WORKING PAPER

**Building the Knowledge-Based Organization:
How Culture Drives Knowledge Behaviors**

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May 1997

"This knowledge initiative is not a culture change project. It's just that our culture is in the way of what we want to do, so we've got to change it."

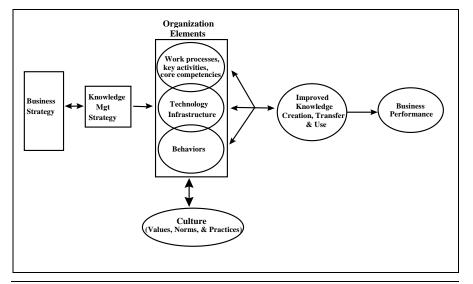*— knowledge manager, manufacturing company*

Any knowledge management strategy designed to improve business performance must address three components: (1) the work processes or activities that create and leverage organizational knowledge; (2) a technology infrastructure to support knowledge capture, transfer, and use; and (3) behavioral norms and practices — often labeled "organizational culture" — that are essential to effective knowledge use.

Even though the economic incentives are becoming clearer and technological capabilities now exist to support knowledge-based organizations,[1] pioneers in knowledge management are finding the behaviors supported by their existing organizational cultures to be a major barrier to this transformation. Our premise is that organizational knowledge and culture are intimately linked, and that improvements in how a firm creates, transfers, and applies knowledge are rarely possible without simultaneously altering the culture to support new behaviors.

Although we recognize that culture also affects technology systems and work structures, as indicated in Figure 1, this paper focuses on how culture impacts behaviors related to knowledge use. Specifically, our purpose is to propose four ways in which culture and knowledge are linked. By understanding how culture influences knowledge in their organizations, managers can then ask diagnostic questions that will suggest specific actions for adapting the organization's culture to support the behaviors needed.

FIGURE 1

An Overview of Knowledge Management Elements

Whether the objectives of a knowledge management strategy are to improve operational efficiencies, enhance organizational learning, intensify innovation, or speed up response to the market, a culture change strategy designed to shift behaviors and practices is a critical part of almost any knowledge initiative. The CEO of Buckman Labs, a specialty chemical company, learned this when his firm installed a knowledge network to support global sales and marketing efforts. Reflecting on the experience, CEO Bob Buckman said, "What's happened here is 90% culture change. You need to change the way you relate to one another. If you don't do that, you won't succeed."[2]

A multi-billion dollar international engineering and construction company invested hundred of thousands of dollars making knowledge management a centerpiece of its new business strategy. However, while designing new cross-functional business processes and installing technology to support them, senior management only paid lip service to the need for culture change. As a result, the initiative failed. The firm's dominant engineering culture refused to support the new processes proposed by the strategy and, as a result, there was little behavioral change in how knowledge was shared globally across projects. One manager responsible for the implementation concluded, "The culture is a huge problem. As

we roll out the system, we find we lack a culture that supports collaborative work because people still view knowledge as a method of securing their job, so they're reluctant to share."

Other organizations have recognized the importance of culture in reinventing themselves as knowledge-based businesses, and have taken steps to align their norms and practices to support the new behaviors needed. At Skandia, a $7 billion international financial services firm based in Sweden, the director of intellectual capital, has worked to create measures that drive employee behavior by introducing a new method for measuring intangibles, such as customer relations and organizational knowledge. Raising the visibility of these "soft" factors critical to performance is essential for encouraging the new behaviors needed in a knowledge-based economy.

Why Culture Matters

Leveraging knowledge is not an end in itself. Experience has shown that successful knowledge management strategies are always driven by clear links to business objectives.[3] But simply implementing a more knowledge-oriented business focus and installing the necessary technological infrastructure will not produce the changes necessary in behavior and culture to enable more effective knowledge use. There are several reasons for this:

- First, organizations that are currently profitable and riding high in the financial markets will have a hard time convincing senior management, much less employees, that a revolution in how people create, share and use knowledge is necessary or worth the organizational pain. Thus, the shift to a more knowledge-driven business is likely to be incremental, which means the existing culture will have a major impact on the implementation of any knowledge strategy.

- Second, the essential technologies supporting knowledge management will be adopted and shaped by the existing organization.[4] This means the technology will be implemented and used effectively only to the degree that a culture is aligned to support the objectives for knowledge management. This point was illustrated in a study of a Lotus Notes implementation in a professional services firm. Designed, in part, to facilitate knowledge sharing among

consultants, the system failed because of the firm's rigid hierarchy and it's competitive and individualistic culture.[5]

- Third, many firms today rely heavily on the quality, experience, and expertise of their technical and professional workforce. For these organizations, human intellectual capital has become one of their most valuable, albeit intangible assets. Assuming these employees are expected to be valuable in the future in more knowledge-centered businesses, management cannot afford to alienate or demotivate them by ignoring their existing values and norms when implementing a knowledge management strategy.

