groups to Review, Edit, and Verify Requirements and Use Cases. This is typically cone through a review of materials with several focused groups using structure facilitation techniques to identify the final list of functional requirements

- Step 3: Review and Identify Department-level, OMB, and Other Technical Requirements
- Step 4: Develop Evaluation Criteria Based on Functional and Technical Criteria
- Step 5: Conduct Focus Groups to Rank and Weight the importance of Evaluation Criteria

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Communities of practice and organizational performance

by E. L. Lesser
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As organizations grow in size, geographical scope, and complexity, it is increasingly apparent that sponsorship and support of communities of practice—groups whose members regularly engage in sharing and learning, based on common interests—can improve organizational performance. Although many authors assert that communities of practice create organizational value, there has been relatively little systematic study of the linkage between community outcomes and the underlying social mechanisms that are at work. To build an understanding of how communities of practice create organizational value, we suggest thinking of a community as an engine for the development of social capital. We argue that the social capital resident in communities of practice leads to behavioral changes, which in turn positively influence business performance. We identify four specific performance outcomes associated with the communities of practice we studied and link these outcomes to the basic dimensions of social capital. These dimensions include connections among practitioners who may or may not be co-located, relationships that build a sense of trust and mutual obligation, and a common language and context that can be shared by community members. Our conclusions are based on a study of seven organizations where communities of practice are acknowledged to be creating value.

Steve walked into the meeting room and quickly grabbed a seat. Having just recently joined the company, his boss had recommended that he attend this weekly lunchtime meeting of VisualBasic programmers. He felt it was a good way for Steve to get "plugged into" the company, and would give him an opportunity to see some of the projects that others, across the firm, were working on.

The meeting began with a series of short introductions around the table. Then, one of the senior designers, Cindy, plugged a laptop into the overhead projector and started demonstrating a new set of programming tools that had been developed by one of the company's strategic partners. Steve took notice of the extended functionality of some of the tools, and saw an opportunity to use it on one of the new projects he would be spending time on. At the end of the meeting, Steve walked up to Cindy and introduced himself. They spent another 20 minutes discussing the opportunity to use the tools on Steve's project and how Steve might be able to also use some existing code from one of Cindy's recent development efforts. After writing down Cindy's contact information on a napkin, he headed back to his office, thinking about this new course of action.

As organizations grow in size, geographical scope, and complexity, it is increasingly apparent that sponsorship and support of groups such as the one described above is a strategy to improve organizational performance. This kind of group has become known as a community of practice (CoP)—a group whose members regularly engage in sharing and learning, based on their common interests. One might think of a community of practice as a group of people playing in a field defined by the domain of skills and techniques over which the members of the group interact. Being on the field provides members with a sense of identity—both in the individual sense and in a contextual sense, that is, how the individual relates to the community as a whole.[1] A

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sense of identity is important because it determines how an individual directs his or her attention.[2] What one pays attention to is, in turn, a primary factor in learning. Therefore, identity shapes the learning process. The relationships within the community are enacted on the field, which provides an initial set of boundaries on the interactions among its members and on their goals. And, as with most field-based games, overall community welfare ultimately is more important than individual goals.

The playing field analogy is imperfect, however, for two reasons. First, in the "game" played on the field, the number of "players" is indeterminate. In fact, being able to maintain the community by bringing new members onto the field—like the fictional programmer in the vignette above—is an important defining characteristic. New members build legitimacy through participating in learning interactions with other members of the community. The nature of participation must be engaging, although there is clearly room for what is called legitimate peripheral participation.[2] Indeed, peripheral members bringing new ideas can catalyze innovation. One usually thinks of face-to-face communication as the way that members of a community achieve the necessary level of engagement to develop their identities, relationships, and learn. In fact, most prior studies of the ways that people engage with each other have focused primarily on face-to-face communication. Nevertheless, there is nothing in the classical sociological definition of community of practice that rules out communication media such as e-mail, discussion groups, or chat rooms as support mechanisms for participating in distributed communities of practice.[3]

The second problem with the playing field analogy is that it can lead to thinking about communities as large, unstructured teams. The distinction between communities and teams sometimes leads to confusion. Storck and Hill[4] suggest that the differences between the two constructs can be characterized as follows:

1. Team relationships are established when the organization assigns people to be team members. Community relationships are formed around practice.
2. Similarly, authority relationships within the team are organizationally determined. Authority relationships in a community of practice emerge through interaction around expertise.
3. Teams have goals, which are often established by people not on the team. Communities are only responsible to their members.
4. Teams rely on work and reporting processes that are organizationally defined. Communities develop their own processes.

