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Knowledge Management and Organizational Learning:

Fundamental Concepts
for Theory and Practice

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Abstract

This paper investigates several issues regarding the nature, domain, conceptual foundations, and practical challenges of knowledge management and organizational learning. The paper first identifies and contrasts two fundamental philosophical orientations to knowledge management -- the *personal knowledge* orientation and the *organizational knowledge* orientation -- and illustrates the distinctive kinds of knowledge management practices that result from the two orientations. It then summarizes three essential organizational processes in knowledge management: (i) maintaining learning loops in all organizational processes, (ii) systematically disseminating knowledge throughout an organization, and (iii) applying knowledge wherever it can be used in an organization. A general model of organizational learning -- the Five Learning Cycles model -- is introduced to represent how individuals, groups, and the overall organization are linked in an organizational learning process. Key challenges in managing each of the Five Learning Cycles are discussed, and examples of appropriate managerial interventions are proposed for each learning cycle. Concluding comments suggest how knowledge management processes reflect a fundamental shift in management thinking and practice from traditional concepts of command and control to more contemporary concepts of facilitation and empowerment.

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Introduction

As a growing focus of concern within management, knowledge management is an area of research and practice that is still searching for a stable set of core concepts and practical applications. This paper undertakes to contribute to this search by addressing some fundamental questions about the nature, domain, conceptual foundations, and practical challenges of knowledge management and organizational learning.

The first section of the paper considers two fundamental philosophical orientations to knowledge management -- the “tacit” or *personal knowledge* orientation *versus* the “explicit” or *organizational knowledge* orientation. I describe the deep assumptions underlying each orientation, and the resulting differing emphases in knowledge management concepts and practices that each orientation leads to. Examples drawn from current practice in several companies illustrate the distinctive kinds of knowledge management practices that result from the two orientations.

The second section proposes that there are three essential organizational processes that must be functioning well in any effective knowledge management system: (i) maintaining learning loops in all organizational processes, (ii) systematically disseminating new and existing knowledge throughout an organization, and (iii) applying knowledge wherever it can be used in an organization. I also argue that an organization that can carry out these processes effectively must develop processes for converting personal knowledge into organizational knowledge, and vice versa, on an ongoing basis.

The third section presents the Five Learning Cycles model of organizational learning. In this general model of learning processes in an organization, five kinds of learning cycles are identified that link individuals, groups, and the overall organization in an organizational learning process. The model makes clear how new knowledge developed by individuals in an organization must navigate each of the Five Learning Cycles to become accepted by other people in the organization, and then how new knowledge becomes embedded in the organization and its way of working. In effect, the model shows at the macro level how personal knowledge is converted into organizational knowledge, and vice versa, in processes for active and continuous organizational learning.

The fourth section discusses some key challenges in managing each of the five learning cycles so that active learning processes are maintained at the individual, group, or organizational levels. I also suggest some ways in which managers can help to prevent breakdowns and dysfunctions from occurring in each of the Five Learning Cycles, and thereby help to sustain overall organizational learning processes. Examples drawn from recent research into knowledge management practices help to illustrate the nature of such managerial interventions.

I conclude with some comments on the ways in which the knowledge management processes discussed here reflect a fundamental shift in management thinking and practice from traditional concepts of command and control to more contemporary concepts of facilitation and empowerment.

1. Basic Philosophical Orientations to Knowledge Management

The growing stream of articles on and consulting approaches to knowledge management practice today reveals a wide range of recommended processes and techniques. Unfortunately -- especially for managers looking for insights to guide knowledge management practices -- many of these recommendations often seem disconnected from each other, and in the worst cases, various recommended approaches even seem to be contradicting each other. Analysis of current recommendations, however, suggests that the many ideas for knowledge management being advanced today can be grouped into one of two fundamentally different views of the nature of knowledge itself and of the resulting possibilities for managing knowledge in organizations. These two views are characterized here as the *personal knowledge* approach and the *organizational knowledge* approach. The basic premises and the possibilities for knowledge management practice implied by each of these two approaches are discussed below.¹ (**Figure 1** summarizes the fundamental differences in the assumptions underlying the two approaches).

Some important advantages and disadvantages of the two approaches to knowledge management are then discussed.

¹ See also Ron Sanchez (forthcoming), "Personal knowledge versus Organizational Knowledge Approaches to Knowledge Management Practice," in *The Knowledge Economy Handbook*, D. Rooney, G. Hearn, and A. Ninan, editors, Oxford: Routledge.

Figure 1

**Basic Assumptions in
Personal *versus* Organizational Knowledge Management Approaches**

Personal Knowledge Approach	Organizational Knowledge Approach
<p><i>Knowledge is personal in nature and very difficult to extract from people.</i></p> <p>Knowledge must be transferred by <i>moving people</i> within or between organizations.</p> <p>Learning can only be encouraged by <i>bringing the right people together</i> under the right circumstances.</p>	<p><i>Knowledge can be articulated and codified</i> to create organizational knowledge assets.</p> <p>Knowledge can be <i>disseminated (using information technologies)</i> in the form of documents, drawings, best practice models, etc.</p> <p>Learning processes can be designed to remedy knowledge deficiencies through <i>structured, managed, scientific processes</i>.</p>

Adapted from Ron Sanchez (forthcoming), “Personal Knowledge versus Organizational Knowledge Approaches to Knowledge Management Practice,” in *The Knowledge Economy Handbook*, D. Rooney, G. Hearn, and A. Ninan, editors, Oxford: Routledge.

The Personal Knowledge Approach

The personal knowledge approach to knowledge management derives from the fundamental assumptions that knowledge is essentially personal in nature and that knowledge is therefore very difficult (perhaps impracticably so) to extract from the minds of individuals. In effect, this approach to knowledge management assumes, often implicitly, that the knowledge within an organization essentially consists of “tacit” *personal knowledge* in the minds of individuals in the organization.²

Working from the premise that knowledge is inherently personal in nature and will therefore largely remain tacit in the minds of individuals, the personal knowledge approach generally offers recommendations for knowledge management practice that focus on managing people as individual generators and carriers of knowledge. To manage the personal knowledge of individuals, managers are typically urged to identify the kinds of knowledge possessed by various people in an organization and then to arrange appropriate interactions between knowledgeable individuals. For example, the personal knowledge approach views the dissemination of knowledge in an organization as a task that can best be accomplished by transferring people as “knowledge carriers” from one

² Some writers and consultants have even gone so far as to argue that *all* knowledge is tacit in nature. The irony inherent in trying to transmit to others the “knowledge” that all knowledge is tacit, however, should be obvious.

part of an organization to another. Further, in this approach, a usual recommendation for stimulating organizational learning is to bring knowledgeable individuals together under circumstances that encourage them to share their ideas. These interactions are intended to encourage knowledgeable individuals to apply their knowledge constructively together, to share their knowledge with each other in order to move knowledge from one part of the organization to another, and hopefully through their interactions to create new knowledge that may be useful to the organization.

Some examples illustrate how the personal knowledge approach to knowledge management may be applied in practice.

Most managers of organizations today do not have a clear view of the specific kinds of knowledge that individuals in their organization have. This common state of affairs is reflected in the comment usually attributed to executives of Hewlett-Packard in the 1980s: "If we only knew what we know, we could conquer the world." As firms become larger, more knowledge intensive, and more globally dispersed, the need for managers to "know what we know" is becoming acute. A common kind of initiative within the personal knowledge approach is therefore an effort to improve understanding of *who* knows about *what* in an organization. The creation within Philips, the global electronics company, of an intranet-based "yellow pages" listing experts with different kinds of technical knowledge within Philips' many business units is an example of such an effort. Today Philips employees can type in key words for a specific knowledge domain -- say, for example, knowledge about the "design of optical pickup units" for CD/DVD players and recorders -- and the yellow pages will retrieve a listing of the people within Philips worldwide business units who claim to have such knowledge. Contact information is also provided for each person listed, so that anyone in Philips who needs the kind of knowledge that an individual claims to have can get in touch with those individuals.

Toyota provides an example of a personal knowledge approach to transferring knowledge within a global organization. When Toyota builds a new factory and wants to transfer knowledge about its production system to the new employees in the factory, Toyota typically selects a core group of two to three hundred new employees and sends them for several months training and work on the assembly line in one of Toyota's existing factories. After several months of studying the production system and working alongside experienced Toyota assembly line workers, these trained workers are sent back to their new factory site to become the core of production teams formed with other new employees. When they are repatriated, these trained workers are also accompanied by two hundred or so long-term, highly experienced Toyota production workers, who then work alongside all the new employees in the new factory to assure that knowledge of how Toyota's production process works is fully transferred to all employees in the new factory.