The relatively gradual shift to more knowledge-centered businesses, the mutually influential relationship between technology and culture, and the need to respect the occupationally-defined values and norms of a highly-skilled professional workforce all combine to make organizational culture a central factor in effectively improving a firm's ability to compete based on knowledge.

Defining "Knowledge" and "Culture"

One of the barriers to understanding how knowledge and culture interact is that they are two of the most intangible elements any manager must deal with. It is not surprising, therefore, to find that both terms — knowledge and culture — are used inside most organizations in multiple ways to mean many things. But, without definitions, both terms just become buzzwords, which promote "muddy" and ineffective thinking. To develop an action plan for aligning culture with knowledge management objectives, there must be some shared understanding about what the terms mean, if only so progress can be measured. We offer some practical definitions below as a starting point.

What is "Knowledge"?

The debate about what is "knowledge," has a long and torturous history in the social and natural sciences. For our purposes, however, the concept of "knowledge" can be narrowed down to several key dimensions. In it's most basic form, "knowledge" is the combination of information and human context that enhances the capacity for action. There are two dimensions that managers must keep in mind, however. First, knowledge may be viewed at

the individual, group, or organizational levels. The focus of knowledge management is primarily to improve use at the organizational level.

The second dimension of knowledge is usually characterized as explicit or tacit, or structured and unstructured knowledge. Explicit or structured knowledge is represented in documents, databases, products, and processes. This is knowledge that can be codified and shared in formal, systematic languages or objects. Tacit or unstructured knowledge is more dependent on action, context and personal experience, which makes it difficult to formalize and communicate. Tacit knowledge is often described as what we know but cannot explain, e.g. how to: negotiate a contract, identify critical competitive intelligence, assess an individual's potential, or build a cross-functional team.[6] Recognizing these different types of knowledge is important because culture affects each type differently.
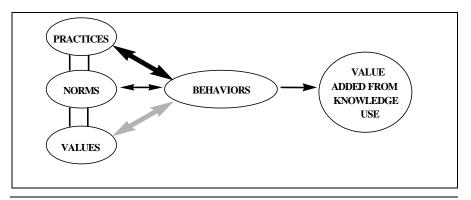
Culture

"Culture" is a term that also needs definition to make it useful. Like the concept of knowledge, researchers have defined "organizational culture" in many ways.[7] Although there is no widespread agreement on exactly what culture is, there is some consensus that organizational cultures can be described in terms of values, norms, and practices.

- *Values* indicate what an organization's members believe is worth doing or having. They indicate preferences for specific outcomes or behaviors, or what the organization aspires to achieve. It is important to differentiate espoused values, which are talked about but that don't influence behavior, from values that truly motivate behavior in a firm.

- *Norms* are the shared beliefs about how people in the organization should behave, or what they should do to accomplish their work. Norms represent the *expected* patterns of behavior. For example, they describe how employees *actually* create, share, and use knowledge in their work.

- *Practices* are the formal or informal routines used in the organization to accomplish work. Practices include project implementation processes, team meetings, time sheets, career paths, compensation plans, as well as Friday afternoon beer blasts. Each practice – formal or informal – has specific roles and rules (often unspoken) guiding how they are carried out.

Culture exists at different levels of the organization. Values are deeply embedded, tacit assumptions that are difficult to talk about and even more difficult to change. Norms and practices, on the other hand, are more directly observable and easier for employees to identify. Thus, norms and practices around knowledge use are more amenable to change. In fact, practices are the most visible symbol of culture, and they provide the most direct levers for changing behaviors needed to support knowledge management objectives. Changing behaviors around knowledge use is the most direct way to alter organizational norms, which will reinforce the necessary behaviors over time. On the other hand, values should not be the focus of the change effort, since they are too deep seated, tacit, and difficult to transform, unless the CEO and other senior managers in the organization are personally driving the implementation of the knowledge strategy, believe strongly in the need to change fundamental knowledge-related values of the firm, and are willing to lead a long term culture change project (3 to 10 years).

