Diagnosing cultural barriers to knowledge management

David W. De Long and Liam Fahey

Executive Overview

 Organizational culture is increasingly recognized as a major barrier to leveraging intellectual assets. This article identifies four ways in which culture influences the behaviors central to knowledge creation, sharing, and use. First, culture—and particularly subcultures—shape assumptions about what knowledge is and which knowledge is worth managing. Second, culture defines the relationships between individual and organizational knowledge, determining who is expected to control specific knowledge, as well as who must share it and who can hoard it. Third, culture creates the context for social interaction that determines how knowledge will be used in particular situations. Fourth, culture shapes the processes by which new knowledge—with its accompanying uncertainties—is created, legitimated, and distributed in organizations. These four perspectives suggest specific actions managers can take to assess the different aspects of culture most likely to influence knowledge-related behaviors. This diagnosis is the critical first step in developing a strategy and specific interventions to align the firm's culture in support of more effective knowledge use.

Obviously, there is a set of tools, such as Lotus Notes, intranets, etc., which you need to be knowledge-based. But technology is only 20 percent of the picture. The remaining 80 percent is people. You have to get the culture right.

> —Roger Chaddock, associate director,
> Computer Sciences Corporation[1]

What's happened here is 90 percent culture change. You need to change the way you relate to one another. If you can't do that you won't succeed.[2]

> —Bob Buckman, CEO of Buckman Labs

As we roll out our knowledge system, we find we lack a culture that supports collaborative work because people view knowledge as a method of securing their job. So they're reluctant to share. The culture is a huge problem.

> —Chief knowledge officer, global
> engineering firm

 A growing number of executives, consultants, and management theorists have proclaimed in recent years that knowledge now constitutes the major source of competitive advantage for organizations.[3] This knowledge-based view of the firm

argues that creating, organizing, and using knowledge assets are the essence of what firms do. Their effectiveness in these activities, relative to the competition, determines performance.[4] Heeding this counsel, many firms have launched major programs to manage knowledge better, and it is increasingly common to see titles such as chief knowledge officer and knowledge manager in organizations. Without a doubt, knowledge management has become an important topic.[5]

 But the efforts of many companies to manage knowledge have not achieved their objectives, and there is a growing sense of disenchantment among executives about the practicality of trying to enhance organizational knowledge. Our research in more than 50 companies pursuing knowledge management projects (see Appendix) revealed that organizational culture is widely held to be the major barrier to creating and leveraging knowledge assets. And our interviews also revealed that, while most managers intuitively recognize the importance of culture, they find it difficult or impossible to articulate the culture-knowledge relationship in ways that lead to action.

 To effectively diagnose the fit between their existing organization and knowledge management objectives, managers need frameworks to help ar-

113

ticulate how culture affects their unit's ability to create and apply knowledge. Only then can they design strategies to either adapt to the culture or try to reshape it to support the firm's knowledge management objectives.

The purposes of this article are to demonstrate the importance of the cultural perspective on many of the issues central to effective knowledge management; to explore four ways in which organizational culture shapes knowledge creation, sharing, and use; and to suggest diagnostic action steps that managers can take to assess the fit between their firm's existing culture and desired behaviors related to effective knowledge use. In short, our intent is to provide managers and researchers with frameworks for understanding and diagnosing how and why organizational culture so often impedes attempts to generate and leverage knowledge.

Defining Knowledge

In order to think productively about the problems of managing knowledge, we need to distinguish between the concepts of data, information, and knowledge. While there is no general consensus on the boundaries of these terms, let us make our assumptions clear. In this article, we view data as raw or unabridged descriptions or observations about states of past, present, or future worlds, and information as patterns that individuals find or imbue in data.[6]

Knowledge, on the other hand, is a product of human reflection and experience. Dependent on context, knowledge is a resource that is always located in an individual or a collective, or embedded in a routine or process. Embodied in language, stories, concepts, rules, and tools, knowledge results in an increased capacity for decision making and action to achieve some purpose.[7]

Embodied in language, stories, concepts, rules, and tools, knowledge results in an increased capacity for decision making and action to achieve some purpose.

Two dimensions are critical to understanding knowledge in a practical, organizational context. First, knowledge exists at individual, group, and organizational levels. The focus of knowledge management efforts is primarily on improving knowledge creation and use at group and organizational levels. Second, knowledge is either explicit or tacit. Explicit knowledge can be codified and embedded in formal rules, tools, and processes. Tacit knowledge is what we know but cannot explain. Automatically reordering parts when inventory declines to a certain

level is explicit knowledge; assessing an individual's potential, or building a cross-functional team, is tacit knowledge.

We believe that a major source of confusion in discussions about knowledge and knowledge management in organizations today is the failure to recognize that there are at least three distinct types of knowledge.

- **Human Knowledge:** This constitutes what individuals know or know how to do. Human or individual knowledge is manifested in skill (e.g., how to interview customers) or expertise (e.g., deep understanding of why customers purchase particular products), and usually combines both explicit and tacit knowledge. This type of knowledge may be sentient, that is, located in the body, such as knowing how to type or ride a bicycle. Or it may be cognitive, that is, largely conceptual and abstract.[8]
- **Social Knowledge:** This form of knowledge exists only in relationships between individuals or within groups. For example, high-performing teams of research scientists or Web-page designers share certain collective knowledge that is more than the sum of the individual knowledge of the teams' members. Social or collective knowledge is largely tacit, shared by group members, and develops only as a result of working together.[9] Its presence is reflected by an ability to collaborate effectively.
- **Structured Knowledge:** This is knowledge embedded in an organization's systems, processes, tools, and routines. Knowledge in this form is explicit and rule-based. A key distinction between structured knowledge and the first two types is that structured knowledge is assumed to exist independently of human knowers.[10] It is, instead, an organizational resource.

Some researchers and consultants argue that knowledge cannot exist independent of humans, but we believe, from the practical standpoint of management, that knowledge is regularly created and embedded in routines, systems, and tools.[11] Take, for example, sophisticated accounting software. The knowledge embedded in the software was originally created by humans in the form of accounting rules and software code, and it is useful only in specific business contexts where it enhances management's decision-making capabilities. Certainly, additional human knowledge may be needed to customize the accounting software in a particular organization, where existing social knowledge will also affect use of the software, but a significant amount of structured knowledge does exist in the program.

The knowledge that is embedded in routines,

systems, and tools, and that requires minimal human intervention to perform an activity, is different from information, such as that found in books, manuals, and databases. These resources, no matter how highly analyzed, only become practical knowledge when individuals can apply their own experience and contextual understanding to interpret the details and implications for action.[12]

The purpose of knowledge management is to enhance organizational performance by explicitly designing and implementing tools, processes, systems, structures, and cultures to improve the creation, sharing, and use of all three types of knowledge that are critical for decision making. Knowledge management is typically made operational through a series of new projects, (such as British Petroleum's virtual teamwork program using video conferencing to share human expertise between remote sites),[13] processes (such as creating research teams to visit customer sites), and activities (such as interviewing potential customers).

In recent years, researchers and consultants have tended to focus on one type of knowledge, ignoring or discounting the other two types. For example, those with a technology orientation have concerned themselves primarily with structured knowledge, often putting text-based information into this category. At the same time, they have ignored the importance of human and social knowledge needed to complement structured knowledge. A growing number of researchers and consultants,[14] on the other hand, have argued that social knowledge is the only valid notion of knowledge that managers should be concerned with. We believe that to effectively enhance their organization's capacity to create, share, and use knowledge, managers ultimately must take into account all three types of knowledge.