Toyota's use of Quality Circles also illustrates a personal knowledge approach to creating new knowledge. At the end of each work week, groups of Toyota production workers spend one to two hours analyzing the performance of their stage in the production system to identify actual or potential problems in quality, productivity, safety, etc. Through their discussions, each group proposes "countermeasures" to correct identified problems, and discusses the results of countermeasures taken during the previous week to address problems identified in earlier Quality Circle discussions. Through such interactions, Toyota employees share their ideas for improvement, devise

steps to test new ideas, and assess the results of their tests. This knowledge management practice, which is repeated weekly as an integral part of the Toyota production system, progressively identifies, eliminates, and even prevents sources of process errors. Improvements developed and implemented by Quality Circles over many years have transformed Toyota's production system into one of the highest quality production processes in the world (Spear and Bowen 1999).

The Organizational Knowledge Approach

In contrast to the personal knowledge approach, the organizational knowledge approach assumes that knowledge is something that can be made explicit -- i.e., can be articulated and explained by individuals who have knowledge, even though some effort and assistance may sometimes be required to help individuals articulate what they know. As a result, the organizational knowledge approach fundamentally assumes that much, if not all, of the knowledge of individuals that is useful to an organization can be articulated and thereby made explicit and available to others.

Working from this premise, the organizational knowledge approach generally advocates the creation and use of formal organizational processes to encourage and help individuals articulate the important knowledge they have -- and thereby to create *organizational knowledge assets*. The organizational knowledge approach also addresses ways that organizational knowledge assets can be disseminated within an organization, usually through documents, drawings, standard operating procedures, manuals of best practice, and the like. In this regard, information systems are seen as providing a critical means to disseminate organizational knowledge assets over company intranets or between organizations via the internet.

Along with the assumption that knowledge can be made explicit and managed explicitly goes the belief that new knowledge can be created through definable, manageable learning processes. The organizational knowledge approach generally suggests that experiments and other forms of structured, targeted learning processes can be used to remedy important organizational knowledge deficiencies, or that market transactions or strategic partnering may be used to obtain specific forms of needed knowledge or to improve an organization's existing knowledge assets.

Given these assumptions, the recommendations for knowledge management practice proposed by researchers and consultants working within the organizational knowledge approach typically focus on designing organizational processes for *generating, articulating, categorizing, and systematically leveraging* organizational knowledge assets.

Some examples may help to illustrate the organizational knowledge management approach.

In the 1990s, Motorola was the global leader in the market for pagers (also known as "beepers"). To maintain its leadership position, Motorola introduced new generations of pager designs every 12-15 months. Each new pager generation was designed to offer more advanced features and options for customization than the preceding generation.³ To

³ By using modular product architectures to create increasingly configurable product designs, Motorola was able to increase the number of customizable product variations it could offer to customers from a few thousand variations in the late 1980s to more than 120 million variations by the late 1990s.

produce its rapidly evolving lines of pagers, Motorola also designed and built a new factory with higher-speed, more flexible assembly lines for each new generation of pager. To sustain this high rate of product and process development, Motorola formed teams of product and factory designers to co-develop each new generation of pager and the factory for producing the new generation of pager. At the beginning of each project, each new team of designers received a manual of development methods and techniques from the team that had developed the previous generation of pager and its factory. The new development team would then have three deliverables at the end of their project: (i) an improved and more highly configurable next-generation pager design, (ii) the design of a more efficient and more flexible assembly line for the factory that would produce the new pager, and (iii) an improved design manual that extended the development methods provided to the team in the manual it received by including improved development methods that the team had developed to meet the more demanding product and production goals for its project. This improved development manual would then be passed on to the next development team given the task of developing the next generation pager and its factory. In this way, Motorola sought to make explicit and disseminate the knowledge developed by its engineers during each project, and thereby to systematically leverage that knowledge in launching the work of the next project team.

In addition to Toyota's personal knowledge management approach that transfers employees around its factories to transfer knowledge about its production system, Toyota also follows highly disciplined organizational knowledge management practices that document in detail the tasks that each team of workers and each individual worker are asked to perform on its assembly lines. These documents provide a detailed description of the content, timing, sequence, and output of each task -- how each task is to be performed, how long each task should take, the sequence of steps to be followed in performing each task, and the steps to be taken by each worker in checking his or her own work (Spear and Bowen 1999). As problems arise and are analyzed on the assembly line or in employees' weekly Quality Circle meetings, suggestions for improving Toyota's processes are evaluated by Toyota's production engineers and then formally incorporated in revised task description documents.

In addition to documenting process descriptions for repetitive tasks like factory work, some organizations have also created organizational knowledge management approaches to support more creative tasks, such as developing new products. For example, Chrysler's "platform teams" of development engineers have responsibility for creating the next generation platforms⁴ on which Chrysler's families of automobiles will be based. Each platform team is free to evaluate and select its own design solutions for the many different technical aspects of its vehicle platform. However, each platform team is also required to place its design solutions in a "Book of Knowledge" on Chrysler's intranet. All platform teams can then consult this catalog of developed design solutions as they carry out their development processes, so that good design solutions developed by one platform team can be located, evaluated, and possibly used by other platform teams.

Other firms have taken an organizational knowledge management approach in product development processes even further. For example, GE Fanuc Automation, one of the world's leading industrial automation firms, develops detailed, company-specific

⁴ A platform includes a system of standard component types and standardized interfaces between component types that enable "plugging and playing" different component variations in the platform design to configure different product variations (see Sanchez 2004).

design methodologies for the design of new kinds of components for their factory automation systems. In effect, instead of letting each engineer use his or her own personal knowledge to create new component designs, GE Fanuc's engineers must work together to define standard design methodologies for each type of component the firm uses. Many of these design methodologies are then programmed so that the design of new component variations can be automated, and GE Fanuc's computers then automatically generate design solutions for new components. In this way, GE Fanuc tries to make explicit the best design knowledge of all its engineers -- and then to systematically re-use that knowledge by automating new component design tasks.

2. Advantages and Disadvantages of Personal *versus* Organizational Knowledge Approaches

Both personal and organizational knowledge management approaches have some significant advantages and disadvantages, as briefly summarized below.

Advantages and Disadvantages of the Personal Knowledge Approach

A main advantage of the personal knowledge approach is that it offers some relatively simple steps to begin managing knowledge. A basic first step is to identify what each individual in the organization believes is the specific kind of knowledge that he or she has. Such statements of claimed expertise can help managers do a better job of matching individuals' knowledge with the knowledge requirements of various tasks in the organization -- for example, making more effective assignments of individuals to specific tasks that they will be good at performing, or composing teams with appropriate sets of knowledge to carry out a project. As Philips found with its intranet-based "yellow pages," the relatively little effort needed to create a database listing the expertise claimed by individuals in the organization may greatly facilitate knowledge sharing among individuals. These easy-to-implement personal knowledge management practices may also avoid some of the practical and motivational challenges that may arise when an organization asks individuals to make their knowledge explicit -- a challenge that is discussed further below.

Although relatively easy to begin, the personal knowledge approach, if used exclusively by an organization, has some important long-term limitations and disadvantages. One disadvantage is that individuals in an organization may claim to have personal knowledge that they do not actually have (Stein and Ridderstråle 2001). Moreover, if knowledge only remains tacit in the minds of individuals in an organization, then the *only* way to move critical knowledge within the organization is to move people who claim to have such knowledge. Moving people is often costly and time-consuming, and some individuals may resist moves that would disrupt their current work or family life. Even when knowledgeable individuals are willing to be moved, an individual can only be moved one place at a time and can only work so many hours per day, thereby limiting the reach and the speed with which an organization can practically hope to transfer an individual's knowledge. Further, people in other parts of the organization may not accept the knowledge of a newly transferred person or may otherwise fail to establish sufficient rapport with transferred individuals to allow the desired knowledge transfer to take place.

Perhaps an even more serious concern in many organizations is that leaving knowledge in tacit form in the minds of key individuals creates a risk that the organization may lose important knowledge if an individual becomes incapacitated, leaves the organization, or joins a competing organization.⁵

Advantages and Disadvantages of the Organizational Knowledge Approach

In many key respects, the advantages and disadvantages of the organizational knowledge approach present a “mirror image” of the advantages and disadvantages of the personal knowledge approach. The organizational knowledge approach is usually much more challenging to start, but may offer significantly greater potential benefits in the long term. I first consider some important potential advantages of the organizational knowledge management approach, and then address some key challenges in starting and sustaining organizational knowledge management approaches in an organization.