Others tie the difference between teams and communities to the legitimizing process. In a team, legitimizing occurs principally through the assignment of formal roles and relationships (i.e., team membership and structure are defined external to the team). As indicated above, members of a community of practice establish their legitimacy through interaction about their practice.[3]

Communities of practice have previously been thought of as coming into existence when people interested in a common work-related area or in an avocation feel a need to share what they know and to learn from others. Professional associations, groups of software developers, and skilled craft guilds are examples of work-related communities of practice. Avocational examples range from communities of quilters to communities of rowers. In the past few years e-mail, electronic discussion groups, and electronic chat rooms have facilitated the development of communities of practice whose members are not all colocated. Regardless of the mode of interaction, the traditional notion of a community of practice is that it emerges from a work-related or interest-related field and that its members volunteer to join.[5]

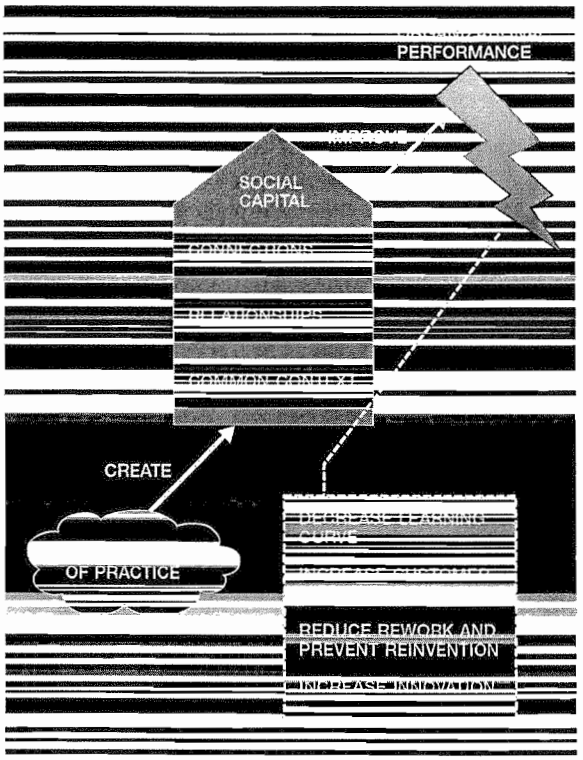
In some organizations, the communities themselves are becoming recognized as valuable organizational assets. Whereas the value was previously seen as being relevant primarily to the individual members of a community, it is often now recognized that benefits can also accrue to the organization itself. Acknowledging that communities of practice affect performance is important in part because of their potential to overcome the inherent problems of a slow-moving traditional hierarchy in a fast-moving virtual economy. Communities also appear to be an effective way for organizations to handle unstructured problems and to share knowledge outside of the traditional structural boundaries. In addition, the community concept is acknowledged to be a means of developing and maintaining long-term organizational memory. These outcomes are an important, yet often unrecognized, supplement to the value that individual members of a community obtain in the form of enriched learning and higher motivation to apply what they learn.

Although we (and others, e.g., see References 4, 6, and 7) assert that communities of practice create organizational value, there has been relatively little systematic study of the linkage between community outcomes and the underlying social mechanisms that are at work. The difficulty in assessing their contribution is that communities are often hidden assets, appearing neither on an organization chart nor on a balance sheet. To build understanding of how communities of practice create organizational value, we suggest thinking of a community as an engine for the development of social capital. We argue that the social capital resident in communities of practice leads to behavioral change—change that results in greater knowledge sharing, which in turn positively influences business performance.