In this article, however, we set aside the debate about what types of knowledge need to be managed, or how culture influences each one separately. Our primary purpose is more fundamental—to help executives understand how cultures can shape the creation, sharing, and use of knowledge in general. Understanding these relationships first is essential for thinking productively about the fit between culture and knowledge in any organization. Thus, subsequent references to knowledge should be assumed to include all three types described above, unless we indicate otherwise. And we will leave it to the reader to make the necessary distinctions between different forms of knowledge when diagnosing a particular organization.

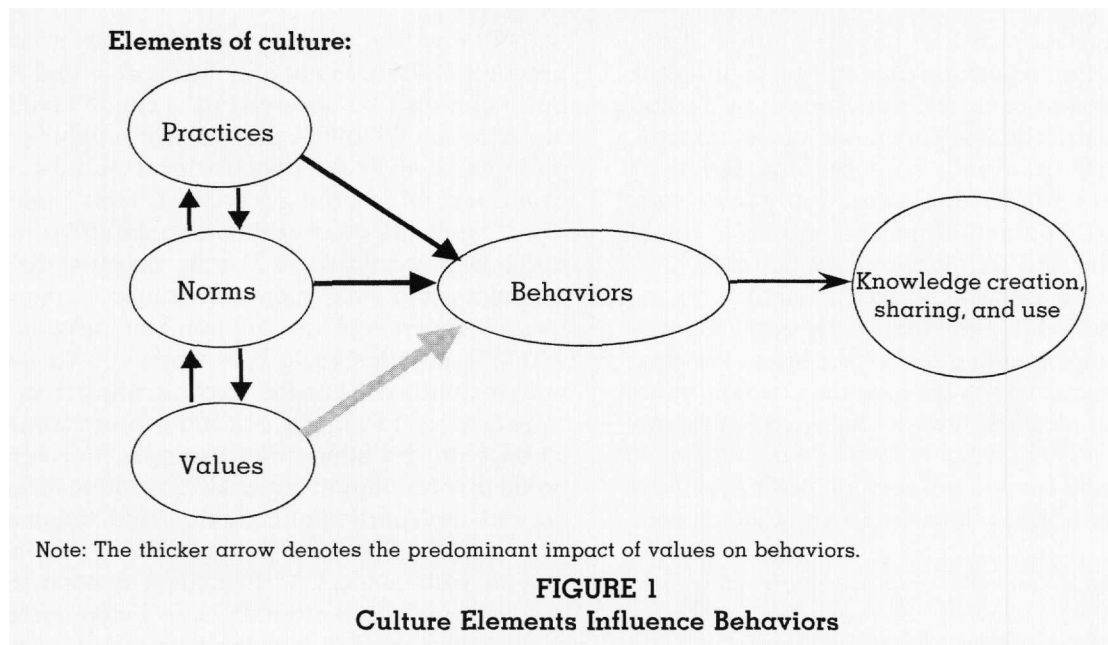### Understanding Links Between Culture and Behavior

The concept of culture, like that of knowledge, is often used loosely by executives and consultants

without any real attempt to define what it means in practice. Culture is not only intangible and illusive, but it can also be observed at multiple levels in an organization.[15] Culture is reflected in values, norms, and practices. At the deepest level, culture consists of values, which are embedded, tacit preferences about what the organization should strive to attain and how it should do so. Values are often difficult to articulate and even more difficult to change. Their impact on knowledge creation and use, however, which is manifested in behaviors, should never be underestimated. Thus the arrow leading from values to behaviors in Figure 1 is more prominently indicated than the others. For example, if a firm truly holds a value that every customer interaction is important, then particular behaviors and actions can be expected. Employees will be more likely to treat customers with respect, to ask them questions about product use and performance, to listen carefully to their replies, and to develop a mutually supportive relationship with them over time. Values that inspire individuals to regard customers as partners are more likely to motivate behaviors that create useful knowledge about customers.

Values that inspire individuals to regard customers as partners are more likely to motivate behaviors that create useful knowledge about customers.

Norms are generally derived from values, but they are more observable and easier for employees to identify. Thus, they are more susceptible to change. Consider, for example, norms associated with sharing information. If employees believe that sharing what they know incurs personal risks and decreases power, then the social norms governing how individuals should interact will not support the behaviors needed to create and sustain the exchange of knowledge.

Practices are the most visible symbols and manifestations of a culture. They are a way of understanding any widely understood set of repetitive behaviors, such as how people in an organization answer the telephone, fill out time reports, or review a weekly status report. They also include repeated types of interactions that have identifiable roles and social rules, such as performance reviews, weekly staff meetings, and Friday afternoon beer blasts. Practices provide the most direct levers for changing behaviors needed to support knowledge creation, sharing, and use. For example, the ways in which departmental meetings are conducted strongly influence the likelihood of a

Elements of culture:

Note: The thicker arrow denotes the predominant impact of values on behaviors.

FIGURE 1
Culture Elements Influence Behaviors

group's generating new knowledge or leveraging its existing knowledge. Are differences of opinion encouraged and respected, or routinely discounted by group leaders? Is conflict managed constructively, or is it suppressed or smoothed over?

Values, norms, and practices reflect different levels of observability of an organization's culture, but the concepts are also fundamentally interrelated. Values are manifested in norms that, in turn, shape specific practices. While values shape norms and practices, sometimes managers will change practices and norms in an attempt to reshape values over time.

Four Frameworks Linking Culture and Knowledge

Our research on knowledge management initiatives has shown that knowledge and culture are inextricably linked in organizations.[16] Indeed, any discussion of knowledge in organizational settings without explicit reference to its cultural context is likely to be misleading. In addition, we found that culturally generated and condoned behaviors of both individuals and groups are often inimical to developing and leveraging knowledge.

To evaluate how an organization's current culture influences the creation, sharing, and use of knowledge, managers must first understand how culture actually influences knowledge-related behaviors. These four frameworks provide diagnostic tools for analyzing how culture currently affects a firm's knowledge-related behaviors. This is an essential step before deciding whether to adapt

knowledge management objectives to the existing culture, or to try to change the culture.

1. Culture shapes assumptions about which knowledge is important

Cultures, and particularly subcultures (which will be addressed in the next section), heavily influence what is perceived as useful, important, or valid knowledge in an organization. Culture shapes what a group defines as relevant knowledge, and this will directly affect which knowledge a unit focuses on.

For example, an advertising agency may give priority to human creative knowledge, while an auto parts distributor may value more structured knowledge embedded in supply-chain processes. These beliefs about which knowledge is most important do not occur in an organizational vacuum. They are shaped by values and norms.

In a more specific case, a printed circuit-board design team was supposed to be capturing lessons learned in its part of the product development process, which was a core process for the company. But the group's members were so concerned with being able to account for their time in the government-funded work that they initially refused to reflect on their experiences and develop lessons learned.[17] No management initiative to improve knowledge creation could override the team's well-established norm of being billable. The barrier to creating this new knowledge was removed only when the knowledge manager found an administrative accounting code to which time for extract-

ing lessons learned could be charged. Local norms, such as always accounting for time in some explicit form, and practices, such as filling out time sheets, determine the priority that individuals accord to different types of knowledge and learning in every organization. In the case of this design team, the norms associated with being billable were so powerful that they had to be accommodated before new knowledge related to the product development activities could be created and captured.