The most fundamental advantage of organizational knowledge approaches is that once an individual’s knowledge is articulated in an explicit form (a document, drawing, process description, or other kind of organizational knowledge asset), information systems can usually be used to quickly disseminate that knowledge throughout an organization. In effect, converting personal knowledge into organizational knowledge creates a knowledge asset that can be made available anytime and anywhere it is needed in an organization -- in effect, freeing an organization from the limitations of time and space that constrain the dissemination of personal knowledge by moving individuals.

Moreover, once important forms of knowledge are made explicit within an organization, they can be codified and thereby made easier to leverage than knowledge left in tacit personal form. To *codify knowledge* is to place knowledge in categories that allow important interrelationships between different kinds of knowledge within an organization to be identified. For example, forms of knowledge in an organization that share similar theoretical or practical knowledge bases can be identified, so that networks for knowledge sharing can be organized among people working with similar kinds of knowledge. Once important forms of an organization’s knowledge are articulated and codified, knowledge created in one part of an organization can also be proactively delivered through information systems to people in other parts of the organization that can benefit from having such knowledge. For example, in the late 1990s AT+T created an IT-based global knowledge network linking common processes in its factories worldwide. New knowledge developed in one factory that would be useful in improving similar processes in other factories could be entered into AT+T’s IT system and proactively sent to all other AT+T factories that had similar processes.

A further advantage of the organizational knowledge approach is that once organizational knowledge is made explicit and disseminated to other individuals who have expertise in the same knowledge domain, an organization’s organizational knowledge becomes “visible” and can be discussed, debated, tested further, and improved, thereby stimulating organizational learning processes. (Such processes may also help to identify which individuals in the organization who claim to have important

⁵ Patent, copyright, and trade secrecy laws may give an organization *intellectual property rights* in the personal knowledge developed by individuals working in the organization. Such rights may of course discourage -- though not entirely prevent -- individuals from sharing their personal knowledge with other organizations.

knowledge are actually capable of making significant contributions to the organization's knowledge base, and which are not.)

By systematically making its current knowledge base more visible and analyzable, an organization can greatly improve its ability to identify deficiencies in its knowledge base. In effect, by making what it knows explicit, an organization can begin to see more clearly what it does not know, and then take steps to develop or acquire important forms of knowledge that it does not have or that are not developed to a sufficient level within the organization.

Finally, an organization that articulates, codifies, and disseminates its important knowledge assets may thereby minimize the risk that vital knowledge of key individuals may become unavailable if those individuals become incapacitated or leave the organization.

A number of significant organizational challenges must be overcome, however, to obtain these potential benefits of an organizational knowledge management approach. These challenges primarily arise in managing processes for articulating, evaluating, applying, and protecting organizational knowledge.

Not uncommonly, some individuals in an organization may lack the skill or motivation to *articulate* their useful knowledge. Individuals may vary greatly in their abilities to articulate their knowledge, and significant organizational support and facilitation may be required to help some individuals with important knowledge to adequately articulate their knowledge and contribute to the creation of organizational knowledge assets. Providing organizational support to individuals who have difficulty articulating their knowledge may involve significant time and financial cost.⁶

An even more fundamental challenge arises when an individual resists articulating his or her knowledge, even though requested by his or her organization to do so. Such resistance may commonly occur if an individual believes that his or her job security depends on the personal knowledge that he or she has that is important to the organization. Individuals may fear that revealing such knowledge would lead to dismissal or loss of influence in an organization, usually because they believe they would subsequently be less necessary or important to the organization. Overcoming such fears may call for a redefinition of the employment relationship within an organization, especially with regard to its key knowledge workers. New employment relationships and incentives may have to be defined to encourage key knowledge workers to engage in continuous learning, to make their knowledge explicit, and to help disseminate their knowledge to others in the organization.

Organizations must also find ways to systematically *evaluate* knowledge that has been made explicit by various individuals. For example, individuals with different educational backgrounds and professional experience may have come to different conclusions about the most effective way to do something. Such differences will usually be revealed in the process of making their individual knowledge explicit. Organizational processes must be established for evaluating the knowledge that individuals have made explicit and for resolving conflicting knowledge beliefs of individuals. The people

⁶ The greater the extent to which an organization employs "knowledge workers" with advanced education and training in formally communicating their ideas, however, the less intellectually difficult the articulation of organizational knowledge within the organization should be.

involved in making such evaluations must be respected within the organization for their expertise, objectivity, and impartiality -- and in most organizations, such people are usually in short supply, and their time is difficult to obtain. Involving such people in processes for evaluating organizational knowledge may impose significant costs on an organization -- although the resulting benefits may far outweigh the costs. For example, some consulting firms today have panels of senior experts in various practice areas who review post-project recommendations from project teams and define "best demonstrated practice" models for various practice areas.

Since knowledge is useful to an organization only when it is *applied* in action, a further challenge in implementing organizational knowledge management approaches is assuring that knowledge articulated in one part of the organization is not rejected or ignored by other parts of the organization because of an intra-organizational "not invented here" syndrome. One organizational knowledge management approach to this concern is requiring that "best practice models" (such as those defined by panels of experts) be followed throughout an organization. As various groups within the organization apply current best practice models, they may develop new knowledge about ways to improve the current best practice, and then report their findings to a panel of experts for their process area, so that their findings can be evaluated and possibly lead to modification of the organization's current best practice models. Implementing such an organizational knowledge management process, however, requires a high degree of organizational motivation and discipline in systematically contributing to and applying an organization's current best knowledge and best practice models.

Finally, to assure that organizational knowledge assets remain within the boundaries of the organization and do not "leak" to competitors, security measures of the type most organizations now routinely use to secure their databases must also be extended to *protecting* an organization's explicit knowledge assets.

Combining Personal and Organizational Knowledge Management Approaches

Personal and organizational knowledge management approaches involve quite different emphases and practices, but both kinds of knowledge management processes are likely to be needed in any organization. Each approach has important advantages, and in many respects the advantages of one approach can be used to help offset the disadvantages of the other. The objective for knowledge managers is therefore to create knowledge management processes that synthesize the "right" combination and balance of the personal and organizational knowledge management practices. What the "right" combination and balance may consist of will vary with a number of factors specific to each organization and the way it tries to compete in its markets. However, some basic guidelines can be suggested.

As a rule, personal knowledge management initiatives that bring key knowledge workers face to face are likely to be necessary to build a climate of personal trust and respect among individuals who have important knowledge. Face-to-face meetings may also stimulate exchanges of ideas and speculations that people may be reluctant to contribute through more formalized, IT-based knowledge management processes. Thus, personal knowledge management practices are likely to be vital to *generating* significantly new ideas and thereby to introducing new knowledge to an organization. By contrast, a key advantage of organizational knowledge practices is their capacity for more

efficient, faster dissemination of knowledge, especially through IT systems. In addition, an organizational knowledge approach to disciplined use of best practices and common processes can create “learning platforms” that enable the systematic sharing of new learning that can be used throughout an organization.

Organizations that have not previously implemented systematic knowledge management approaches should in most cases begin with relatively inexpensive, fast to implement, and less challenging personal knowledge management practices, such as those discussed above. Such practices often create surprising organizational interest in and energy for developing more extensive knowledge management practices. Personal knowledge management practices should evolve to include organizational knowledge management approaches in the long run, however, because organizations that implement effective organizational knowledge management approaches are likely to be much more effective at leveraging their knowledge, and may also become better at systematically generating organizational learning. The first steps in implementing personal knowledge management practices within an organization should therefore be communicated as only the first step in an evolving knowledge management process that will eventually include more formal and systematic organizational knowledge management practices.

When the respective advantages of personal and organizational knowledge management practices can be combined, an organization should be able to develop and apply new knowledge considerably faster and more extensively than organizations that do not try to manage knowledge or that use only personal knowledge management practices or only organizational knowledge management practices. Thus, the eventual goal for knowledge management practice in organizations is to craft hybrid, organization-specific knowledge management processes in which organizational knowledge management practices can complement and extend active personal knowledge practices, as I suggest below.