FIGURE 2

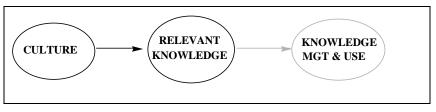**Linking Behaviors and Elements of Culture**

The most direct way to change behaviors around knowledge use is to change the practices that generate them (see Figure 2). New behaviors resulting from new practices will change norms over time, which will provide long term support for more effective knowledge use. Values are an ever present and powerful force shaping behaviors, but they are usually too complex to change directly.

An often overlooked phenomenon in culture is the role that subcultures play in shaping organizational behavior. Subcultures consist of distinct sets of beliefs, norms, and practices exhibited by specific groups in an organization, e.g. R&D, sales, engineering, MIS. Subcultures have characteristics that distinguish them from the firm's overall culture, as well as from other subcultures. For example, R&D's values may seem focused on elegant product features to the detriment of marketability and profits, while finance appears to value only controlling costs. MIS, on the other hand, seems only concerned 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 in organizations.[8]

Four Ways That Culture and Knowledge are Linked

Most managers recognize intuitively that organizational culture is relevant to how their firm creates, shares and uses knowledge. But what is the logic underlying this connection? Until managers can articulate specifically why and how culture effects their unit's ability to leverage knowledge, they can't diagnose the fit between the existing organization and their knowledge management objectives, nor can they design a strategy to reshape the culture. The purpose of this section is to make the connections between culture and knowledge explicit and to suggest the implications of these links for aligning the organization's characteristics with the knowledge management strategy. There are four ways that culture and knowledge interact that are particularly important to understand.

FIGURE 3

CULTURE → RELEVANT KNOWLEDGE → KNOWLEDGE MGT & USE

Culture Defines Knowledge

I. Culture Shapes Assumptions About What

How Important is Knowledge?

Cultures — and particularly subcultures — heavily influence what is defined as useful, important, or valid knowledge in an

Knowledge is Important

organization and, indeed, if knowledge is important at all to the business. A printed circuit board design team was supposed to be capturing lessons learned in its part of the product development process. 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 document their learning. The barrier to capturing this new knowledge was removed only when the knowledge manager found an accounting code to which time for extracting lessons learned could be charged. Local norms and practices determine the priority that knowledge and learning have in every organization. In the case of this design team, being billable was such a powerful norm that it had to be accommodated before new knowledge could be captured. This example suggests several questions to uncover how your culture is shaping assumptions about knowledge:

- How are the culture's (or subculture's) priorities likely to support or undermine more effective knowledge use around a particular activity? For example, is making the next sales call always more important than looking for patterns in lost customers? Is going to a skill-building training class a lower-status activity than performing daily tasks?

- What behaviors would demonstrate that knowledge was critical to your business? What existing norms and practices may be barriers to these behaviors? Can they be changed to support new behaviors?

Subcultures Differentiate Knowledge

In one major electronics firm, the engineering subculture was entreprenurial and encouraged lots of experimentation and frequent, informal interactions. Thus, engineers viewed knowledge sharing and personal relationships as integrally related and believed any attempts at knowledge management must facilitate 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 knowledge that was embedded in processes, software programs, and documents.

This is an example of how subcultures can define meaningful knowledge differently.[9] Some cultures will only value

"objectified" knowledge that can be embedded in processes and systems, while others will recognize and favor knowledge that is the product of social interactions. These different views of knowledge often lead to miscommunication and conflict between functions, as subcultures apply different criteria in judging valid knowledge. For example, the criteria for "knowing" that a new marketing information system is successful will be different for marketing, finance, and MIS departments. And these differences will often produce distinct strategies and goals in knowledge management initiatives that suggest the following questions:

- What are the distinct subcultures involved in this initiative, and how are they likely to define knowledge differently? Can we achieve some level of shared understanding about the types of knowledge most important to the business?

- Does our unit's orientation to knowledge suggest biases and blindspots that might lead us to overlook critical knowledge management opportunities? For example, are we too focused on capturing objects in a knowledge repository, while ignoring cultural barriers to absorbing and applying the knowledge?

- Are we making realistic assumptions about the new behaviors needed to leverage 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?

Knowledge and Boundaries

Employees at Chaparral Steel constantly scan the world for emerging technical knowledge that could improve its steel production processes. When British Petroleum reorganized around its core activities, it outsourced the generation and processing of seismic data to several outside companies. However, the knowledge and experience of BP's staff was still critical for evaluating the seismic data, and these activities were kept within the organization. In a related example, IKEA, the Swedish furniture manufacturer, educates its customers to assemble its products after purchase. In a sense, the company views its customers as an extended workforce, and knowledge

sharing about proper assembly techniques is an important part of the strategy.