Managerial actions

This example suggests several actions managers can take to discover how their culture shapes assumptions about knowledge creation, sharing, and use:

- Explore how your culture's (or subculture's) priorities are likely to support or undermine more effective creation and sharing of knowledge around a particular activity or process. For example, is being billable always more important than some other knowledge-enhancing activity, such as looking for patterns in lost customers? Is going to a skill-building training class a lower-status activity than performing daily tasks?
- Identify behaviors that would demonstrate that a particular set of essential knowledge-building activities is critical to your organization. For example, what would sales managers be doing differently if sharing knowledge about customers across divisions was an established norm in the culture? What would senior management be doing and saying that reflected the importance of this norm?
- Clarify which existing norms and practices may be barriers to the new behaviors needed. And ask whether those elements of the culture can be changed to support these behaviors.

Subcultures apply different criteria in defining knowledge

To understand how conflicts arise about what knowledge is important it is critical to understand the impact of subcultures. Subcultures consist of distinct sets of values, norms, and practices exhibited by specific groups or units in an organization, such as R&D, sales, engineering, MIS, different levels of management, and different geographic regions. Subcultures have characteristics that distinguish them from the firm's overall culture, as well as from other sub-

cultures. For example, R&D's values may seem focused on elegant product features to the detriment of product marketability and profits, while finance appears to value only controlling costs. MIS, on the other hand, may seem concerned only with maintaining strict adherence to its technology standards. Organizations usually have both an overall culture and multiple subcultures. However, the influence of the overall culture and the amount of conflict among subcultures will vary across organizations.[18]

Subcultures often lead their members to define important knowledge differently than other groups in the organization.[19] In a major electronics firm, the engineering subculture was entrepreneurial. Its values and norms encouraged lots of experimentation and frequent, informal interactions. Thus engineers viewed knowledge sharing and personal relationships as integrally related and believed that any attempts to manage knowledge must facilitate such social interactions. The firm's MIS subculture, on the other hand, was procedurally oriented and heavily rule-bound, placing a high value on standardized processes. The department's managers valued the structured knowledge that was embedded in processes, software programs, and documents. This reflected the type of knowledge management system they tried to supply to the engineers.

Subcultures often lead their members to define important knowledge differently than other groups in the organization.

Such different views of knowledge often lead to miscommunication and conflict between functions, as subcultures apply different criteria in valuing knowledge.[20] And these differences, which often produce conflicting strategies and goals in knowledge management initiatives, suggest the following actions:

- Identify the distinct subcultures involved in your knowledge initiative. How are different groups likely to define knowledge differently? What values are reflected in each definition of knowledge? What are the critical assumptions that underlie these value differences?
- Make explicit what types of knowledge are preferred by each subculture. Engage in discussions to achieve some level of shared understanding about the types of knowledge most important to the business.
- Explore whether your unit's orientation to knowledge (as evidenced in prevailing norms and practices) suggests biases and blind spots

that might lead you to overlook critical knowledge-management opportunities. For example, are you too focused on developing human knowledge and skills, while ignoring the need to invest in more structured knowledge for business processes? Are you too committed to placing objects in a knowledge database, while ignoring existing levels of human and social knowledge, as well as cultural norms and practices, that will inhibit absorbing and applying the system's content?

• Reflect on whether you are making realistic assumptions about the new behaviors needed to leverage specific types of knowledge, given the different subcultures involved. For example, is an informal, entrepreneurial engineering group expected to use a formal, procedurally oriented knowledge repository? Can the system be adapted to fit the culture? Or should management invest in culture change?

2. Culture mediates the relationships between levels of knowledge

Culture embodies all the unspoken norms, or rules, about how knowledge is to be distributed between the organization and the individuals in it, as illustrated in Figure 2. Culture dictates what knowledge belongs to the organization and what knowledge remains in control of individuals or subunits. This is most evident when management tries to convince individuals to share the human knowledge they have so that it can be converted into more structured knowledge,

FIGURE 2
Culture Mediates Relationships Between Organizational and Individual Knowledge

which the organization will control. A common instance of this occurs when management tries to convince sales people to contribute their knowledge about individual customers to a common customer database.

As we have already argued, human knowledge transferred into databases is really information until interpreted by others with the experience and skills to apply it in a different context. Nevertheless, when people are asked to put what they know into an organizational system, they tend to feel they have lost ownership of knowledge they alone had previously controlled. Often, a company's norms will support this individual ownership, encouraging people to refuse to share their knowledge, even as the organization pursues a business strategy whose success requires individuals to share what they know. In essence, cultural norms and practices determine who is expected to control what knowledge, as well as who must share it, and who can hoard it. Knowledge management objectives must be aligned with these norms and practices if they are to be achieved.

Three themes are particularly significant when culture is used as a lens to understand knowledge distribution. That is, who controls what knowledge and where are they located.

Importance of individual knowledge

Knowledge sharing is too often compromised, if not completely sacrificed, at the altar of norms and practices that advocate and reinforce the supremacy of individual knowledge. Consider the following example, in which one manager explained how his company's culture reinforced the value of individual knowledge:

> In divisional reviews, the senior manager comes around and says, "Show me something I've never seen before." So the whole goal is to blow their socks off. Nobody ever says, "Show me where you've worked together with another business unit." The assumption is that the value executives add in these reviews is to cross-fertilize the organization and to connect related ideas. And the engineers think their role is to show individual engineering brilliance. It's totally individual. They reward you to be competitive, instead of recognizing team-based performance and collective accomplishments.

Management's attempts at generating more collaboration and knowledge sharing in this com-
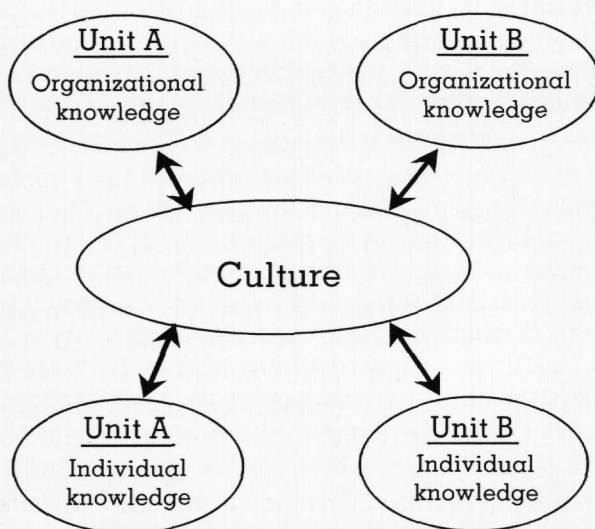
pany will fall short until they directly address how the culture reinforces and values knowledge use at the individual level.[21]

The CEO of Buckman Labs took on this challenge directly when he implemented a knowledge-sharing network to support global sales operations. At the start, Robert Buckman recognized that the firm's IT investment would not be sufficient to achieve his knowledge-sharing and business objectives, because he knew that the organization's cultural norms condoned hoarding knowledge as a source of power. Bulging file cabinets around the company symbolized individual knowledge banks. But this behavior began to change when Buckman told the company, upon launching the computer-based knowledge network:

> Those of you who have something intelligent to say now have a forum in which to say it. Those of you who will not contribute also will become obvious. If you are not willing to contribute or participate, then you should understand that the many opportunities offered to you in the past will no longer be available.[22]

This was a first step in Buckman's three-year campaign to reshape norms and practices that defined the relationships between individual knowledge and the organization. The CEO recognized that as long as people benefited from not sharing, the organization's ability to leverage their knowledge would be limited, since the investment in information technology would not change the culture by itself.