3. Three Essential Processes in Knowledge Management

Whether personal or organizational knowledge management practices are used, there are three basic and essential organizational processes that must function well in order for knowledge management to be effective: (i) maintaining learning loops in all organizational processes, (ii) systematically disseminating new and existing knowledge throughout an organization, and (iii) applying knowledge wherever it can be used in an organization. Let us consider each of these processes.

A *learning loop* is any learning process that tries to improve another process, whether incrementally or radically. Quality Circles are an example of an incremental learning loop designed to steadily raise the quality of a production process. More radical learning loops are possible, however -- such as regular efforts to “think outside the box” in re-conceptualizing how a firm competes in its markets. Whether incremental or radical in intent, learning loops should be designed into *all* organizational processes. The reasoning behind this prescription has much to do with the current emphasis on the “lean organization.” In today’s competitive world, only lean organizations that are focused on and excel at key value adding activities (and that outsource other necessary processes) are likely to meet today’s rising demands for higher performance and lower price. Every process in a lean organization is therefore important and worthy of continuous improvement through organizational learning processes -- i.e., learning loops.

Once learning loops are in place in an organization, the next challenge is to *systematically disseminate* existing knowledge and new knowledge generated through learning loops throughout an organization. Whether accomplished by moving people with personal knowledge or by disseminating new explicit knowledge over IT systems, new knowledge must find its way to other locations in the organization where it can be used. Such dissemination processes can be either need-driven or proactive. Need-driven dissemination processes use passive systems (like the Philips internal yellow pages) to help individuals find explicit knowledge or other knowledgeable individuals when they feel the need for further knowledge. Proactive dissemination systems classify organizational knowledge and the kinds of people and processes that would benefit from various kinds of knowledge, and then proactively direct new knowledge to people and processes that can benefit from that kind of knowledge.

Knowledge has value to organizations only when it is applied in action within an organization's processes. Thus, the basic goals of knowledge management practice are not just generating new knowledge, but also assuring that new and existing knowledge is actually applied in all processes where the knowledge can be used throughout an organization. Achieving this objective is likely to require new incentives and new monitoring processes to assure that new knowledge created elsewhere does not fall victim to a "not invented here" syndrome in which new knowledge is rejected or ignored by groups in whose processes the new knowledge would actually be useful. As a general rule, achieving high performing processes for knowledge generation, dissemination, and application will require substantial redesign of both incentives and monitoring systems in most organizations.

Carrying out these three basic processes of knowledge management will require an organization to become adept at stimulating development of new knowledge by individuals and then converting the personal knowledge of individuals into explicit organizational knowledge and new actions based on new knowledge. In the next section, I discuss a general model of how the generation and application of new knowledge happens in organizations.

4. A General Model of Organizational Learning: The Five Learning Cycles of the Learning Organization

In this section I develop a general model of the way in which a learning organization generates, disseminates, and applies knowledge. I first define some key concepts and terms that are central to the analysis of organizational learning. Using these concepts, I then develop a general model of how an organization learns. The model identifies and explains *five learning cycles*⁷ that drive an organization's learning processes and that knowledge management practices must therefore support, as shown in **Figure 2**.

The five learning cycles represent the processes through which

- Individuals in organizations create new knowledge;

⁷ See Ron Sanchez (2001), "Managing knowledge into competence: The five learning cycles of the competent organization," pp. 3-37 in *Knowledge Management and Organizational Competence*, R. Sanchez, editor, Oxford: Oxford University Press.

- Individuals and the groups they interact with share, test, and accept or reject new knowledge developed by individuals;
- Groups interact with other groups to determine whether new knowledge developed by a given group becomes accepted within the overall organization;
- New knowledge accepted at the organizational level is embedded in new processes, systems, and the culture of an organization;
- New knowledge embedded in new processes, systems, and organizational culture leads to new patterns of action by groups and individuals.

Figure 2

New Organizational Knowledge Becomes Embedded in Organization's Interpretive Framework(s) -- Its Culture, Systems, and Processes

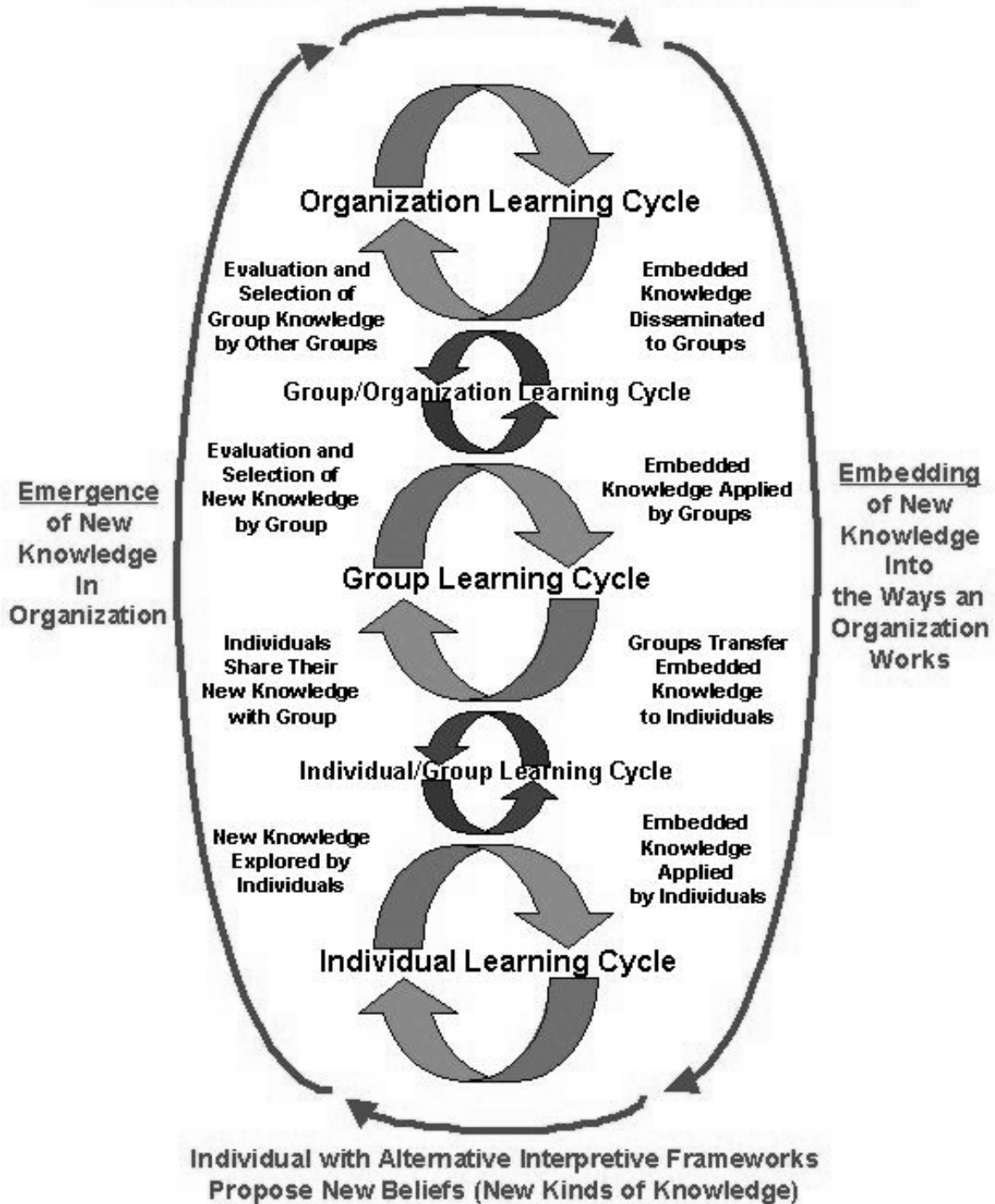


Figure 2: The Five Learning Cycles of a Learning Organization

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The Five Learning Cycles represent organizational learning as a collective sensemaking process that follows an identifiable progression of cognitive activities. The progression begins with individuals noticing events of potential significance for the organization, then seeking to understand and derive meaning from those events by applying their current interpretive frameworks, and finally reacting to any meaning extracted from events by forming new or modified sets of beliefs about the world and the situation of the organization in the world.

To describe this process more adequately, however, we need to use a set of well defined concepts that refer to specific aspects of this sensemaking process. I therefore next define several terms that represent the essential conceptual building blocks of organizational sensemaking and learning processes: data, information, knowledge, learning, sensemaking, and interpretive frameworks.