The concept of social capital has been widely addressed in the sociology, political science, and economic development literatures.[8–13] More recently, a number of scholars have begun to apply social capital principles to a wide variety of business issues. These include understanding the development of intrafirm networks,[14] the formation of cross-organizational relationships in the biotechnology industry,[15] the success of firms within Silicon Valley,[16] the development of professional ethics in the legal profession,[17] and variations in managerial compensation.[18] In addition to scholarly journals, there have been a number of mainstream managerial books focused on the role of the individual[19] and the organization[20] in developing social capital. While there has been a plethora of definitions that describe this topic (see Reference 21 for an extensive list), a useful framework for understanding social capital in a business context was developed by Janine Nahapiet at Oxford University and Sumantra Ghoshal at the London Business School. They define social capital as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit."[22] Further, they express social capital in terms of three primary dimensions:

- There must be a series of connections that individuals have to others. In other words, individuals must perceive themselves to be part of a network (the structural dimension).
- A sense of trust must be developed across these connections (one aspect of the relational dimension).
- The members of the network must have a common interest or share a common understanding of issues facing the organization (the cognitive dimension).

Figure 1 Communities of practice are linked to organizational performance through the dimensions of social capital



These conditions apply quite aptly to communities of practice. Thus, our hypothesis is that the vehicle through which communities are able to influence organizational performance is the development and maintenance of social capital among community members. By developing connections among practitioners who may or may not be colocated, fostering relationships that build a sense of trust and mutual obligation, and creating a common language and context that can be shared by community members, communities of practice serve as generators for social capital. This social capital, in turn, creates an environment in which business performance is positively impacted. Figure 1 illustrates this process. Our objective in this paper is to demonstrate how the three dimensions of social capital provide a window into how communities create value.

The conclusions in this paper are based on a study of seven companies in which communities of practice are acknowledged to be creating value. During the study, we focused on a number of critical questions, including, "What value do communities provide?" For each of the companies that participated in the study, we interviewed between five and ten members of existing communities of practice regarding their perceptions of value at both an individual and organizational level. The research team then developed a "mind map," which in turn led to the categorization scheme used to review the interview transcripts. From the categories, we abstracted the key sources of individual and organizational value.

The communities in this sample were identified jointly by the research team and the study participants, using our previously described definition of communities of practice as a guideline in selecting potential candidates. The CoPs we examined represent different stages of development, cross several industries, are both global and local in scope, and, most importantly, offer the opportunity to consider different kinds of contributions to organizational performance. Table 1 summarizes these characteristics.

We build on these examples to illustrate how each of the three dimensions of social capital relates to the creation of value by a community, with particular focus on outcomes that are a result of greater knowledge sharing and innovation. Finally, we conclude with a discussion of the linkage between the special kind of social capital represented by a community of practice and organizational performance.

Dimensions of social capital

Our sample of companies provides significant evidence that communities represent an important vehicle for developing social capital in organizations. Using Nahapiet and Ghoshal's framework, we can describe how the various activities that a community of practice undertakes influence the development of social capital's three key dimensions: structural, relational, and cognitive.

Structural dimension. Fundamentally, the structural dimension of social capital refers to the ability of individuals to make connections to others within an organization. These connections, as Nahapiet and Ghoshal write, "constitute information channels that reduce the amount of time and investment required to gather information" (Reference 22, p. 252). The communities of practice within our sample focused a significant amount of their resources and attention on making these connections between members using a number of different techniques.

One technique that was used to build ties between previously disconnected employees was the use of face-to-face meetings. In some situations, such as in the project manager and the software developer communities we examined, a kickoff meeting served as an initial venue to bring together similar individuals who were unfamiliar with one another. Other communities, such as that of the urban service specialists, sponsored a number of brown bag lunches to attract individuals who had a keen interest in the topic. Another technique that was also employed was the leveraging of information technology to make it easier for individuals to locate and contact fellow community members. For example, the repository used by the land and real estate specialists (see Table 1) identified experts, both inside and outside the organization, who could be valuable in addressing questions posed by community members. Also, both the e-mail system used by the telecommunications projects managers and the discussion database used by the researchers at the specialty chemical company gave community members the opportunity to "reveal" their expertise to others through answering posted questions.

Relational dimension. Making connections through networking is one important component of building social capital. Another is the development of the interpersonal relationships that reinforce these initial connections between individuals. Nahapiet and Ghoshal suggest that there are four components to this relational dimension: obligations, norms, trust, and identification (Reference 22, p. 254). Obligations refer to a sense of mutual reciprocity, for example, the willingness to return a favor with a favor. Norms include the setting of common standards of behavior that individuals are willing to abide by. Trust involves the predictability of another person's actions in a given situation, whereas identification refers to the process whereby individuals see themselves as united with another person or set of individuals.