Cultures define not only what knowledge is valued, but also what knowledge must be kept inside the organization to support a core competency, and what should be transferred outside or shared to create strategic advantage. Culture plays a part in making these decisions, and this raises questions for managers such as:

- How effectively do our norms and practices support aggressive scanning and integration of external knowledge critical to the business?

- Do our values, norms, and historical practices lead us to overlook opportunities to reconfigure knowledge distribution across organizational boundaries? Are there unexamined beliefs and assumptions we need to explore in this regard?

- How are our attempts at outsourcing or redistributing knowledge affecting our ability to create, capture, share, and apply new knowledge around our core competencies? What are the unanticipated positive and negative impacts on knowledge-related norms and practices?
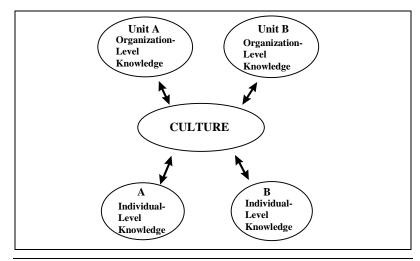
II. Culture Mediates the Relationships Between Individual and Organization-Level Knowledge

Rules Dictating Knowledge Distribution

Culture embodies all of the unspoken rules about how knowledge is to be distributed between the organization and the individuals in it. It legitimates what knowledge belongs to the organization and what knowledge remains in control of the individual. The head of a toxicology lab in a pharmaceutical firm refuses to participate in a knowledge mapping project but is not censured by management because norms allow him control of the knowledge in his department. Cultural rules determine who is expected to have what knowledge, as well as who must share it, and who can hoard it. Unless management understands the current distribution of knowledge in the organization, and how their strategy proposes to change it, altering behaviors around knowledge use becomes very problematic. Some of the questions that are surfaced when we view culture as the arbiter between individual and organization-level knowledge include:

- Is there shared agreement about who "owns" the specific knowledge to be managed?

- Who are the organization's most valued experts?

- To what degree do individuals trust the organization with their knowledge?

- What strategically critical knowledge is embedded in our processes and systems and what is in people?

FIGURE 4

Distributing Individual and Organization-Level Knowledge

Importance of Individual-Level Knowledge

One manager explained how his company's culture reinforced the value of individual-level 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 collaborative, knowledge sharing behaviors in this company will fall short until they directly address the cultural reinforcement provided for individual-level knowledge.

The CEO of Buckman Labs took this challenge on directly when he implemented a knowledge network to support global sales operations. At the start, Bob Buckman recognized that 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 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.[10]

This was a first step in Buckman's three-year campaign to reshape norms and practices that defined the relationships between individual-level knowledge and the organization. He recognized that as long as people benefited from not sharing, the organization's ability to leverage knowledge would be limited.

Low Trust Cultures

When one of its mechanical engineers sought cost information related to a design project, an automaker's finance department responded, "You're an engineer. You don't need to know that." Cultural norms made this an acceptable view of knowledge sharing in the company. But the implicit message of holding internal information proprietary is "We don't trust you." And the level of trust that exists between the organization, it subunits, and its employees will have a great deal of influence on the amount of knowledge that flows from individuals into the firm. Firms that have recently downsized have a particular problem. They will 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.

High Status Functions

Culture affects knowledge sharing between organizational units in another way by establishing and reinforcing status hierarchies among different functions or operating units. Managers in one firm clearly recognized that their culture valued R&D, marketing, manufacturing, and finance in descending order. This shared

sense that functions were valued differently reinforced a silo mentality in the firm and encouraged employees to spend unproductive time defending their unit's perspective. A culture that clearly values some units over others is more likely to undermine cross-functional knowledge sharing, in part, by supporting subcultures that seek to defend their knowledge bases.

If we recognize that culture is the silent broker, or mediator between individual and organizational-level knowledge, then the importance of renegotiating norms around knowledge distribution, ownership, and access becomes more evident. Whenever a knowledge management initiative threatens — intentionally or not — to change patterns of knowledge distribution and use, then management must address certain questions:

- How will our knowledge management strategy shift the distribution of knowledge?

- How will our current culture facilitate/undermine the proposed redistribution of knowledge?

- What new behaviors must leaders exhibit to communicate a shift from valuing individual to collective knowledge?

- What practices need to change to reinforce more collaborative knowledge use?