Essential Concepts and Terms in Analyzing Organizational Learning

In our analysis of the five learning cycles in a learning organization, *data* are representations of events that someone wishes to bring to the attention of other people in the organization. Data may include both qualitative and quantitative descriptions of events. As descriptions, data are always incomplete representations of events. Some aspects of an event may be noticed and reported, while other aspects are not noticed or reported. The aspects of events represented in an organization's data depend on what aspects of events observers both notice and think have significance for the organization. Thus, all data are selective representations of events, implicit in which are some presumptions by individual observers about which events and which aspects of those events are likely to have significance for the organization. Thus, the data gathered within and considered by an organization are greatly influenced by the interpretive frameworks (defined below) of individuals that determine which events they notice and how individuals describe those events to an organization.

Information is the significance -- or more precisely, the *meaning* -- that is derived from some data when the data are evaluated by an individual using his or her personal interpretive framework. People derive meaning from data through processes of comparison of data with other data, and the interpretive framework that an individual uses to derive meaning from data will determine the kinds of comparisons that the individual thinks are relevant for interpreting different kinds of data. When comparisons of some data suggest a significant change in the state of the world or an organization, that perceived change is the meaning or "information content" derived from an individual's process of interpreting (comparing) data. Of course, comparisons of data that suggest that the state of the world or an organization has *not* changed may provide information that tends to reinforce belief in continuation of the *status quo*.

In our analysis, *knowledge* is a set of beliefs that individuals hold about cause-and-effect relationships in the world and within an organization. This pragmatic concept of knowledge -- which treats knowledge as some variant of an individual's belief that "A causes B" -- is fundamental to the notion of knowledge management. In effect, because the basic objective of management is to help organizations *do things better*, knowledge management as a management process is inevitably concerned with forms of knowledge that can be used to cause things to happen more effectively and efficiently in an

organization and its markets.⁸ Thus, our theoretical conception of knowledge is one that is rooted in the action-oriented world of managers.

Further, although knowledge ultimately exists as a set of beliefs in the minds of individuals in an organization, I will use the term *organizational knowledge* to refer to a set of cause-and-effect beliefs that is sufficiently widely shared among individuals in an organization to enable them to act on those beliefs and to work together in doing something that is useful to the organization.

Learning is the process that results in a change in knowledge. Learning thus leads to change in an individual's beliefs about causal relationships in the world and within an organization. Learning changes the *content* of a belief about cause-and-effect relationships (adding or deleting specific causal relationships from an individual's set of beliefs), the *conditionality* of a belief (something thought to be a general principle is seen to have limits to its applicability, or vice versa), or the *degree* to which a specific belief is held (a strongly held belief becomes less certain, or vice versa) . Because learning changes to some extent the web of interrelated causal relationships that make up an individual's knowledge base, learning modifies an individual's interpretive framework (defined below) for making sense of the world and taking action in it.

Organizational learning can be said to occur when there is a change in the content, conditionality, or degree of belief of the beliefs shared by individuals who jointly act on those beliefs within an organization.

Sensemaking is the process in which an individual perceives events, looks for similarities or differences between current events and past events, and forms expectations about the significance of current events based on their similarities or differences with past events. In this way, sensemaking may lead to learning that changes the content, conditionality, or degree of an individual's beliefs.

An *interpretive framework* is an individual's current set of beliefs about cause-and-effect relationships, against which he or she continuously compares current events in his or her sensemaking process. If the events that an individual currently observes appear inconsistent with the cause-and-effect beliefs that comprise his or her current interpretive framework, such inconsistencies may precipitate changes in the beliefs that make up the interpretive framework, thereby restoring consistency between current events and the individual's interpretive framework. In this regard, interpretive frameworks are both the *means* for individual sensemaking and the *result* of individual sensemaking.⁹

From a knowledge management perspective, the sensemaking processes of individuals are not a goal *per se* for an organization, but rather a means to achieve the broad objectives of the organization. To help an organization achieve its goals, managers must be able to integrate the sensemaking activities of its individual participants into effective organizational processes for learning and taking action.

⁸ This concept of knowledge also helps to make an important distinction between simply being aware of something (which means having data or information in our framework) and having knowledge, which implies actually knowing how to do something or how to cause something to happen.

⁹ Because modifying interpretive frameworks can require significant cognitive effort, sometimes people may prefer to ignore current events that are inconsistent with their current beliefs, to focus on other events that tend to corroborate current beliefs, or simply not to worry about the inconsistencies of current events with current beliefs.

The Five Learning Cycles Model of Organizational Learning

Our discussion of the role of knowledge management in organizational learning begins with the presumption that no one can manage a process that is not adequately defined and analyzed. The first step in developing a useful model of organizational knowledge and learning must therefore be to define and analyze the forms of knowledge and learning in an organization and the ways in which both can be interrelated and integrated in an organization's various processes.

Perhaps the most fundamental distinction in forms of knowledge involved in organizational learning is whether some knowledge (i) exists only as a belief in the mind of an individual, (ii) is shared among participants in a work group, or (iii) is accepted and used at the level of the overall organization. These three distinctions are represented by the Individual, Group, and Organizational Learning Cycles in the Five Learning Cycles model shown in Figure 2. Two other learning cycles -- the Individual/Group Learning Cycle and the Group/Organization Learning Cycle -- link the Individual, Group, and Organizational Learning Cycles. Let us consider each of these cycles in an organizational learning process.

Individual Learning Cycle. The Individual Learning Cycle at the bottom of Figure 2 indicates that the ultimate source of organizational knowledge is the knowledge (beliefs about causal relationships) that individuals in an organization develop through their own personal sensemaking processes. Of course, organizations develop and apply various kinds of frameworks for sensemaking, such as frameworks for gathering and interpreting data about markets and the like. In any organization, however, at least some individuals will usually have the critical capacity and imagination to develop their own interpretive frameworks that complement or even challenge existing organizational frameworks for sensemaking. Ultimately, the meanings that can be derived from data within an organization depend on the kinds of interpretations that each individual in the organization makes, which in turn depends on the deductive and inferential powers that each individual uses in interpreting data available to them within their own interpretive framework.

Thus, the wellsprings of organizational sensemaking -- and the learning that sensemaking leads to -- are the dual capacities of individuals in an organization both to apply existing interpretive frameworks and to generate new interpretive frameworks that improve or extend the sensemaking capabilities of existing frameworks. The Individual Learning Cycle represents the reservoir of individual interpretive frameworks that individuals in an organization use in their individual sensemaking processes.

Individual/Group Learning Cycle. Learning that results from an individual's personal sensemaking process may sometimes be applied directly in performing his or her task within the organization, but the work of most individuals is done in some group, team, network of peers, or other context for interacting with other people in the organization. Thus, before an individual's learning can become the basis for taking action in an organization, the individual's knowledge must be shared with the other individuals in a work group, so they can consider whether that individual's learning (i.e., his or her new beliefs) should be accepted as valid and become the basis for group action.

A critical step in an organization's learning is therefore the process through which individuals share knowledge with other people that they work with. This critical link between individuals and the groups they work with is represented by the

Individual/Group Learning Cycle in Figure 2. The Individual/Group Learning Cycle includes the repertoire of interactions through which individuals within an organization's various groups share (or may fail to share) their individual knowledge and learning with others in their group.

Group Learning Cycle. For individuals in a work group to perform their group tasks in a coherent, coordinated manner, they must share some core set of beliefs (i.e., knowledge) about how to get their task done. In performing individual and group tasks, people may learn by doing or learn by analyzing. Learning while doing a task can lead to practical, hands-on, "know-how" knowledge (Sanchez 1997) of how to perform a given task well or better -- the kind of learning that creates "repeatable patterns of action" that are the essence of an organization's capabilities (Sanchez, Heene, and Thomas 1996). Know-how knowledge developed by a group usually becomes embedded in a repertoire of routines that the group can perform on demand (Nelson and Winter 1982). Learning by analyzing a task, on the other hand, helps to develop more theoretical "know-why" insights into why a given task can be accomplished by taking certain kinds of coordinated actions (Sanchez 1997). Groups that are capable of performing analyses that lead to new know-why knowledge, however, may establish "double-loop" learning routines that enable them to redesign how they do their work process (Argyris and Schoen 1978).

The Group Learning Cycle in Figure 2 therefore represents both the repertoire of know-how routines that a work group has developed for executing tasks assigned to it, as well as any know-how and know-why learning capabilities a group has developed for improving the group's current routines for performing its tasks.