The level of trust that exists between the organization, its subunits, and its employees greatly influences the amount of knowledge that flows both between individuals and from individuals into the firm's databases, best practices archives, and other records.

Low-trust cultures constrict knowledge flow

When a mechanical engineer in an automotive firm sought cost information related to a design project, an employee in the finance department responded: "You're an engineer. You don't need to know that." Cultural norms supporting departmental autonomy made this an acceptable view of knowledge sharing in this company. But the implicit message of holding internal information proprietary is: "We don't trust you." The level of trust that exists between the organization, its subunits, and its employees greatly influences the amount of knowledge that flows both between individuals and from individuals into the firm's databases, best practices archives, and other records.

Companies with a history of downsizing face a particular problem in this area. They have to rebuild trust levels in their culture before they can expect individuals to share expertise freely without worrying about the impact of this sharing on their value to the company. To do so requires paying considerable attention to the supporting norms and behavioral practices that manifest trust as an important organizational value.

Status differences impede cross-functional knowledge sharing

A culture that clearly values some units over others is more likely to undermine the cross-functional sharing of any type of knowledge, in part by supporting subcultures that seek to defend their own knowledge assets. Managers in one firm clearly recognized that their culture valued R&D, marketing, manufacturing, and information systems, in descending order. This shared sense that functions were valued differently—an example of social knowledge—reinforced a silo mentality and encouraged employees to spend unproductive time defending their unit's perspective.

If we recognize that culture is the silent broker, or mediator between individual, group, and organizational knowledge, then the importance of renegotiating norms around knowledge distribution, ownership, and access becomes more evident. This is especially important for traditional firms competing in emerging electronic business environments where intense integration between functions, such as marketing and information systems, is critical to success.

Managerial actions

Whenever a knowledge-management initiative threatens (intentionally or not) to change patterns of knowledge distribution and use, then management should take the following steps:

- Consider how your knowledge-management strategy proactively intends to change attitudes towards ownership of knowledge.
- Evaluate how your current culture will facilitate or undermine the proposed redistribution of knowledge.

- Identify what new behaviors leaders must exhibit to communicate a shift from valuing individual to collective knowledge.
- Make explicit what practices need to change to reinforce more collaborative knowledge use.

3. Culture creates a context for social interaction

Earlier we said that culture shapes perceptions and behaviors. One way culture does this is by establishing the organizational context for social interaction.[23] Cultures represent the rules (e.g., "Don't interrupt a superior." "Challenge everyone but the CFO.") and practices (e.g., meeting formats and frequencies, appropriate uses of e-mail versus voice mail), that determine the environment within which people communicate. These cultural ground rules shape how people interact and have a major impact on knowledge creation, sharing, and use.[24]

For example, a major bank was interested in sharing lessons learned from the many electronic commerce initiatives that had sprung up in its different divisions. But a lack of norms or practices to support sharing this knowledge across units meant there was no organizational context where one group's valuable experiences were likely to be passed on to others in the firm. Thus the potential value of applying this knowledge elsewhere in the bank was being lost.

By defining the context for interaction, culture determines how all types of knowledge will be used in a particular situation. It does this primarily by dictating the norms—the rules, expectations, and penalties—that govern social interactions between individuals and groups, and by shaping people's perceptions of their range of options acceptable to the organization. For example, where functions, such as R&D and manufacturing, are not expected to continually share knowledge and collaborate, and are without routine practices to do so, there is no context for interaction to support this sharing. A new intranet infrastructure or reengineered work process can surely improve the environment for knowledge sharing. But, unless executives address long-standing interaction patterns and beliefs shaped by different subcultures, the benefits of their knowledge-management strategy will be limited.

The impact of culture on the context for interaction can be assessed on at least three dimensions: vertical interactions, horizontal interactions, and special behaviors that promote knowledge sharing and use.

Vertical interactions

Culture shapes vertical interactions in many ways, but two particularly relevant to knowledge creation and sharing are norms determining the acceptability of discussing sensitive topics, and perceived approachability of senior management.

Sensitive Topics. At Buckman Labs, shortly after the knowledge network was introduced, the CEO engaged in a lengthy electronic debate about the sales compensation system. For weeks, salespeople argued on-line, sometimes directly with the CEO, about the unfairness of the existing bonus system. The cultural message underlying this open exchange was that anything is discussible, a norm that builds the trust necessary to support vertical knowledge sharing. And we have already pointed out the negative impacts of low-trust cultures on knowledge sharing in the previous section.

Approachability. Norms and practices that make executives accessible and approachable also help create a context for effective knowledge sharing. At Chaparral Steel, workers' lockers are intentionally located next to a vice president's office to facilitate informal interactions.[25] In contrast, executives in one large manufacturing company we studied seemed unaware of how intimidating their high levels of technical and business expertise were to subordinates. One manager explained: "When engineers are put in front of top management, they're thinking, 'I'm not going to say a word unless I'm positive I can say something that's absolutely accurate.' There's a feeling of intimidation and a fear of looking stupid, so people keep their thoughts to themselves."

Cultures with norms and practices that discourage open and frank exchanges between levels in the hierarchy create a context for communication that undermines effective knowledge sharing.

Cultures with norms and practices that discourage open and frank exchanges between levels in the hierarchy create a context for communication that undermines effective knowledge sharing.

Horizontal interactions

Culture also shapes patterns and qualities of interactions needed to leverage knowledge among individuals at the same level in the organization. Three characteristics differentiate organizations in this area: the volume of interactions, level of col-

laboration and collective responsibility, and an orientation to seek out existing expertise or knowledge.

Interactivity. Culture determines the patterns of interaction used to accomplish work. Norms and practices, for example, that bring people together vary from one organization to another. One traditional firm may rely on formal communication processes and meetings designed to periodically bring individuals together, while a more entrepreneurial Internet startup expects frequent, unplanned, and unstructured interactions among employees. In these organizations, formal and informal interactions are valued differently, which results in different patterns of knowledge creation and sharing.

To take advantage of new electronic communication technologies, companies like British Petroleum and Buckman Labs have actively managed the behavioral norms and practices needed to facilitate knowledge sharing. At Buckman Labs, for example, employees using the firm's knowledge network now expect a greater level of interaction when looking for help with a sales or marketing problem. "If you are in a global company, there's somebody awake and working all the time. Having K'Netix[26] gives us the capability to respond," says one executive. "A new mind-set has taken hold at Buckman. Rather than picking up the phone, someone can communicate with a mass of people faster."

Even though the Internet and other new technologies are greatly reducing communication barriers, unless cultural norms and practices support higher levels of interactivity between the right individuals or groups, these new channels will have relatively little impact on knowledge use.[27]

Collaboration. Another way that culture shapes the context for horizontal interactions is through norms and practices that promote collaboration. In electronic business, the customer's needs are evolving so quickly, says the CEO of one Internet company, that salespeople must feed market information as fast as possible to product developers: "Our salespeople are attuned to what other functions in the company need, so instead of waiting until quarterly product meetings, they are telling our product managers, 'This is what I've seen in at least 10 calls during the week.'"