- Given the current level of trust in the culture, how realistic are our expectations for changing patterns in individual-level sharing? What new practices are needed to generate the behaviors required to support our strategy?
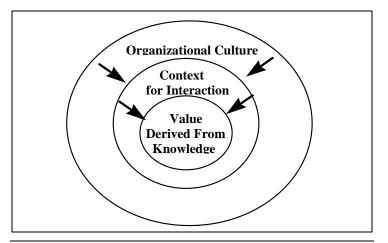
III. Culture Creates a Context for Interaction that Determines the Value Derived From Knowledge

Supporting Social Interaction

When knowledge is viewed as a product of social interaction, instead of as an object (e.g., a patent, report, software program), then culture becomes even more central for understanding how to leverage knowledge because it creates the context for interaction in which knowledge is created and used. For example, a company where it is not normal to share "lessons learned" across projects or sites does not provide a behavioral context where one group's valuable experiences are likely to be passed on to others in the firm, even if the technology makes it possible to do so. Thus, the added value of the knowledge for the organization is lost.

FIGURE 5

Creating Interaction Context

By establishing the context for interaction, organizational culture determines how knowledge will be used in a particular situation. It does this primarily by dictating the rules, expectations, and penalties that govern social interactions between individuals and groups and shape individuals' perceptions of their range of options acceptable to the firm. If, for example, a firm has no behavioral routines or expectations for capturing critical feedback from customers and converting it into product or service improvements, then no context exists to support the interactions needed to develop and apply new knowledge about the market.

And, in an organization where interdependent functions (e.g., R&D and manufacturing) are not expected to continually share knowledge and collaborate, and where no routine practices exist to do so, then there's no context for interaction to support this sharing. Surely, a new electronic knowledge base or reengineered work process will improve the environment for knowledge sharing, but unless senior management addresses long-standing interaction patterns and beliefs shaped by different subcultures, the benefits of the knowledge strategy will be limited.

The impact of culture on the context for interaction can be assessed on at least three dimensions: (1) patterns and qualities of vertical interactions (e.g., boss/subordinate); (2) patterns and qualities of horizontal interactions; and (3) general behaviors rewarded or punished that affect knowledge creation, transfer, and use.

Vertical Interactions

Culture shapes vertical interactions in many ways, but two that are particularly relevant to knowledge use are: (1) norms determining the acceptability of discussing "hot" or sensitive topics; and (2) 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.

Approachability. Norms and practices that make senior management accessible and approachable also help create a context for effective knowledge use. At Chaparral Steel, workers' lockers are intentionally located next to a vice president's office to facilitate informal interactions.[11] In contrast, executives in one large manufacturing company seem unaware of how intimidating their high levels of technical and business expertise are to subordinates. One knowledge 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 and use.

Horizontal Interactions

Culture also shapes patterns and qualities of horizontal interactions necessary for knowledge creation, sharing, and use. Three characteristics that differentiate organizational contexts in this area include: (1) the volume of interactions; (2) level of collective responsibility; and (3) orientation to seeking out existing expertise or knowledge.

Interactivity. Culture determines the frequency and expectations for interactions needed to accomplish work. One firm may rely on formal communication processes and meetings designed to periodically bring people together, while another encourages frequent, unplanned, and unstructured interactions among employees. These two companies will create and use knowledge differently.

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. The result is higher levels of interactivity that greatly facilitate knowledge use. At Buckman Labs, for example, employees using the firm's knowledge network now expect a different 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 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. People have become addicted to the speed."[12]

Regardless of what technology infrastructure is provided, unless cultural norms and practices support higher levels of

interactivity over time, new communication channels will have relatively little impact on knowledge use.

Collaboration. When cooling hoses on the production line at Chaparral Steel began to burst, a group of operators, a welder, a foreman, a buyer, and even someone from the training department spontaneously began working together to solve the problem. Explained one senior operator, "When something like that comes up and there seems to be no immediate solution, you go see what the problem is. You don't say, 'That's not my area,' or 'I don't know that much about it.' You just show up."[13] Another way that culture shapes the context for horizontal interactions is through norms and practices that promote collaboration. 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.[14] Cross-functional problem solving is expected at Chaparral where every employee carries a business card reading "member of the sales force." When norms and practices promote collaboration between functions and operating units, interactions are much more likely to create new organizational knowledge and apply it more effectively.