Group/Organization Learning Cycle. The outputs of the Group Learning Cycle may include three forms of learning. Groups may learn how to perform their own task better -- such as the process improvement learning that emanates from Quality Circles and other forms of continuous process improvement. This form of know-how learning may often be applied directly by the group to its own processes, but may sometimes involve process improvements that require support and resources from other groups in the organization (including groups of managers who allocate resources). Groups may also generate know-why learning that identifies new kinds of capabilities the group could develop and apply to its task. Implementing this form of learning may require new resources to build new capabilities and develop new routines, and these new resource requirements must be communicated to and accepted by the organization. Groups may also generate ideas for new kinds of tasks they could perform with current or new capabilities. This form of "know-what" learning (Sanchez 1997) must usually be shared with the organization in order to gather support for the group to undertake new kinds of activities.

The Group/Organization Learning Cycle in Figure 2 therefore represents the processes by which groups communicate their new know-how, know-why, or know-what knowledge to the larger organization (i.e., to other groups in the organization) in efforts to acquire the resources to put such knowledge into action. The Group/Organization Learning Cycle includes the repertoire of processes that groups in an organization can use in communicating their knowledge to other groups in the organization in efforts to gather organizational resources needed to implement their new knowledge.

Organization Learning Cycle. At the top of the five learning cycles is the Organization Learning Cycle. In this cycle, the groups that interact in an organization (including -- but not limited to -- groups of managers) exchange group knowledge and

learning in an effort to have each group's knowledge accepted as valid and become a basis for taking action in the organization. Note, however, that the position of this learning cycle at the top of the Five Learning Cycles does not imply that this form of learning is the exclusive concern of top managers in an organization, as I clarify below. Rather, the Organization Learning Cycle represents the processes in an organization through which groups compete to influence and, if possible, to determine the sensemaking processes used in an organization. In principle, all groups within an organization may potentially play a role in this process.

Management's Role in the Five Learning Cycles

It is important to emphasize that the vertical array of the Five Learning Cycles in Figure 2 does not represent an authority hierarchy, with the ideas of front-line workers at the bottom and the ideas of top management at the top. As noted earlier, the critical distinction being made in this model is whether some knowledge is a belief that is held by an individual, that is shared by a group within an organization, or that is accepted and used widely by groups within an organization. Thus, in this model of organizational learning, the beliefs of the factory-floor worker and the beliefs of the CEO of an organization are fundamentally in the same position: they are beliefs in the mind of an individual. Though a CEO may have certain advantages not available to the factory-floor worker, the ideas of both individuals must navigate the same organizational learning process and overcome essentially the same challenges if either individual wants to have his or her beliefs accepted by their work group and, ultimately, by the organization at large. In effect, all individuals with beliefs that they want to propagate as a basis for action within an organization must find a way to clear the cognitive hurdles of group and organizational acceptance in order to manage those beliefs "into good currency" within the organization (van de Ven 1986), as suggested by the upward arrow "Emergence of New Organizational Knowledge" in Figure 2.

In effect, the Five Learning Cycles model presumes that managers cannot dictate the beliefs that "knowledge workers" will genuinely accept and commit to act on in an organization. Nevertheless, even though individual managers cannot impose their beliefs on others in the organization by fiat as it were, they do have an important source of influence on the knowledge base and learning processes of an organization, because top managers can usually decide which interpretive frameworks will be institutionalized as the "official" or "established" frameworks for sensemaking in the various systems and processes of the organization. For example, top management may decide to adopt a customer-relationship management (CRM) software system that will determine, at least in part, how customers are described, categorized, communicated with, and otherwise managed by groups and individuals in the organization. In this way, certain interpretive frameworks and the knowledge on which they are based may be cascaded down from the organizational to the group and ultimately to the individual level in the model, as suggested by the downward arrow "Integration of New Knowledge into Organization" in Figure 2.

Although establishing interpretive frameworks selected by top management by no means assures that all groups and individuals in the organization will accept and use those frameworks, such frameworks in effect establish the orthodoxy against which alternative interpretive frameworks will be evaluated and against which they sometimes must compete.

In a learning organization, managers will understand the dynamics that drive all five learning cycles and will adopt knowledge management practices that assure that the Five Learning Cycles function effectively and sustain the overall “learning loop” of continuous organizational learning suggested by the four arrows surrounding the Five Learning Cycles in Figure 2. Managers must support and stimulate the generation of new ideas by individuals (the bottom horizontal arrow), the progression of new ideas upwards to group and organization levels (the left upward arrow), the adoption of new ideas by embedding them in the organization’s systems and processes (the top horizontal arrow), and the implementation and testing of new knowledge in the systems and processes an organization uses.

I next suggest a number of fundamental issues and practical challenges that managers must understand and manage well in order for the Five Learning Cycles to function well in driving the learning dynamics of an organization.

5. Issues and Challenges in Managing the Five Learning Cycles

Both through academic research into the psychological and social dimensions of the Five Learning Cycles model and through practical applications of the model by managers seeking to improve learning processes in their organizations, a number of important issues and challenges in managing the Five Learning Cycles in organizational learning have been identified. I next consider some of the most important (by effect and frequency of occurrence) of the issues and challenges likely to arise in each of the five cycles.

Managing the Individual Learning Cycle

How an individual *learns* -- how a person manages to move beyond the beliefs that form his or her current interpretive framework to form new beliefs that modify that interpretive framework -- is a question that will no doubt be studied for decades to come. Yet today we do understand some things about individual learning processes that managers who want to stimulate and sustain processes of organizational learning should attend to.

We know, for example, that learning fundamentally occurs in the minds of individuals as they evolve their personal interpretive frameworks for making sense of the world. As Stein and Ridderstråle (2001) describe it, learning begins with a process of “internal simulation” that causes a person to draw on past experience in trying to interpret and assess the significance of current events and thereby to be better prepared to understand and even anticipate future events and circumstances. This internal simulation is precipitated by events and situations that do not neatly fit within the understandings that comprise a person’s current interpretive framework and that thereby invite or sometimes “force” an individual to *imagine* possibilities that lie beyond the current content and limits of his or her interpretive framework.

Stimulating individual learning processes in this mode raises two key issues for managers. The first is the need to stimulate *metaphorical learning*, and the second is the need to build an organization’s capacity for encouraging the emergence of *divergent*

interpretive frameworks within an organization. The two issues are interrelated in important ways, as I now explain.

To understand what metaphorical learning means in a managerial context, it is useful to distinguish it from basic education and from training. For the purposes of this analysis, let us say that *education* is the acquisition of a base of facts and concepts and a set of skills in logical analysis and reasoning that together form the foundation for the interpretive frameworks of “educated people” in a given society. Similarly, let us characterize *training* as processes for improving an individual’s skills in the performance of specific kinds of tasks. When managers offer employees (including themselves) opportunities to pursue further education, they are in effect offering people the chance to acquire additional familiarity with and understanding of the “conventional wisdom” that is regarded as “knowledge” in a given society. Training programs deepen specific skills that are regarded as useful within the conventional wisdom of a society and its business culture. Both of these forms of learning, however, are fundamentally *convergent* in nature -- they lead individuals to develop personal interpretive frameworks that share deep, fundamental assumptions about “how the world works” in general and in some specific aspects.

By contrast, metaphorical learning is learning that challenges and eventually changes the deep assumptions of individuals in a given social setting about how the world works -- or could work. Metaphorical learning presents individuals with situations that have some deep structural similarity or fundamental points of relevance to the kinds of situations they have been educated and trained to interpret in certain ways -- but then analyzes those situations with concepts and rationales that are different from those that currently form an individual’s interpretive framework. In effect, metaphorical learning opportunities offer new conceptual frameworks and ways of reasoning about situations that demand that individuals “stretch” beyond their current understanding to see and interpret even familiar things in a new way.

An example of metaphorical learning is the use of cases in executive development programs that lie outside the industries with which participants have experience, or that introduce examples of atypical firm strategies and tactics within familiar industries. The new concepts and ways of reasoning introduced in such cases are intended to help program participants develop new ways of representing and thinking about their own familiar business situations. This intent is also evident in “best in world” benchmarking processes. For example, when Chrysler decided to fundamentally rethink the way the company conceives of and designs customer service strategies, it did not just look to excellent customer service firms in the automobile industry. Instead, Chrysler benchmarked its customer service concepts and strategies against Federal Express -- a firm recognized as a world leader in creating and maintaining very high levels of customer service and satisfaction. To benefit from this benchmarking, Chrysler managers had to engage in metaphorical learning -- recognizing how Federal Express’ ways of conceptualizing and designing customer service in its express package business could be applied in fundamentally rethinking how Chrysler conceptualizes, designs, and delivers customer service in the automotive industry.