The data from the case studies suggest that communities of practice play an important role in influencing the relational dimension within an organization. Many of the face-to-face activities that were discussed earlier not only made it easier for individuals to identify others with similar interests, but also enabled individuals to develop a sense of empathy around common trials and tribulations. Face-to-face

Table 1 Communities studied

Organization	Community	Objectives	Community Activities	Key Value Outcomes
Multinational lending institution	Urban services specialists	Share experience and expertise across similar projects	• Held informal lunchtime seminars • Conducted formal training sessions • Facilitated Web site repository • Produced CD of relevant intellectual capital • Captured experiences of retiring practitioners in multimedia	• Faster project delivery • Greater reuse of intellectual capital developed by projects
Multinational lending institution	Land and real estate specialists	Share experience and expertise across similar projects	• Held informal lunchtime seminars • Conducted training sessions • Sponsored conferences with outside speakers • Facilitated Web site • Developed Web links to relevant outside content sources	• Faster project delivery • Greater reuse of intellectual capital developed by projects • Improved linkages to outside knowledge sources
Manufacturing company	Quality champions	Develop and exchange implementation and training techniques	• Held informal discussions among practitioners • Developed Web sites with relevant training material and advice	• Increased reuse of previously developed assets
Pharmaceutical firm	Research chemists	Share knowledge about a new industry development	• Held face-to-face discussions and meetings to share insights • Used video-conferencing to connect research labs • Maintained Web site, using one of the technologists as a webmaster	• Development of a new business capability based on advanced research techniques
Software development company	Programmers	Respond to needs for customization of a standard product	• Maintained internal listservs for individuals to post comments about modifications • Maintained Web site to support sharing of software components • Provided access to "spearhead" experts around the company	• Greater reuse of existing software assets • Increased innovation around new software products
Specialty chemical company	Researchers	Share and innovate new solutions to satisfy customer needs	• Maintained extensive discussion database where individuals can post and seek answers to customer problems • Employed knowledge brokers and editors to cull through discussion databases and identify frequently asked questions and other knowledge needs • Held informal "breakfast seminars" to share discoveries and engage other researchers in problem solving	• Faster response time to customer problems • Greater linkage between customers and research staff in developing new solutions
Telecom company	Project managers	Transfer experience and techniques across industry groups	• Held initial face-to-face meeting with community members to outline community objectives and opportunities • Developed e-mail-based expert access/question-and-answer system to post and distribute inquiries	• Faster response to project bids and request for proposals • Greater reuse of existing knowledge assets

meetings not only built connections between community members, but also fostered access to more experienced practitioners that newer employees would be less likely to have. Given that the most knowledgeable practitioners often have the greatest demand on their time, community membership served as a selection mechanism for determining whom they were willing to spend time with.

Another mechanism that fostered a sense of mutual trust and obligation was the development of shared repositories and discussion databases that were actively managed by the community. In these shared spaces, individuals began to evaluate who was making contributions to the greater community knowledge pool, and they began to judge the willingness of others to share the documents, templates, and other similar knowledge artifacts.

Cognitive dimension. In addition to connections and trust, the third important dimension of social capital is the development of shared context between two parties. As described by Nahapiet and Ghoshal, "To the extent that people share a common language, this facilitates their ability to gain access to people and their information. To the extent that their language and codes are different, this keeps people apart and restricts their access" (Reference 22, p. 253). This use of common language includes, but goes beyond languages, such as English, Spanish, Japanese, etc. It also addresses the acronyms, subtleties, and underlying assumptions that are the staples of day-to-day interactions. Further, this idea of a common context can also be extended to the use of shared narratives or stories that can enable individuals to make sense of their current work environment and their relative role within it.

Another activity that was useful in building shared context was the development of taxonomies within the common repositories managed by community members. Virtually all of the cases that we studied involved the development of some structured repository, where individual members could submit knowledge artifacts, such as research papers, presentations, and other forms of intellectual capital that could be reused by others. By classifying and organizing these documents within taxonomies where others could find materials, many of the communities helped establish a common mechanism for structuring and storing the collective memory of their members.

Linking communities of practice and organizational performance

As part of our research, the community members in our study suggested a number of different mechanisms in which communities of practice influenced business outcomes. Although many of these were tied to the specific business environment that each of the communities operated within, our analysis highlighted four areas of organizational performance that were impacted by the ongoing activities of communities of practice. These included:

We found in our study that communities of practice were quite valuable in decreasing the learning curve for new employees.