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 and expertise. It may be creative directors for a global ad agency who see each new project as a unique creative effort, or design engineers for an automaker who refuse to search out lessons from their counterparts working on other car platforms. Cultures that primarily reward individual creativity and innovation have different patterns of interaction around knowledge than cultures where uncovering and leveraging existing expertise — from almost any source — is the norm. To encourage the use of existing knowledge, Texas Instruments recently created an annual "Not-Invented-Here-But-I-Did-It-Anyway" award to recognize those who borrow good ideas from both inside and outside the company.
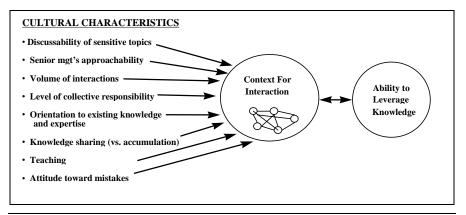
Knowledge-Oriented Behaviors

Sharing and Teaching. Norms and practices also encourage a variety of behaviors that influence the quality of interactions and, in the process, the creation, sharing, and use of knowledge. Cultures that explicitly favor knowledge sharing over knowledge acquisition will create a context for interaction that's 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. An increasing number of firms have discovered the benefits of expecting their employees to teach others about core aspects of the business.

Dealing with mistakes. One 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. Another behavior central to the context for interaction is how an organization reacts to mistakes. They may be covered up, explained away, punished severely, or ignored. Or norms and practices may dictate that they be sought out, clearly reconstructed, and used as a source of learning. In either case, the organization's approach will influence how people interact and, thus, the quality of 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 insists on separating 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.[15]

CULTURAL CHARACTERISTICS
- **Discussability of sensitive topics**
- **Senior mgt's approachability**
- **Volume of interactions**
- **Level of collective responsibility**
- **Orientation to existing knowledge and expertise**
- **Knowledge sharing (vs. accumulation)**
- **Teaching**
- **Attitude toward mistakes**

Context For Interaction

Ability to Leverage Knowledge

How Culture Creates Context for Interaction

These characteristics of organizational culture that shape the context for interaction (summarized in the Figure 6) are not intended to be a complete list. Instead, they are designed to demonstrate another way in which culture impacts knowledge, and to suggest diagnostic questions that logically follow from understanding this relationship. These questions include:

- What norms and practices are barriers to discussing sensitive topics in our organization?

- What evidence is there that senior management is perceived as accessible and approachable?

- What norms and practices in the firm encourage or discourage:
  — a high frequency of interaction?
  — an expectation of collaborative problem solving?
  — seeking out existing expertise and knowledge (instead of "reinventing the wheel")?
  — the practice of teaching others?
  — identifying and learning from mistakes?

The answers to these questions will suggest places that knowledge managers should focus when designing strategies to align their culture with knowledge management objectives.
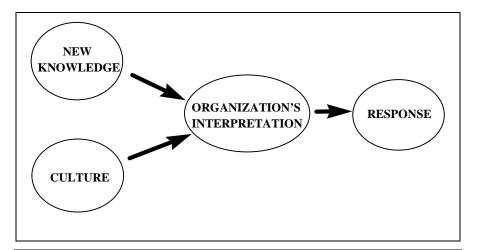
IV. Culture Shapes the Organization's Reaction to New Knowledge

Validating (or Rejecting) New Knowledge

In the 1970s, Ford's market research produced "overwhelming evidence" 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, refused to accept this new market knowledge, labeling the minivan concept as untested and risky. Chrysler, of course, went on to capture this major new market, with a product that essentially saved the floundering automaker.[16]

FIGURE 7

Culture Filters New Knowledge

A firm's culture heavily shapes how new organizational knowledge is captured, legitimated (or rejected), and distributed throughout an organization (Figure 7). The dynamics of this process represent a special problem for companies today who are regularly confronted by competitive and technological changes that threaten their survival. Companies must be able to capture, validate, and distribute new knowledge fast enough to change strategic direction and resource allocations, if they are to prosper in turbulent competitive environments. In reality, some firms, such as Wal-Mart, Intel, and Motorola, appear more successful at this than others.

The question for management is: What are the characteristics of a culture that will help a firm rapidly interpret and distribute new organizational knowledge to enhance decision making and performance? But before addressing this question, we must identify two faulty assumptions about knowledge that implicitly devalue how culture affects its integration into a firm.

Faulty Assumptions

(1) New knowledge arrives in a firm as prepackaged and validated, and is accepted without discord. This, of course, is not true. The Ford example shows how knowledge related to the external environment must be interpreted, debated, and formulated in a way that makes sense, given the firm's operating beliefs. In Ford's case, the culture allowed executives to dismiss discordant new knowledge as "untested," instead of at least exploring the uncertainties about the future of the auto market suggested by the research findings. Norms and practices shape the dynamics of how new knowledge is introduced and then validated, rejected, or co-opted[17] by a firm.