When metaphorical learning happens in the minds of individuals in an organization, it is likely to lead them to recognize and question the deep assumptions and engrained practices of their organization, and to propose new ideas that lie outside of their organization’s current interpretive frameworks for determining what the organization

should do and how to do it. Therein lies the second managerial challenge in stimulating the Individual Learning Cycle. Once some individuals do succeed in going beyond their current interpretive frameworks to imagine new possibilities for taking action in the world, they may try to suggest these new possibilities to their peers in the organization -- as I have discussed above in the Individual/Group Learning Cycle. If their ideas begin to gather support from their own group and other groups in the organization, this process adds diversity to the interpretive frameworks in the organization -- and thereby begins to compete against the established orthodoxy of interpretive frameworks in the organization.

The emergence of diverse interpretive frameworks in an organization should expand the sensemaking capacity of an organization, enabling it to sense new kinds of opportunities and threats, and to imagine new ways of responding. At the same time, taking organizational action requires that individuals have a “critical mass” of shared beliefs in their interpretive frameworks sufficient to serve as the basis for coherent collective action. Too much diversity in the interpretive frameworks of an organization may make it difficult or impossible for the organization to take effective action. Thus, managers must try to maintain a *dynamic balance* between generating new interpretive frameworks to expand sensemaking capacity and achieving sufficient convergence in interpretive frameworks to form a basis for effective collective action. While no simple rule exists to help managers determine what the optimal dynamic balance would be in their organization, it is essential to understand that metaphorical learning and the diversity in sensemaking that it generates are the wellsprings of organizational learning, and thus must be systematically supported even while seeking sufficient convergence to achieve collective action.

Managing the Individual/Group Learning Cycle

The essential concern in managing the Individual/Group Learning Cycle is maintaining the willingness of individuals to share their knowledge with other people in their work group or peer network in an organization. Understanding how to maintain the willingness of individuals to share their knowledge in an organization starts with the recognition that individuals may perceive significant disincentives for sharing their knowledge. Individuals may decide not to communicate what they know to their peers and work group, because they fear that fully disclosing and explaining what they know may diminish their perceived value and importance in an organization. In the extreme case, an individual may even fear being replaced by a less experienced person (or even a computer!) if they fully explain how they do analyses, prepare designs, organize a work process, make decisions, etc.

Ericsson and many other companies have experimented with the creation of specific incentives for individual knowledge sharing and with the use of various socialization processes to encourage individuals to communicate what they know more freely to their coworkers (Stein and Ridderstråle 2001). Other companies have undertaken to fundamentally redefine the employment relationship with their key knowledge workers in ways that would allay any fears of negative consequences that such workers would have if they were to share their individual knowledge. An example may illustrate why such a fundamental rethinking of the employment relationship may be needed.

In the mid 1990s I was helping a global electronics firm define and document the way one of its product divisions creates new product designs. A key part of this design process was defining the architecture of the next generation product -- i.e., the kind of

components to be used in the product and the way the components would be interrelated in the product design. One senior designer was always given this critical task, because his architectures always seemed to work well. When I met with the designer and explained that I had been asked by the product division management to document the “design rules” that he followed in creating new architectures, he at first appeared to be quite flattered that his skill in this area was recognized at such a high level in the organization, and he was very cooperative.

As we proceeded to discuss and write down the design rules that he followed, however, his attitude began to change, and soon he asked me to explain again exactly why management wanted to document the design rules he had developed. I explained again what his management had asked me to do, but soon thereafter he said that he had already told me everything that he could explain, even though he had earlier mentioned several other design rules that we had put on a list to discuss. It became clear that the designer was beginning to worry that if all the design rules he knew and followed were made explicit, perhaps he would be replaced by a junior designer or even a computerized design program. Eventually, only personal assurances by top management that they had no intention of replacing him -- and a widely publicized redefinition of his role in the organization as leader of the division’s architecture development and improvement process -- persuaded him that there was nothing to fear in revealing his current knowledge, and much for him and the organization to gain by continuously developing and building on that knowledge.

As more organizations recognize the fundamental importance to organizational learning of converting the tacit personal knowledge of their key knowledge workers into explicit organizational knowledge, organizations will increasingly have to rethink, redefine, and clearly communicate employment relationships with their key knowledge workers that ensure that those individuals will not withhold knowledge that is vital to the organization.

Managing the Group Learning Cycle

The essential concern in managing the Group Learning Cycle is assuring that work groups will generate and apply new knowledge in an effective way. Effective management of this learning cycle requires recognizing the inherently social nature of individual learning processes -- and the resulting potential for individuals in a work group to fall into the cognitive trap of “group think.”

The ongoing formation of a person’s interpretive framework for sensemaking is significantly influenced by the social interactions and individual experiences. In work processes within an organization, an individual is likely to seek a measure of “cognitive congruence” with the co-workers and peers he or she interacts with frequently (Merali 2001). Individuals evaluate the effects of their actions on the people in their social context and tend to adopt patterns of thought and norms of behavior that are compatible with the ways of thinking and acting of other people in their social context. Thus, each individual’s interpretive framework is co-evolving with a social context and seeks to achieve cognitive congruence that leads to a cognitive equilibrium with that context.¹⁰ The social impulse to seek cognitive equilibria in the evolution of human interpretive

¹⁰ The extent to which an individual will seek a cognitive equilibrium with his or her social context in an organization may of course vary significantly with the personality of each individual, as well as with the tolerance for conflict within the culture of an organization.

frameworks has important practical implications for managing individual/group learning interactions.

First, left to their own, the individuals in a work group are likely sooner or later to converge towards a set of beliefs that are compatible, at least as they affect work processes the group must perform. While this may be helpful and even essential in achieving efficient coordinated action, the desire of individuals to achieve and maintain cognitive equilibrium can lead a work group into cognitive rigidity and “group think” that is resistant to change in ideas once an equilibrium is attained. Stimulating the learning processes of individuals and the flow of new ideas from individuals into work groups is therefore likely to require managerial interventions to upset established cognitive equilibria at the work group level.

Various managerial interventions may help to overcome group think and expand the sensemaking capacity of a work group. The composition of a work group may be changed, for example, by assigning new individuals to the group who will bring new interpretive frameworks that will destabilize and eventually shift the group’s current cognitive equilibrium. A group may also be given a task that would be impossible to perform while staying within its current cognitive equilibrium. For example, in the 1980s Honda’s management wanted to reinvigorate its product development department, which was efficient in performing its basic development task, but was showing signs of deepening group think by developing a succession of new car designs that were increasingly similar and familiar. To upset the cognitive equilibrium in its development department, Honda management launched a new development project for a “City” car whose requirements for roomy interior space, compact external dimensions, exciting driving performance, outstanding fuel efficiency, and other design objectives simply could not be met through the current approaches of its designers. Setting this challenging goal forced Honda designers to “think outside the box,” to abandon familiar design concepts and methods, and to seek a new set of design concepts and processes outside its current cognitive congruence. The result was a bold and innovative design that quickly became an icon for the young generation of urban Japanese.

Cognitive congruence helps the individuals in a group work together in a coherent way and thereby become efficient in performing a familiar task, but it is also likely to prevent a group from seriously considering the potential gains that could result from exploring alternative ways to perform a current task or from imagining new tasks it could perform that could increase the group’s contribution to the organization. Thus, ironically, the potential gains from managerial interventions to disturb cognitive equilibria are likely to be greatest in work groups that are performing their current tasks most efficiently, because such groups will probably have achieved the greatest degree of cognitive congruence in their cognitive equilibrium. Like Honda’s managers, managers must therefore carefully evaluate whether the benefits derived from the efficiency with which a group is performing its current task (i.e., “doing things right”) outweigh the potential gains in effectiveness (“doing the right things”) that disturbing an efficient group’s cognitive equilibrium might bring to an organization.

Managing the Group/Organization Learning Cycle

The central issue in managing the Group/Organization Learning Cycle is encouraging and maintaining interactions between work groups in an organization that

can benefit from sharing their knowledge with each other and that have the potential to build new organizational knowledge (shared beliefs) through such interactions.