Collaboration and cross-functional problem solving are also expected at Chaparral Steel, where every employee carries a business card reading "member of the sales force." A sense of collective responsibility leads employees to go to great lengths to avoid letting colleagues down,

frequently offering help to those in other departments, even though it burdens their own work.[28] When norms and practices promote collaboration between functions and operating units, interactions are more likely to lead to creating and sharing new knowledge of all types.

Reusing Existing Knowledge. Culture also shapes the context for interaction through norms and practices that determine to what lengths employees will go to seek out and build on existing knowledge. Culture may create an organizational context where creative directors for a global ad agency see each new project as unique, or an environment where design engineers for an automaker refuse to search out lessons from their counterparts working on other car platforms. Cultures that primarily reward individual creativity and innovation produce different patterns of interaction around knowledge than cultures where uncovering and leveraging existing expertise is the norm. To encourage the use of existing knowledge, Texas Instruments created an annual "Not-Invented-Here-But-I-Did-It-Anyway" award to recognize those who reuse good ideas from elsewhere.

Special behaviors promoting knowledge development

We could address a long list of desirable behaviors that help shape the context of social interaction to support knowledge sharing and use. Instead, we have chosen two that seem most important.[29]

More and more firms have discovered the benefits of having their employees teach others about core aspects of the business.

Sharing and teaching. Cultures that explicitly favor knowledge sharing over knowledge acquisition will create a context for interaction that is more favorable to leveraging knowledge. The U.S. Army is one of a growing number of organizations that formally considers knowledge-sharing capabilities when identifying candidates for promotion. Teaching is another behavior that influences the social context, even as it enhances a firm's existing knowledge base. Companies as different as General Motors and Skandia, the Swedish financial services firm, both recognize the value of asking managers to teach what they know about the business as a way of refining and improving their existing knowledge, even as they share it. More and more firms have

discovered the benefits of having their employees teach others about core aspects of the business.[30]

Dealing with mistakes. A large international engineering and construction company trying to build a lessons-learned database found one legacy of large layoffs after a recent business downturn was that engineers in the firm were reluctant to admit mistakes. This, of course, significantly limited the scope of the lessons that could be captured. How an organization reacts to mistakes is another norm that shapes the context for social interaction. Mistakes may be covered up, explained away, punished severely, or ignored. Or norms and practices may dictate that mistakes be uncovered and used as a source of learning, as many fast-moving Internet businesses are now doing. In either case, the approach used will influence how people interact, and thus will shape the quality of the knowledge created and applied.

Recognizing this phenomenon, the U.S. Army is more concerned with the value of recognizing mistakes and fixing them than it is with doing things right the first time. This attitude stems from battlefield experience, where no plan is ever carried out without errors. Thus the ability to evaluate and correct mistakes becomes critical to success. To reinforce the importance of frank interactions for diagnosing and learning from errors, the Army strives to separate its debriefing activities from its evaluation processes. Groups won't learn from their mistakes if the same interactions are being used to fix blame, keep score, or humiliate those involved.[31]

Managerial actions

Some key characteristics of organizational culture that shape the context for social interaction are noted in Figure 3. Although not a complete list, these characteristics do demonstrate another way in which culture affects knowledge of all types, and it suggests actions that logically follow from understanding this relationship.

• Identify norms and practices that are barriers to discussing sensitive topics.
• Find and evaluate evidence that senior management is perceived as accessible and approachable. Are there elements of the culture that inhibit vertical interactions?
• Find norms and practices in the firm that encourage or discourage:

  —a high frequency of interaction.

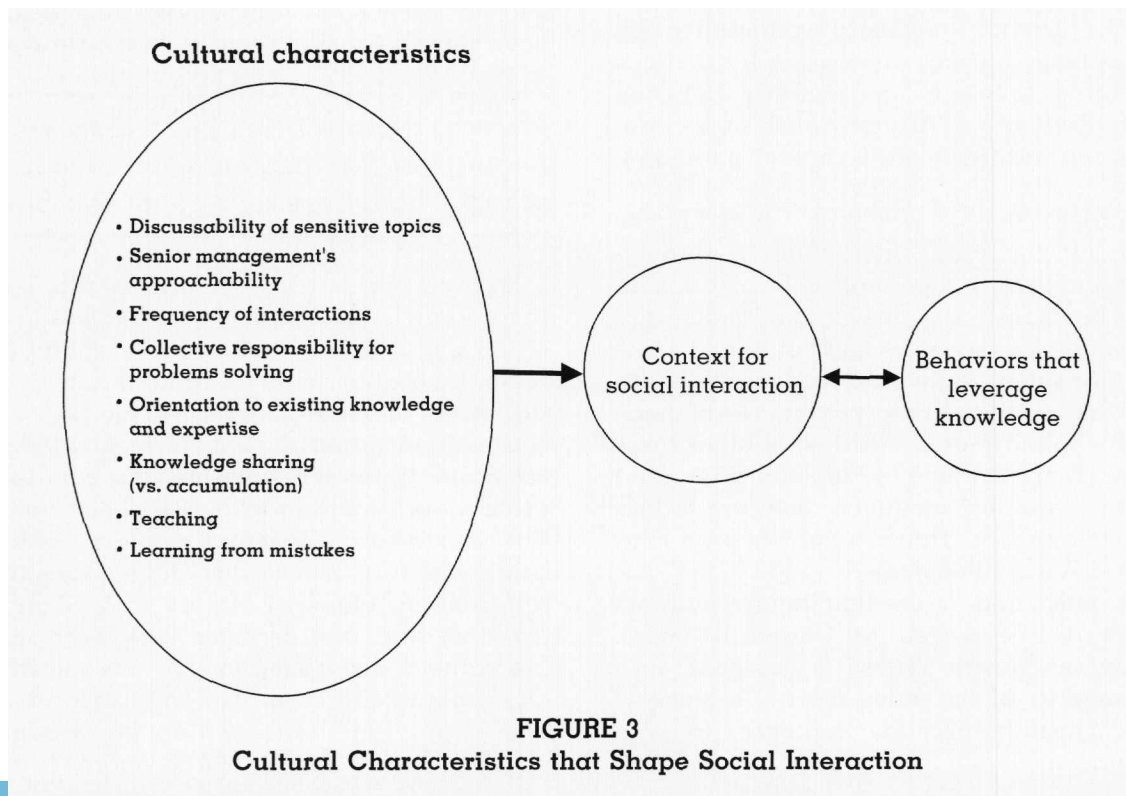 —an expectation of collaborative problem solving.

Cultural characteristics

• Discussability of sensitive topics
• Senior management's approachability
• Frequency of interactions
• Collective responsibility for problems solving
• Orientation to existing knowledge and expertise
• Knowledge sharing (vs. accumulation)
• Teaching
• Learning from mistakes

→ Context for social interaction ↔ Behaviors that leverage knowledge

FIGURE 3
Cultural Characteristics that Shape Social Interaction

—seeking out existing expertise and knowledge instead of "reinventing the wheel."

—teaching others.

—identifying and learning from mistakes.