- Decreasing the learning curve of new employees
- Responding more rapidly to customer needs and inquiries
- Reducing rework and preventing "reinvention of the wheel"
- Spawning new ideas for products and services

Decreasing the learning curve of new employees. A common challenge faced by many companies is the need to rapidly increase the productivity of new employees. As employee mobility continues to increase across organizations, the ability to quickly assimilate individuals into the methods, tools, and activities of a new position represents an important capability. This task becomes especially important in dispersed organizations where an employee's direct supervisor may be located across town, or in a different country altogether. In the companies that we examined, communities of practice enabled new practitioners to "get wired" into the organizational memory and made it easier to learn both the technical and cultural aspects of their new roles and responsibilities.

In our sample, we found that communities of practice were quite valuable in helping newcomers identify subject matter experts who could answer questions and guide them to resources within the organization. Within a community of practice, new employees were able to make the connections that allowed them to identify a number of people with

Table 2 Linking business outcomes with the dimensions of social capital

	Connections	Relationships	Common Context
Decrease learning curve	Find experts	Mentor and coach new employees	Understand rules of the firm
Increase customer responsiveness	Find individuals with similar experiences	Develop willingness to respond to random questions	Understand the common language
Reduce rework and prevent reinvention	Find artifacts and the individuals who developed them	Establish positive reputation	Understand situational nature of knowledge
Increase innovation	Leverage weak ties that provide exposure to new ideas	Build safe environment for brainstorming and testing new ideas	Understand which problems are of common interest

> *If you've done some good work on a project, you can package it up and put it into the Tool Pool. That is well perceived by other developers around the world, and it's a good way of getting your name known and raising your profile in the organization.*

Spawning new ideas for products and services. In several of the companies that we examined, the communities of practice served as breeding grounds for innovation. These communities provided a forum in which individuals were able to share a variety of perspectives around a common topic. For example, software developers who worked with different customers often got together to exchange ideas about fixes for existing products and ideas for new software. One of these software developers commented on the community's role in bringing people together to come up with new solutions:

> [The community] . . . *drives our software development from a real, in-the-field experience, and people exchange ideas about what the software would do, and about the situations they encounter with customers. It's very much appreciated by people in development so they see that what they develop is actually used, and how people are using it in the field. They find out what they are doing with it, what they like about it, and what they don't like about it.*

Bringing in new or divergent points of view was also a technique used to spark innovation within the community. Several of the groups that we studied brought in outside speakers during community events to educate members on new developments in the field or provide alternative viewpoints. These outside influences were seen as valuable in ensuring that the community was exposed to a broad range of thinking from inside and outside the organization.

One of the primary reasons that communities were seen as an important vehicle for innovating was their ability to create a safe environment where people felt comfortable in sharing challenges. The development of these interpersonal relationships within the community was especially useful in asking sensitive questions or testing ideas that were not fully "baked." In many of the companies that we examined, the ability of individuals to use other community members as a sounding board was a highly valued feature of community life. In these situations, individuals were willing to share innovative thoughts with those whom they trusted, yet were also able to tap their expertise to refine and explore these new ideas. As one member of the lending institution remarked:

> *In terms of support, I think that if I had any bottlenecks or any questions, I could always go to the community. There was a sense of belonging to a family of like-minded people who faced similar issues before. I feel very free to go to people who are part of it.*

Summary. Table 2 summarizes the relationship between the dimensions of social capital and the business outcomes influenced by communities of practice. The table can be interpreted in two ways.

Looking at the columns of the table, we see that each dimension of social capital developed within these communities makes an important and unique contribution to the corresponding business outcomes. For example, communities help members locate individuals with expertise, discover others with similar experiences, locate tools and artifacts that have been previously developed, and identify outside influences that can help spark new ideas. Similarly, the table highlights the importance of the different dimensions of social capital and their relationship to business outcomes. When examining the drivers of reducing rework and preventing reinvention, we believe that communities can help individuals find and reuse existing materials, form relationships that enhance the credibility of the developers of these materials, and build a common understanding that is necessary to apply these tools in new settings.