Virtually any approach to allocating tasks within an organization design -- whether based on functional, product, regional, or other divisions of labor -- will to some extent create “silos” within an organization by focusing various groups on their own specific tasks. As groups perform their tasks, however, they may develop knowledge that would be useful to other groups in the organization. Although groups may be connected organizationally by basic material and information flows necessary to maintain coordination among tasks, exchanges of knowledge among groups are unlikely to occur in any systematic way unless managers overtly cause such interactions to happen. The formation of multifunctional project teams is becoming an increasingly important way of fostering knowledge exchanges among groups within an organization, as the following example illustrates.

Raub (2001) studied how a large Swiss retailer used project teams to develop new organizational knowledge that enabled the firm to achieve new forms and levels of environmental performance. Raub describes the process as a set of interactions between the firm’s top managers and several groups, undertaken in three phases. In the first phase, the firm’s managers determined that rising customer expectations about the environmental performance of firms made it strategically necessary for the firm to improve its environmental performance, but the managers also understood that they did not know enough about the detailed operations of the firm to identify the specific operational areas with the greatest potential for improving environmental performance. The managers therefore formed several expert groups to help the managers define specific strategic options for environmental performance improvement in the major areas of the firm’s operations. Each group had the detailed knowledge of an operational area needed to define specific environmental issues in each major area of the firm’s operations, to propose ways of dealing with those issues, and to identify specific forms of knowledge within and external to the organization that could be brought to bear on those issues.

In the second phase, a “coordination team” was formed to promote exchanges of knowledge and information between the expert groups. Working with the expert groups, the coordination team allocated specific areas of activity and responsibility to the groups, categorized what each group identified as its relevant knowledge, and established organizational structures and processes for systematically making this knowledge visible and accessible by the groups to promote the transfer of relevant knowledge among the groups.

The third phase involved intensive interactions among top managers, the coordination team, and the expert groups to decide how the new knowledge developed by the groups would be put into action. Improvement projects identified by the expert groups were evaluated in detail, selected for action, and prioritized. Plans for coordinating capability development initiatives recommended by the groups were drawn up, and a top management monitoring process was established to assure that development and deployment of the new capabilities proceeded on schedule.

Raub’s study suggests that building new organizational knowledge involves two basic kinds of group-based managerial initiatives. First, managers may be able to generate new organizational knowledge simply by creating opportunities for groups in their organization to interact in new ways that allow their current group knowledge to be

shared, evaluated, integrated, and then applied more widely in the organization. Second, managers may also stimulate the formation of new organizational knowledge by creating multifunctional groups that are given the task of working together in (and sharing joint responsibility for) creating new organizational knowledge that becomes the basis for building new organizational capabilities.

The Organization Learning Cycle

In the Five Learning Cycles model, the creation of organizational knowledge occurs when the knowledge of one or more groups in an organization is accepted as valid and adopted sufficiently widely within an organization to become the basis for organizational action. In becoming the basis for organizational action, knowledge may become embedded in an organization in a number of ways that profoundly affect the way groups and individuals in the organization work. Of particular importance in terms of its significant and long-lasting impact on the way an organization works is the knowledge embedded in the accounting and control systems of an organization, because these systems embody knowledge that is the basis for defining and measuring performance in the various tasks carried out in an organization. A key task of managers in managing the Organizational Learning Cycle, therefore, is assuring that the control systems used in their organization are based on knowledge that is the most appropriate knowledge for meeting the demands of their organization's current competitive environment.

Control systems include all formalized processes for coordinating an organization's activities and for monitoring, measuring, and assessing those activities. Control systems gather the data that are generated by an organization and define how those data are interpreted formally within an organization to create information that is "officially" recognized within an organization as relevant in managing an organization. Control systems are therefore de facto interpretive frameworks that shape managers' and other employees' perceptions of how their organization is performing in its environment. Control systems take considerable time and effort to develop and put in place, and organizations therefore are often reluctant to adopt significant changes in their control systems, even when their competitive environments are undergoing major changes. Managers must therefore continually question whether the control systems put in place yesterday -- based on knowledge of how to compete effectively in yesterday's competitive environment -- are still effective in helping an organization compete in today's competitive environment.

In his study of Groupe Bulle, a leading French computer company in the 1980s, Lorino (2001) documents the profound impact of control systems on organizational sensemaking and managerial decisionmaking. In the 1970s and early 1980s, competition in the computer industry was driven by hardware performance, quality, and cost. Competitive success went to those firms that could develop high-performing computers (measured by calculations per second, for example) and cost efficiently manufacture computers with high quality levels (measured by low defect rates, for example). To monitor its organizational performance in this competitive environment, Groupe Bulle developed a sophisticated set of cost measures used in managing hardware development, production of components, and assembly of mainframe computers. Management processes were defined to achieve continuous improvements in those cost measures, and advancement in the company went to those managers who could deliver performance in continuous cost reductions and efficiency improvements, as determined by the measures provided by the cost control system.

By the mid-1980s, however, the competitive environment in the computer industry had changed, and there were many capable producers offering high quality, high performing computers at competitive prices. In an industry in which hardware had largely become a commodity, offering customized “turn key” software solutions for individual customer needs became the key to competitive success. Nevertheless, Groupe Bulle continued to rely primarily on its established hardware-focused cost control systems to guide and monitor performance within the organization. The result was that the firm’s management processes continued to focus on managing cost reductions in hardware development and production, while the primary source of competitive advantage had shifted to superior knowledge of how to create customized software solutions quickly and efficiently.

Of course, some managers within Groupe Bulle recognized the growing gap between what its control system was measuring and what mattered in the firm’s competitive environment. But as Lorino points out, embedding organizational knowledge in the form of an official, institutionalized interpretive framework like an important management control system pressures individuals to adjust their personal interpretive frameworks to conform to the view of “reality” embedded in the institutionalized framework. This pressure not only constrains the sensemaking processes of individuals and groups within the organization, but also shifts “the burden of proof” in arguing for new or modified interpretive frameworks onto those seeking change. Thus, institutionalizing knowledge and related interpretive frameworks in an organization’s control systems helps an organization to apply and extend that knowledge, but also tends to discourage development of new kinds of organizational knowledge and interpretive frameworks.

Managers must therefore be alert to the need to create and sustain a dynamic cognitive equilibrium between processes for applying and extending yesterday’s knowledge (for example, through use of established control systems) and adapting the knowledge base of the organization to meet today’s and tomorrow’s competitive conditions. To this end, along with their use of current control systems, managers should implement what Lorino calls an “inquiry procedure” -- a periodic process for open questioning of an organization’s current control systems and the usually implicit knowledge that underlies them -- to assure that an organization’s interpretive frameworks are effective in monitoring an organization’s performance in its current competitive environment.

Concluding Comments

The fundamental knowledge management concepts and processes discussed here reflect a profound and growing shift in management thinking and practice today. This shift represents a clear evolution away from traditional management concepts based on command and control to concepts of management in which managers are more importantly concerned with developing, supporting, connecting, and empowering an organization’s employees as knowledge workers. In effect, knowledge management theory and practice today is part of a broad movement away from the presumption that management is the sole “brain” of the organization to the assumption that building a broadly based *collective intelligence* among all participants in an organization (including, but not limited to, managers) is the essential task of management.

This shift, and knowledge management's central role within it, implies a profound change in the way managers lead organizations. Knowledge management presumes that managers are not the only people who can have useful ideas in an organization. Managers must therefore create broadly based knowledge sharing and learning processes that stimulate and draw on the learning of all individuals and groups in generating the best possible flow of new ideas for their organizations. In the knowledge economy, therefore, managers cannot lead by the power of their formal authority, but rather must lead by stimulating and harnessing the power of ideas generated by learning processes throughout their organization. Moreover, in an economy in which knowledge workers have mobility, managers cannot lead by "dictating" belief in a given idea or set of ideas. Rather, to create real commitment and motivation in organizational action, managers must first create active organizational learning processes in which all knowledgeable employees can become involved and contribute their ideas.

What this means in practice is that managers must increasingly take responsibility for committing their organizations to action not on the basis of their own personal ideas, but on the basis of the best ideas generated by the learning processes of their organization. For managers schooled in the traditional command and control concepts of management and derived concepts of leadership, acting on ideas generated by others in the organization may seem inappropriate and inordinately risky. For managers who understand what it means to lead by the power of ideas, however, acting on the ideas that their organization generates through its learning processes is not only the best way to try to achieve competitive success -- it may well be the only way.

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