4. Culture shapes creation and adoption of new knowledge

Knowledge ultimately assumes value when it affects decision making and is translated into action. New knowledge[32] is either adopted wholesale from external sources, often in the form of structured knowledge, such as a new software-driven manufacturing process, or it is created internally by taking information from the external environment and interpreting it in the context of the firm's existing knowledge to create new knowledge that becomes a basis for action. The corporate landscape is littered with examples of firms that had access to new knowledge about their competitive environments, but that failed to recognize its potential value.

Consider one well-known case. Ford's market research department produced what it viewed as new knowledge: "overwhelming evidence," in the form of projections, that the minivan would be a huge success as a new product in the automobile market. However, Ford's executives, particularly in the finance department, challenged the validity of this new market knowledge, labeling the minivan concept as untested and risky. In this case, the subcultures involved in negotiating the validity of the new knowledge failed to agree and act on the importance of the insights. And Chrysler, of course, went on to capture this major new market, with a product that essentially saved the struggling automaker from bankruptcy.[33]

A firm's culture, and the relationships among its subcultures, heavily shape how new knowledge about the external environment is created, legitimated (or rejected), and distributed throughout an organization, as illustrated in Figure 4. The dynamics of this process represent a special problem for companies pursuing business opportunities through the Internet, because they are regularly confronted by competitive and technological changes that threaten their survival. Organizations need to be able not only to adopt or create new knowledge in all forms, but also to legitimate and distribute it to change strategic direction and resource allocations faster than their rivals. In practice, some firms, such as Intel, General Electric, Wal-Mart, and Motorola, have historically been more successful at this than others.

Effective knowledge-oriented cultures

The fundamental question for management is: What are the characteristics of a culture that will help a firm rapidly acquire and distribute new knowledge throughout the organization to enhance decision making and performance? We have found four characteristics evident in cultures that are more effective at creating and integrating new knowledge from the external environment.

(1) Knowledge from the external environment is expected to be the starting point, not the end, of innovation. In this type of culture, norms and practices strongly encourage the exploitation of knowledge from the external environment, rather than just being satisfied with absorbing it. For example, when Chaparral Steel bought new rolling mill equipment designed to produce eight-inch slabs of steel, its assumption was that the performance of this new equipment, which represents structured knowledge, could be improved. Indeed, through trial-and-error and continually pushing the technology's capabili-
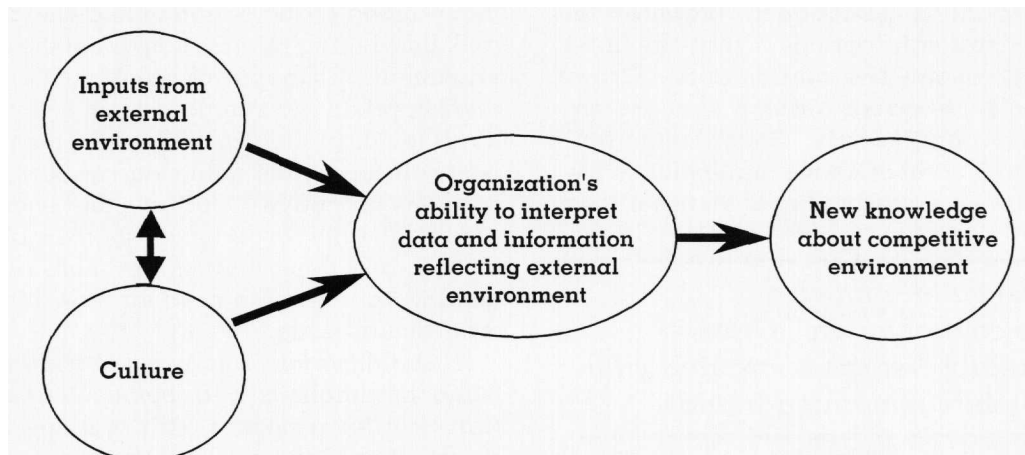

FIGURE 4
Creating and Adopting New Knowledge

ties, the equipment was soon producing 14-inch slabs, a level of performance that led the supplier to try to buy back the new design. The norm at Chaparral is to expect to build on structured knowledge acquired from outside the organization, not simply to absorb it. Among the practices that make this level of innovation possible are continual experimentation and quick-and-dirty prototyping. But most important is the attitude within the company that existing external knowledge can and must be enhanced if Chaparral is to stay competitive.

(2) Intense debate is encouraged on key strategic issues drawing on extensive internal and external inputs. Intel's Chairman Andy Grove sees intense debate and dialogue as a cornerstone of his company's culture, and a key reason why Intel has been able to adapt and prosper in the highly volatile computer industry.[34]

Intel's ability to understand how its computer memory chip business was being transformed was severely tested in the 1980s. Input from the external environment was unmistakable. The Japanese were developing tremendous new capacity to manufacture memory chips. Their quality levels were better. They had major advantages in access to low-cost capital. And the industry was caught in a downward pricing spiral, so that Intel was losing money on chips. In retrospect, the obvious strategic decision was to get out of the memory chip business, given the knowledge of these events. But this interpretation of external events had to be filtered through the firm's values, norms, and practices before becoming knowledge that Intel could act on. In this case, Intel's identity was closely tied to memory chips, to the point where many employees couldn't imagine the company existing without manufacturing them.

To develop an understanding of what the shifting realities of the marketplace meant for Intel, Grove orchestrated a broad-based, highly emotional debate designed to engage the organization and clarify its strategic options. What the Intel culture labeled "constructive confrontation," Grove concedes is really "ferocious arguing with one another while remaining friends." Such debate and dialogue demands a set of norms that includes the acceptance of intense questioning of all assertions

---

What the Intel culture labeled "constructive confrontation," Grove concedes is really "ferocious arguing with one another while remaining friends."

---

and observations made during meetings. This type of productive conflict is essential to first generate and then reconcile disparate views, and to create new knowledge that will become the basis of action. The absence of these norms, and related underlying values, contributed to the missed opportunity in the Ford minivan case described earlier.

Of course, executives like Grove recognize that not everyone in the firm will accept the perspective ultimately taken by senior management, based on its new knowledge of the environment. But the process of engaging and listening to many views on an issue increases the likelihood of a better decision[35] and broader acceptance of an emerging organizational perspective.

(3) High levels of participation are expected in seeking out, debating, and synthesizing knowledge related to important business issues. Norms and practices must go beyond encouraging debate and dialogue to facilitating contributions from individuals at multiple levels of the organization. Such participation is enabled by practices that involve individuals gathering data from diverse sources, exercising their judgment to transform data into information, and then engaging in intense interaction and discourse to produce new knowledge that can be the basis for action.

Today, Buckman Labs has 50 percent of its employees regularly engaged with customers in the belief that directly interacting with the market is the key to profitability. With a goal of 80 percent of its employees on the front line, Buckman has created a huge natural network that feeds information about customers into the company. Employees are expected to contribute to the databases maintained on all of the firm's customers, and this detailed information is a source of much richer knowledge about the marketplace.