Future directions

As we have seen across our cases, communities play a significant role in the development of social capital, which in turn influences organizational outcomes. These findings provide us with guidance to using communities as a vehicle for improving performance. However, the real challenge is to identify the management actions that will build the social capital necessary to achieve these goals. In addition, a second challenge is the development of measures that can guide and link the social capital building activities with actual business outcomes.

Management actions. Although a full examination of the activities that can influence the development of social capital is beyond the scope of this paper, our results suggest a number of potential interventions that can benefit communities of practice.

Provide opportunities for individuals to make new connections. There are a number of ways that firms can enable community members to make connections with one another. One method is to sponsor face-to-face events, such as knowledge fairs, training sessions, and other activities designed to introduce individuals with each other and the work they are currently involved in. Another method is to provide communities with technologies that can support both collaboration and expertise location. By giving people the opportunity to find one another using individual profiles, or through discussion databases and/or other forms of managed repositories, individuals can make connections to others with similar interests beyond in-person meetings. In addition, the use of human intermediaries can also be quite valuable in helping connect individuals to other community members.

Allow time and space for relationship building among individuals. While making connections is an important part of the community building process, the willingness of individuals to share knowledge requires additional time and effort. Employees need the opportunity to interact with each other so that they can evaluate the trustworthiness of others and gauge a sense of mutual obligation. However, we do not suggest that "trust building" activities such as experiential learning events are the key to building these important relationships. Rather, we believe that interactions that focus around work activities, such as repository management, play an important role in building the rapport and common sense of appreciation needed to effectively share knowledge.

Find ways to communicate the norms, culture, and language of the community and the organization. For communities to effectively share their knowledge, they need to develop a common set of norms, standards, and language that provide appropriate context for the community knowledge. Structured storytelling is one mechanism that firms have used to pass along the community "memory" and knowledge of the organization as a whole. Through the use of oral histories and multimedia technologies to capture the audio and visual context of specific situations, communities can capture and pass along the underlying "rules of the firm" in addition to providing the vocabulary necessary to pass along the community wisdom.

Measurement. Another future direction for community research would be to measure the effectiveness of various social capital activities with respect to organizational performance. For example, what is the impact of using expertise location technologies or holding face-to-face meetings on reducing the learning curve of new employees? Similarly, how can the use of stories enable individuals to better understand the context of best practices in other parts of the organization? These are additional issues that should be addressed as we continue to learn about the return on investment of organizational interventions.

Conclusion

It is widely recognized that communities of practice provide value to organizations. From our case studies, we have identified some of the specific business

outcomes that are influenced by communities. Further, we have used the concept of social capital to highlight the mechanisms by which communities deliver this value. By understanding how communities deliver benefits to their larger organizations, we hope to be able to clarify and target potential management interventions that will be most likely to support community formation and development.

