: knowledge management and organizational learning essay

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Lund Institute of Economic Research Working Paper Series Knowledge Management and Organizational Learning: Fundamental Concepts for Theory and Practice 2005/3 Ron Sanchez Ron Sanchez, Professor of Management Copenhagen Business School, Solbjergvej 3 – 3rd floor, DK-2000 Frederiksberg, Denmark, dk Linden Visiting Professor in Industrial Analysis, Institute of Economic Research, Lund, Sweden 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. Jel-codes: M1, M53 Keywords: Knowledge management, Organizational learning, Learning cycles ISSN 1103-3010 ISRN LUSADG/IFEF/WPS-005/3-SE 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 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. 1See 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. 2 Figure 1 Basic Assumptions in Personal versus Organizational Knowledge Management Approaches Personal Knowledge Approach Organizational Knowledge Approach Knowledge is personal in nature and very difficult to extract from people. Knowledge must be transferred by moving people within or between organizations. Learning can only be encouraged by bringing the right people together under the right circumstances. Knowledge can be articulated and codified to create organizational knowledge assets. Knowledge can be disseminated (using information technologies) in the form of documents, drawings, best practice models, etc.

Learning processes can be designed to remedy knowledge deficiencies through structured, managed, scientific processes. 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. 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. 3 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 4 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 esign 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). 6 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.

. 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 Ridderstrale 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. 7 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. 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 5Patent, 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. 8 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 10 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 volving 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 ManagementWhether 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. 11 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 cycles7 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. 12 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. 13 Figure 2 14The 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 ndividual 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-andeffect 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 5 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 ertain, 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-andeffect 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 9This 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. 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. 6 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 17 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 18 earning 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. 19 In a learning organization, managers will understand the dynamics that drive all five learning cycles and will adopt knowledge management practices that ssure 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 Ridderstrale (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 0 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 “ kno