Companies whose cultures are most effective at creating and integrating new knowledge into the organization have norms and practices that demand broad participation in knowledge gathering and distributing information about the external environment. At Chaparral Steel, visiting customers and suppliers is a standard practice for employees at all levels of the firm. "We send people who can best tell us what's going on, whoever they are," says one executive.[36] Cultures that encourage people to directly experience sources of problems, threats, and opportunities are more likely to lead employees to see the need for new thinking about a particular issue.[37]

(4) Organizations find ways to challenge the existing assumptions and beliefs that shaped the firm's earlier successes. This is a special problem for traditional firms trying to move into the Internet-based economy. One vice president of e-commerce observed: "Being a bank doesn't hold us

back, but thinking like a bank does. Our challenge is getting people to stop thinking like a bank and to understand that e-commerce means business will be done in a fundamentally different way."

At Intel, Grove found that the company's fundamental beliefs about memory chips were inhibiting its ability to accept the mounting evidence that it could no longer survive in a market where it had once been a major player. For an organization to question fundamental knowledge about its competitive environment or core technologies, it must learn how to diagnose and correct errors in its existing norms and practices. This form of double loop learning[38] allows firms to legitimate and apply new knowledge by questioning their current assumptions. For example, to get out of the memory chip business and move full force into microprocessors, Intel had to abandon the practice of using memory chips as its technology driver. It also had to give up a belief that the company had to offer a full product line of memory chips, microprocessors, and other products to remain competitive.[39]

Questioning fundamental beliefs and existing ways of working is a particularly difficult challenge for leadership, but it is usually a key step in creating new knowledge for the organization. One of the reasons Ford decided not to build a minivan, despite overwhelming support from its market research, was that Henry Ford himself objected to the use of costly new front-wheel drive technology. Intel's Grove observes that if managers today are to accurately interpret the profound changes occurring in their competitive environments, they must "adopt an outsider's intellectual curiosity . . . unfettered by any emotional attachment to the past."[40]

Questioning fundamental beliefs and existing ways of working is a particularly difficult challenge for leadership, but it is usually a key step in creating new knowledge for the organization.

Managerial actions

It is hard to overestimate how difficult it is to achieve this type of detachment. And the reflection required to question existing norms and practices is even more at risk in an Internet world where speed rules and fast decision making is expected from managers. As with previous sections in this article, we make no pretense about providing a complete list of the characteristics of cultures that support the development of new knowledge around key strategic issues. However, the discussion above suggests several diagnostic actions:

- Look for important new knowledge that was ignored, discounted, or undiscovered by your firm. How did these examples prove costly to the business? What norms and practices created barriers to adopting, creating, or applying this knowledge?
- Seek out examples of new knowledge adopted or created with inputs from the external environment that led to bursts of innovation within the firm, and try to draw lessons from them.
- Identify the norms and practices in your culture that discourage employees from building on and extending structured knowledge acquired from the external environment.
- Find examples where intense debate and dialogue was encouraged on key strategic issues. Reflect on how conflict played a constructive or destructive role in those discussions. What norms and practices would support more constructive confrontations?
- Look at the evidence you have about the levels of participation in both acquiring and challenging knowledge critical to the business. How do your organization's norms and practices encourage or inhibit high levels of participation in this area?
- Seek out examples showing how your organization questions its fundamental assumptions, beliefs, and projections about the competitive environment, core technologies, and the culture itself. What norms and practices would be needed to support more productive questioning in these areas?

These actions can help executives begin to explore how their own cultures help or hinder the integration of new knowledge into the firm. They suggest areas that may need special attention from senior management, as part of an overall strategy to leverage knowledge more effectively.

Aligning Culture With Knowledge Management Goals

Managers need frameworks to characterize the links between culture and knowledge so they can design the interventions needed to create behaviors that will support their knowledge management objectives. A central purpose of this article has been to demonstrate four ways in which organizational culture influences behaviors central to knowledge creation, sharing, and use:

- Culture—and particularly subcultures—shape our assumptions about what knowledge is, and, hence, which knowledge is worth managing.
- Culture mediates relationships between individual and organizational knowledge.

- Culture creates the context for social interaction that ultimately determines how effective an organization can be at creating, sharing, and applying knowledge.
- Culture shapes the processes by which new organizational knowledge—with its accompanying uncertainties—is created, legitimated, and distributed.

Each way of conceptualizing the relationship between culture and knowledge provides a different lens for evaluating the fit between current behaviors and the organization's knowledge management objectives. And each of the four frameworks suggests diagnostic action steps that can be taken to assess different aspects of culture most likely to affect critical knowledge-related behaviors. Once the diagnosis is complete, more informed decisions can be made about how to accommodate or realign the firm's culture to effectively support management's goals for leveraging organizational knowledge.

Appendix

Research Approach

The analytic frameworks, associated diagnostics, and prescriptions presented in this paper emanate from a number of initiatives in the authors' ongoing research program. An initial study investigated how 24 companies initiate and manage knowledge-related projects.[41] A second research initiative involved a thorough review of the literature on organizational culture, as well as interviews with 12 chief knowledge officers across a range of manufacturing and service organizations. The interviews were intended to explore, among other things, what specific facets of organizational culture facilitated or impeded their efforts to establish knowledge management as an integral activity in their organizations. Third, we conducted a systematic and detailed review of the burgeoning knowledge management literature to identify a small number of case studies of organizations identified as exemplars in the emerging practice of knowledge management. Fourth, we are now involved in research on the impact of the Internet on knowledge management practices. Finally, a less formal, but still significant source of many anecdotes, vignettes, and insights into the relationship between culture and knowledge has come from the many executive education programs we have led over the last five years, as well as from a series of knowledge management corporate consortium meetings, sponsored by Ernst & Young's Center for Business Innovation.

Endnotes

[1] Moran, N. 1999. *Financial Times, Special Section, Knowledge Management.* Becoming a knowledge-based organization, April 28:1.

[2] Rifkin, G. Nothing but net. *Fast company,* June–July 1996, 127.

[3] See for example: Nahapiet, J. & Ghoshal, S. 1998. Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review,* 23: 242–266; Teece, D. J. 1998. Capturing value from knowledge assets. *California Management Review,* 40(3): 55–79; and Thurow, L. 1999. *Building wealth: The new rules for individuals, companies, and nations in a knowledge-based economy.* New York: HarperCollins.

[4] For example, see Brown, J. S. & Duguid, P. 1998. Organizing knowledge. *California Management Review,* 40(3): 90–111; Grant, R. M. 1996. Toward a knowledge-based theory of the firm. *Strategic Management Journal,* 17:109–122; Nonaka, I. & Takeuchi H. 1995. *The knowledge-creating company.* New York: Oxford University Press; and Leonard-Barton, D. 1995. *Wellsprings of knowledge.* Boston: Harvard University Press.

[5] Beyond knowledge management. 2000. The Conference Board, Report #1262-00-RR; Dyer, G. 2000. KM crosses the chasm. *Knowledge Management,* 3(3): 50–54.

[6] This distinction is common in a variety of management literatures. For a useful synthesis of the differences between data and information, see Davenport, T. H. 1997. *Information ecology: Mastering the information and knowledge environment.* New York: Oxford University Press.

[7] Despite the attention paid to knowledge management in recent years, surprisingly little rigorous thought has been given to understanding the concept of knowledge itself. The article that most informed our thinking about the concept was Blackler, F. 1995. Knowledge, knowledge work, and organizations. *Organization Studies,* 16: 1021–1027.

[8] Many researchers have made this distinction between knowledge that is more cognitive and knowledge that is more physical. Two examples are Zuboff, S. 1988. *In the age of the smart machine: The future of work and power.* New York: Basic Books; and Blackler, op. cit.