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Cited references

1. E. Wenger, *Communities of Practice: Learning, Meaning and Identity*, Cambridge University Press, Cambridge, UK (1999).
2. J. Lave and E. Wenger, *Situated Learning: Legitimate Peripheral Participation*, Cambridge University Press, Cambridge, UK (1991).
3. P. Hildreth, C. Kimble, and P. Wright, "Communities of Practice in the Distributed International Environment," *Journal of Knowledge Management* **4**, No. 1, 27–38 (2000).
4. J. Storck and P. Hill, "Knowledge Diffusion Through 'Strategic Communities'," *Sloan Management Review* **41**, No. 2, 63–74 (2000).
5. J. S. Brown and P. Duguid, "Organizational Learning and Communities-of-Practice; Toward a Unified View of Working, Learning and Innovation," *Organization Science* **2**, No. 1, 40–57 (1991).
6. E. Lesser and L. Prusak, "Communities of Practice, Social Capital and Organizational Knowledge," *Information Systems Review* **1**, No. 1, 3–9 (1999).
7. E. Wenger and B. Snyder, "Communities of Practice: The Organizational Frontier," *Harvard Business Review* **78**, No. 1, 139–145 (2000).
8. J. Jacobs, *The Decline and Rise of American Cities*, Random House, New York (1961).
9. M. S. Granovetter, "The Strength of Weak Ties," *American Journal of Sociology* **78**, No. 6, 1360–1380 (1973).
10. J. S. Coleman, "Social Capital in the Creation of Human Capital," *American Journal of Sociology* **94**, S95–121 (1988).
11. R. Putnam, "Bowling Alone: America's Declining Social Capital," *Journal of Democracy* **6**, 65–78 (1995).
12. M. Woolcock, "Social Capital and Economic Development: Towards a Theoretical Synthesis and Policy Framework," *Theory and Society* **27**, No. 2, 151–208 (1998).
13. A. Portes, "Social Capital: Its Origins and Applications in Modern Sociology," *Annual Review of Sociology* **24**, 1–24 (1998).
14. R. Burt, "The Contingent Value of Social Capital," *Administrative Science Quarterly* **42**, No. 2, 339–365 (1997).
15. G. Walker, B. Kogut, and W. Shan, "Social Capital, Structural Holes and the Formation of an Industry Network," *Organization Science* **8**, No. 2, 109–125 (1997).
16. S. Cohen and G. Fields, "Social Capital and Capital Gains in Silicon Valley," *California Management Review* **41**, No. 2, 108–130 (1998).
17. B. Arnold and F. Kay, "Social Capital, Violations of Trust and the Vulnerability of Isolates: The Social Organization of Law Practice and Professional Self-Regulation," *International Journal of the Sociology of Law* **23**, 321–346 (1995).
18. E. Meyerson, "Human Capital, Social Capital and Compensation: The Relative Contribution of Social Contacts to Managers' Income," *Acta Sociologica* **37**, 383–399 (1994).
19. W. Baker, *Achieving Success Through Social Capital: Tapping Hidden Resources in Your Personal and Business Networks*, John Wiley & Sons, Inc., New York (2000).
20. D. Cohen and L. Prusak, *In Good Company: How Social Capital Makes Organizations Work*, Harvard Business School Press, Boston, MA (2001).
21. P. Adler and S. Kwon, "Social Capital: The Good, the Bad, and the Ugly," *Knowledge and Social Capital*, E. Lesser, Editor, Butterworth Heinemann, Woburn, MA (2000).
22. J. Nahapiet and S. Ghoshal, "Social Capital, Intellectual Capital and the Organizational Advantage," *Academy of Management Review* **23**, No. 2, 242–266 (1998).
23. G. Murray, *Knowledge Management Factbook*, International Data Corporation Report (1999).

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the same or similar work activities and answer questions about their new position. As one project manager in telecommunications explained,

> *It's useful for the new graduates coming in to ask a question about something that they might be unsure about . . . They will get a response to it that will help them out.*

In addition to simply helping new people identify and locate experts, communities fostered relationships between newer, more junior employees and established practitioners within the organization. These relationships became important for a number of reasons. Community membership appeared to serve as a screening mechanism by senior employees who were limited in the amount of time they could assist new practitioners. As one new community member in the telecommunications company stated,

> *I feel more comfortable calling on them* [more senior practitioners]. *They know me more because they have seen my face; they know who I am. They know me as part of the community so they identify me . . . Originally, they wouldn't necessarily pay me the same attention.*

Further, the community helped foster the development of mentor-mentee relationships that could be valuable for both parties. Through community events and interactions, new employees were able to seek out more experienced practitioners that could provide them with insights and guide them in their career development. One of the senior community members within the multinational lending institution noted the importance of mentoring relationships within the community:

> *It* [the community] *certainly has given me the opportunity to share some of what I have at this stage in my career. There are a lot of new entrants to the work force that are coming in and working on this, and being able to have a way of registering institutional memory on this particular topic is critical . . . The community has been doing a lot of mentoring. We're trying to do that more and more.*

Another challenge faced by new employees is to understand the larger context in which they perform their day-to-day tasks. Being new to an organization, it is often difficult to understand how individual activities impact other individuals and processes. According to several of the individuals we interviewed in the study, communities helped individuals gain a broader perspective on their specific roles. One of the researchers in the specialty chemical company provided a description of this phenomenon:

> [The community] . . . *is dealing with a lot of people working on different parts of a large problem, so you come to understand and you have more perspective as a result. You can look at how individual tasks really fit in with everything else, and start to reinforce that whole way of thinking.*

Finally, communities were seen as useful vehicles for creating shared narratives that could be used to transfer tacit knowledge. As Nahapiet and Ghoshal stated, " . . . myths, stories and metaphors also provide powerful means in communities for creating, exchanging and preserving rich sets of meanings—a view long held by some social anthropologists" (Reference 22, p. 253). Through the use of training courses, internal conferences, and mentoring relationships, new community members were able to hear and exchange useful tips and anecdotes that were not located in any community archive. As one of the specialists in the multinational lending institution indicated,