(2) An increase in knowledge, like an increase in information, reduces uncertainty and increases control. In reality, one knowledge researcher notes, "Each new domain of knowledge appears simple from the distance of ignorance. The more we learn about a particular domain, the greater the number of uncertainties, doubts, questions, and complexities."[18] The process of integrating new knowledge into the organization is shaped by existing norms and practices for dealing with the uncertainties and complexities actually created by increased levels of knowledge. For example, in the Ford case, the uncertainties created by market research supporting the minivan concept were, in part, discounted by a stronger financial subculture that valued less risky new products.

Effective Knowledge-Oriented Cultures

There are several characteristics evident in cultures that are more effective at integrating new knowledge.

(1) Knowledge from the external environment is expected to be the starting point, not the end, of innovation? When Chaparral Steel bought new rolling mill equipment designed to produce 8-inch slabs of steel, their assumption was that the performance of this new equipment could be improved. Indeed, through

trial-and-error and continually pushing the technology's capabilities, 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 knowledge acquired from outside the organization, not simply to absorb it. Among the cultural 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 knowledge can and must be improved on if Chaparral is to remain competitive.

(2) Intense debate is encouraged on key strategic issues with extensive internal and external inputs? Intel's CEO Andy Grove sees this practice as a cornerstone of his company's culture, and a key reason why Intel has been able to adapt and prosper in the turbulent computer industry.[19]

Intel's ability to understand how it's computer memory chip business was being transformed was severely tested in the early 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 external knowledge had to be interpreted through the firm's culture. 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 understand 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." This type of productive conflict is essential to reconcile disparate views on new ideas entering the firm and to generate new knowledge that will become the basis of action. Of course, executives like Grove recognize that not everyone in the firm

will accept the perspective ultimately taken by senior management. But the process of engaging and listening to many views on an issue increases the likelihood of a better decision, and broader acceptance of an emerging organizational perspective.

(3) High levels of participation are expected in capturing and debating knowledge related to important issues for the business. Today, Buckman Labs has 50 percent of its employees regularly engaged with its 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 knowledge about customers into the company. Employees are expected to contribute to the knowledge bases maintained on all of the firm's customers.

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 distribution. 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.[20] Cultures that encourage people to directly experience sources of problems, threats, and opportunities are more likely to convince their employees of the need for new thinking about a particular issue.[21]

(4) Organizations find ways to challenge the existing assumptions and beliefs that shaped the firm's earlier successes. 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[22] allows firms to legitimate and apply new knowledge by questioning 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, as well as the expectation that the company had to offer

a "full product line" of memory chips, microprocessors, and other products to remain competitive.[23]

Questioning cultural 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 evident in its market research, was that Henry Ford himself objected to the use of costly new front-wheel drive technology. Intel's Andy 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."[24]

It's hard to underestimate how difficult it is to achieve this type of detachment. And the reflection required to question existing norms and beliefs is even more at risk where "speed is god" and quick, decisive decision making is expected from managers. As with previous sections in this paper, we make no pretense about providing a complete list of the characteristics of cultures that support the development of new organizational knowledge around key strategic issues. Instead, our purpose is to demonstrate this relationship between culture and knowledge and to suggest diagnostic questions which include:

- Are there examples of important new knowledge that were ignored, discounted, or undiscovered by our firm that proved costly to the business? What norms and practices created this knowledge gap?

- Do we have norms and practices that lead employees to expect to build on and extend knowledge acquired from the external environment?

- How does our culture encourage or discourage intense debate on key strategic issues? How does conflict play a constructive or destructive role in our discussions? What norms and practices would support more constructive confrontations?

- How do our norms and practices encourage or discourage broad participation in capturing and debating knowledge critical to the business?

- Do we have norms or practices that allow us to question fundamental assumptions and beliefs about our competitive environment, core technologies, and our culture itself? If not, can we establish practices to support this behavior?

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

Conclusion

Managers need a conceptual framework of the links between culture and knowledge to design the interventions needed to create behaviors that will support their knowledge management objectives. The purpose of this paper has been to suggest 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, what knowledge is worth managing.

- Culture mediates the relationships between individual and organization-level knowledge.

- Culture creates the context for social interaction that ultimately determines the value an organization derives from knowledge.

- Culture shapes the processes by which *new* organizational knowledge – with its accompanying uncertainties – is captured, 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 linkages suggests questions that can be used to assess different aspects of culture most likely to influence knowledge-related behaviors. This diagnosis is the critical first step in developing both a strategy and specific interventions to align the firm's culture in support of more effective knowledge use.

Endnotes

1   See Stewart, T.A., *Intellectual Capital*, New York: Doubleday, 1997; I. Nonaka and H. Takeuchi, *The Knowledge Creating Company*, New York: Oxford University Press, 1995; and S. Davis and J. Botkin, *The Monster Under the Bed*, New York: Simon & Schuster, 1994.