[9] There is growing interest in the phenomenon of social or collective knowledge. See, for example, Brown & Duguid, op. cit.; Nahapiet & Ghoshal, op. cit.; and Orr, J. E. 1996. *Talking about machines: An ethnography of a modern job.* Ithaca, NY: ILR Press.

[10] The emphasis on the role of "knower" is becoming increasingly common in the knowledge-management literature. For example, see Glazer, R. Spring 1998. Measuring the knower: towards a theory of knowledge equity. *California Management Review,* 40(3): 175–194; Sveiby, K. & Lloyd, T. 1987. *Managing knowhow: Add value by valuing creativity.* London: Bloomsbury.

[11] For an excellent description of this type of structured knowledge and the evolution of its use in industrial organizations see Zuboff, op. cit.

[12] John Seely Brown observes that many knowledge-management advocates have misunderstood this point, applying the label "knowledge management" to what is really "information management." See Cohen, D. 1999. A conversation with John Seely Brown. *Knowledge Directions,* (1): 28–35.

[13] Davenport, T. H. & Prusak, L. 1998. *Working knowledge.* Boston: Harvard Business School Press. Readers interested in pursuing further the issues and nuances of developing a knowledge strategy or a knowledge initiative should see Zack, M. H. 1999. Developing a knowledge strategy. *California Management Review,* (41)3: 125–145; and Nohria, N. & Tierney, T. 1999. What's your strategy for managing knowledge? *Harvard Business Review,* March–April: 106–116.

[14] For example, see Wenger, E. 1998. *Communities of practice: Learning, meaning, and identity.* New York: Cambridge University Press; and Cohen, op. cit.

[15] For a detailed review of research and conceptualizations of

organizational culture, see Trice, H. M. & Beyer, J. M. 1993. *The cultures of work organizations*. Englewood Cliffs, NJ: Prentice-Hall. For a more practitioner-oriented summary of the concept see Schein, E. H. 1999. *The corporate culture survival guide*. San Francisco: Jossey-Bass.

[16] This finding is supported by others such as Sackmann, S. A. 1991. *Cultural knowledge in organizations*. Newbury Park, CA: Sage Publications; Pentland, B. T. 1995. Information systems and organizational learning: The social epistemology of organizational knowledge systems. *Accounting, Management, and Information Technology*, 5(1): 1–21; Brown, J. S. & Duguid, P. 1991. Organizational learning and communities of practice: toward a unified view of working, learning, and innovation. *Organization Science*, 2: 40–57.

[17] Learning, as we use the term, is the act or process of acquiring knowledge. Learning creates knowledge that may be used to improve individual and organizational performance. For more on the relationship between the two concepts, see Leonard-Barton, op. cit., and Dixon, N. 1994. *The organizational learning cycle*. New York: McGraw-Hill.

[18] Trice & Beyer, op. cit., provided material for defining "subcultures;" also see Schein, E. H. 1996. The three cultures of management. *Sloan Management Review*, Fall: 9–20, for an excellent discussion of the role of subcultures as a barrier to improving organizational effectiveness.

[19] Pentland, op. cit.

[20] Subcultures can come into conflict either because they value different forms of knowledge, e.g., human versus structured, or because they each place greater importance on different knowledge that happens to be of the same type.

[21] Readers interested in a detailed exploration of these issues in the context of a leading management consulting firm should see Bartlett, C. 1998. McKinsey & Co.: Managing knowledge and learning, Case study no. 396357. Boston: Harvard Business School Publishing.

[22] Rifkin, op. cit.: 127.

[23] Sackmann, op. cit.; Trice & Beyer, op. cit.

[24] Social interactions clearly underpin the creation and use of social knowledge, but these interactions are not the same thing as social knowledge. This form of knowledge is a product of social interactions, which are shaped by the cultural context. The same interactions can also produce human and structured knowledge.

[25] Details about the Chaparral culture are taken from Leonard-Barton, op cit.

[26] Rifkin, op. cit.: 127. K'Netix is Buckman's term for its knowledge global sharing network.

[27] This point has been made directly and indirectly by many others. See, for example, Davenport, T. H. & Prusak, L. 1998. *Working knowledge: How organizations manage what they know*. Boston: Harvard Business School Press.

[28] Leonard-Barton, op. cit. See Majchrzak, A. & Wang, Q. 1996. Breaking the functional mind-set in process organizations. *Harvard Business Review*, September/October, for excellent insights into how companies are effectively creating collaborative cultures.

[29] Many prominent authors in the organizational learning literature, which preceded the recent emphasis on knowledge management, have emphasized the two elements we have chosen to focus on. See, for example, Argyris, C. 1982. *Reasoning, learning, and action*. San Francisco: Jossey-Bass; and Senge, P. 1990. *The fifth discipline: The art and practice of the learning organization*. New York: Doubleday-Currency.

[30] Tobin, D. R. 1998. *The knowledge-enabled organization: Moving from "training" to "learning" to meet business goals*. New York: AMACOM.

[31] Sullivan, G. R. & Harper, M. V. 1996. *Hope is not a method*. New York: Times Books.

[32] Of course, "new" knowledge that gives the organization different capabilities for action is continually created by interpreting information from both internal and external sources. Our focus here is on how firms acquire or create and distribute new knowledge based on inputs from the external environment because this presents a critical problem in turbulent competitive environments, now marked by the proliferation of electronic business threats and opportunities.

[33] Barabba, V. P. 1995. *Meeting of the minds: Creating the market-based enterprise*. Boston: Harvard Business School Press.

[34] Insights into Intel's culture are taken from Grove, A. 1996. *Only the paranoid survive*. New York: Doubleday, and from Grove's recent speeches available on Intel's home page: *www.intel.com/intel/people/asg/speeches/speeches.htm*.

[35] This point had been well established in a variety of literatures. See, for example, Weick, K. A. 1995. *Sensemaking in organizations*. Thousand Oaks, CA: Sage Publications; de Bono, E. 1991. *Six action shoes*. New York: HarperBusiness.

[36] Preuss, G. 1994. Chaparral steel: rapid product and process development. Case Study 9-692-018, Boston: Harvard Business School Publishing Division.

[37] This idea is adapted from Van de Ven, A. H. 1986. Central problems in the management of innovation. *Management Science*, 32(5): 590–607.

[38] Argyris, op. cit.

[39] Grove, op. cit.

[40] Grove, op. cit.: 93.

[41] Davenport, T. H., De Long, D. W., & Beers, M. C. 1998. Successful knowledge management projects. *Sloan Management Review*, 39(2): 43–57.

David W. De Long is a researcher and consultant based in Concord, MA. His work focuses on helping companies create the organizational capabilities needed to succeed in electronic business environments. A research fellow at Andersen Consulting's Institute for Strategic Change, and an adjunct professor at Babson College, he received his doctorate in organizational behavior from Boston University. Contact: *ddelong@bu.edu*.

Liam Fahey is an adjunct professor of strategic management at Babson College and a visiting professor of strategic management at Cranfield University, U.K. He is the author or editor of eight books and over 40 articles and book chapters. His recent books are *Learning from the Future: Competitive Foresight Scenarios* and *Competitors: Outwitting, Outmaneuvering, and Outperforming*. Contact: *LFahey95@aol.com*.