> *The opportunity to have a point where you can go into depth in one thing and share that with your colleagues across regions is critical. In the days when we were just starting this* [evaluation of urban services], *those of us that are here now were a very small group working on similar projects. We had a chance to get together to talk and exchange every day, or at least every week. That's how we learned. The community is giving us that opportunity again.*

Responding more rapidly to customer needs and inquiries. In an era where both prospective and existing customers are expecting rapid answers to inquiries, communities of practice can play an important role in quickly transferring the knowledge necessary to address customer issues. From a connection perspective, communities can help individuals rapidly identify an individual with the subject matter expertise necessary to provide the best answer to a client problem. This is especially true in organizations where the expertise needed to solve a particular client problem may be separated by time zones, distance, and/or organizational boundaries. For example, in the specialty chemical company that we examined, technical support personnel were able to tap into a community of researchers through the use of discussion boards to identify individuals who may have encountered similar problems in other customer locations. This ability to rapidly identify and locate individuals with particular knowledge was con-

sidered to be a significant source of competitive differentiation in the marketplace.

Also, as many communities maintained some form of centralized electronic repository, the reuse of intellectual capital located in a common location made it easier to find valuable explicit knowledge that could be used to respond to a customer need. The material in this type of repository included marketing presentations, proposals developed for previous prospects, and implementation plans that had been created from similar types of projects. An example of this is provided by one of the project managers within the telecommunications firm:

> *Because we can find out what happened in the past much quicker, the community helps us to deliver solutions to the customer a lot better and give customers better information. Also, if there are issues or concerns coming up, we can let the customer know in advance and make arrangements to start work on different solutions.*

Reducing rework and preventing "reinvention of the wheel." Perhaps the most valuable contribution that communities of practice can make to a sponsoring organization is the ability for members to more easily reuse existing knowledge assets. Given the aging of the workforce population and the increased worker mobility that has been witnessed within the United States over the last several years, the need to retain "organizational memory" has become ever more important. For example, a recent survey conducted by the International Data Corporation suggests that the annual cost of this "knowledge deficit," which includes costs and inefficiencies that result from intellectual rework, substandard performance, and inability to find knowledge resources, will grow to over $5,500 per worker per year.[23]

Virtually all of the communities within the study cited the ability to locate, access, and apply existing intellectual capital to new situations as an important result of community participation. As several community members stated:

> *For starters, the community means you get your work done more quickly . . . If you've got to start from scratch to put that documentation together, it's going to take you longer. If you've got somewhere that you can go to where you've got a template that says that this particular product fits, it helps you.* [Project Manager at a telecommunications company]

> *It's the fact that we don't have to reinvent the wheel all the time. If we're sharing our information, then I can use what somebody else has learned and work on it somewhere else, instead of spending 80 hours doing it myself. It not just saves time, but it has improved the effectiveness of people's delivery material.* [Quality Champion at a manufacturing company]

The repository systems that were used by many of the communities served a number of important functions. First, they provided a common virtual work space, where members could store, organize, and download presentations, tools, and other materials that community members could find valuable. What was of equal value, however, was the presence of meta-data that enabled the individual to identify and locate the author of the document. Given the difficulty in automatically reusing a piece of intellectual capital without knowledge of the situational context in which it was developed, the added ability to contact the developer was very important to community members. Further, the attachment of a community member's name to a particular piece of explicit knowledge in a repository served to reinforce the potential value of the content. As one of the project managers in the telecommunications company stated, "You are believing that someone who is answering [an inquiry] is answering it because they believe they know they have either that experience or they believe it is correct."

Also, we found that virtually all of the repositories incorporated some form of human moderation. Often, the community used content managers, or teams, to ensure that the content within the repository remained fresh and relevant to the users. Often these content managers also served to connect individuals not only to the original author of a particular document, but to other individuals who might be able to provide insight on a particular problem.

Repositories not only were used as storehouses for community knowledge, but also served as a mechanism for evaluating the trustworthiness and reciprocity of others within the community. Through the combination of posting documents and face-to-face interactions, communities of practice helped individuals build reputations both as subject matter experts and as individuals that were willing to help others. This reputation development was cited as an important benefit from participating in community activities by many of those who participated in the study. One member of the programming community in the software development company remarked,