2   Rifkin, G., "Nothing But Net," *Fast Company* Magazine, June-July, 1996, p. 127.

3   Davenport, T.H., D.W. De Long, and M.C. Beers, "Building Successful Knowledge Management Projects," Working Paper, Ernst & Young's Center for Business Innovation, Boston, MA, January 1997.

4   A growing body of research shows that technology does not determine organizational behavior. Rather, technology is adapted into an organization in a way that reflects a kind of iterative dance where both technology and culture mutually shape each other. For more see S. R. Barley, "The Alignment of Technology and Structure Through Roles and Networks," *Administrative Science Quarterly*, (1990) v35, p. 61-103; W.J. Orlikowski, "The Duality of Technology: Rethinking the Concept of Technology in Organizations," *Organization Science*, (1992) v3, p. 398-426; and W.E. Bijker et. al., *The Social Construction of Technological Systems*, Cambridge, MA: MIT Press, 1987.

5   Orlikowski, W.O., "Learning from Notes: Organizational Issues in Groupware Implementation," in *Knowledge Management Tools*, R.L. Ruggles (ed.), Boston: Butterworth-Heinemann, 1997.

6   For more on the explicit/tacit knowledge distinction, see Nonaka, I., "A Dynamic Theory of Organizational Knowledge Creation," *Organization Science*, v5 n1, February 1994:14-37; S.D.N. Cook and J. Seely Brown, "Bridging Epistemologies: The Generative Dance Between Organizational Knowledge and Organizational Knowing," January 1996 unpublished paper, Xerox PARC, Palo Alto, CA; M. Polanyi, *The Tacit Dimension*, Magnolia, MA: Peter Smith, 1983 [orig pub. 1966].

7   See *The Cultures of Work Organizations* by H.M. Trice and J.M. Beyer, Englewood Cliffs, NJ: Prentice Hall, 1993, for a thorough review of research on organizational culture.

8   Trice and Beyer, 1993, provided material for defining "subcultures;" also see "Three Cultures of Management: The Key to Organizational Learning" by E.H. Schein, *Sloan Management Review*, (Fall 1996):9-20, for an excellent discussion of the role of subcultures as a barrier to improving organizational effectiveness.

9   Brian Pentland argues this case convincingly in "Information Systems and Organizational Learning: The Social Epistemology of Organizational Knowledge Systems*,"* *Accounting, Management, and Information Technologies* (1995) v5n1:1-22.

[10] Rifkin, G., 1996.

[11] Details about the Chaparral culture are taken from Dorothy Leonard-Barton's research on the company, which is summarized in *Wellsprings of Knowledge*, Boston: Harvard Business School Press, 1995.

[12] Rifkin, G., 1996, p. 127.

[13] Leonard-Barton, 1995, p. 10.

[14] See "Breaking the Functional Mind-Set in Process Organizations," by A. Majchrzak and Q. Wang, *Harvard Business Review*, September/October 1996, for excellent insights into how companies are effectively creating collaborative cultures.

[15] Sullivan, G. R. and M.V. Harper, *Hope is Not a Method*, New York: Times Books, 1996.

[16] Barabba, V. P., *Meeting of the Minds: Creating the Market-Based Enterprise*, Boston: Harvard Business School Press, 1995.

[17] In some cases, powerful elements of the organization will appear to embrace new knowledge or ideas, espousing their importance for the firm, but a subsequent examination of behaviors reveals absolutely no change from before the new knowledge was supposedly accepted.

[18] Meacham, J.A., "Wisdom and the Context of Knowledge: Knowing that One Doesn't Know," *Contributions to Human Development*, Vol. 8, Kuhn, D. and J.A. Meacham (eds.), New York: S. Karger, 1983, p. 120.

[19] Insight's into Intel's culture are taken from *Only the Paranoid Survive* by Andy Grove, New York: Doubleday, 1996, and from Grove's recent speeches available through the Internet on Intel's home page.

[20] Preuss, G., "Chaparral Steel: Rapid Product and Process Development," Case Study 9-692-018, Boston: Harvard Business School Publishing Division, 1994.

[21] This idea is adapted from A.H. Van de Ven, "Central Problems in the Management of Innovation," *Management Science* (May 1986) v32 n5: p. 590-607.

[22] Argyris, C., *Reasoning, Learning, and Action*, San Francisco: Jossey-Bass, 1982.

[23] Grove, A., 1996.

[24] Grove, A. p. 93.

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