

Managing For Sustainable Innovation

By Mark W. McElroy

June, 2000

Second-Generation KM

In an earlier paper of mine (*Knowledge Management* magazine, October, 1999), I chronicled the unfolding arrival of second-generation knowledge management. In doing so, I described several of its distinguishing characteristics, including its hallmark recognition of the distinction between supply-side versus demand-side knowledge management. Supply-side strategies tend to focus only on the distribution of existing organizational knowledge, and are usually technology-centric in their orientation. Demand-side strategies, by contrast, focus instead on satisfying organizational needs for new knowledge, and therefore tend to be learning- or innovation-oriented. One focuses on *knowledge sharing*; the other on *knowledge making*. Second-generation KM, unlike its first-generation supply-side cousin, attempts to strike a balance between supply- and demand-side thinking by addressing needs on both sides of the line. Only second-generation KM takes a measured approach in this way.

Over the past few months, the development of second-generation KM has continued to unfold. In addition to theory, we now have some tangible practice models before us which can be used by developers of knowledge management strategies to help fulfill the promise of second-generation thinking – that is, continuous learning and sustainable innovation. This is the allure to what Arie De Geus, former Head of

Planning for Royal Dutch/Shell referred to as, “the only sustainable competitive advantage” in business – “the ability to learn faster than your competitors.” Regardless of its other advantages, first-generation, supply-side KM, with its myopic focus on capturing, codifying and sharing existing information, offers a poor prescription for improving organizational learning and business innovation. In the practice of knowledge management, only second-generation thinking tackles these issues. The question, then, becomes how to practice second-generation thinking. What concrete steps can an organization take to not only share knowledge more effectively, but *create it* more prolifically, as well?

A Social Process

The answer to the question of how to improve organizational learning and innovation lies in the recognition of knowledge production as a social process. People don’t innovate, organizations do! Clearly, individual creativity plays a role in the process, but innovations spring forth from the efforts of groups, not individuals. And how could it be otherwise? In order for an idea to become widely deployed, it must first become widely accepted. Wide acceptance, in turn, implies acceptance by groups and whole social systems. The process by which new knowledge is formulated by individuals, validated by communities, and embraced into practice

by organizations is what we call innovation.

Another of the key principles outlined in my earlier paper on second-generation KM was the concept of the knowledge life cycle. According to that idea, organizational knowledge is produced, validated and then integrated within the overall behavior of a social system. In other words, new knowledge is produced by individuals collaborating in groups, who collectively formulate new ideas, validate them, and then propagate their knowledge across the organization such that the individual and collective behavior of all of the organization's members changes in accordance with the new knowledge. Not all organizations engage in this pattern of behavior effectively, but according to second-generation thinking, all organizations are naturally inclined to do so, nonetheless. Why is this?

What many people may find surprising is that most of the ideas bound up in second-generation KM are firmly rooted in complexity theory. Now seen as a valuable source of insight in understanding how living systems function – including human organizations – the science of complexity has a great deal to say about the nature and role of social cognition in the conduct of human affairs. Indeed, second-generation KM owes much of its seminal thinking to complexity theory.

Of particular relevance to KM in the *science* of complexity is a body of thought known as *complex adaptive systems theory*, or CAS theory. CAS theory holds that living systems (i.e., organizations made up of living, independent agents, such as people) self-organize and continuously fit themselves, individually and collectively, to ever-changing conditions

in their environment. They do this, the theory says, by modifying their knowledge, which, in turn, leads to changes in behavior. In short, people and organizations practice their knowledge. If you ever want to determine what an organization knows, all you need to do is observe its practice. Regardless of how else it might be expressed, organizational knowledge is always articulated in the form of organizational behavior and can be deciphered, accordingly.

First Principles

On the assumption that human organizations are complex adaptive systems, general principles on how CASes make and share their knowledge ought to be of instructional value in our attempts to determine how we can help organizations become better learners and innovators. Many models have been developed for this purpose, mostly by the Santa Fe Institute in New Mexico, which is by far and away the citadel of thinking in complexity theory. Having inspected these models and immersed myself in them for the past three years, I have come to the conclusion that not only is CAS theory germane to management in business, but that there are four fundamental areas of knowledge-related behavior in human social systems, which if properly attended to can yield significant gains in learning, innovation and competitive performance in the marketplace. It is the care and feeding of these four dimensions of organizational behavior and make-up, then, that practitioners of second-generation KM should be focusing on. Here they are:

- *Embryology (of knowledge)*: The embryology of knowledge refers to the extent to which individuals in an organization are free to pursue their own learning agendas, and the degree to which they are further free to self-organize into knowledge-making communities of interest, or practice.
- *Politics (of knowledge)*: The politics of knowledge-making, diffusion and use in an organization can have a dramatic impact on the overall rate of business innovation and the quality of ideas produced. Most organizations tend to be organized oligarchically around these functions. Management teams and their administrative designates, including R&D functions, Product Planning and so forth, tend to monopolize innovation while the rest of the organization is relegated to knowledge-following and a regimen of obedience.
- *Intellectual Diversity*: The degree to which a business supports a plurality of ideas, even dissident ones, will, too, have a material impact on its overall performance in innovation. Firms which seek diversified intellectual ethnographies tend to be more innovative than those who don't.
- *Connectivity*: The density of communications networks are also important to business innovation. The degree to which a culture values rich communications and connectivity between individuals and groups will, therefore, materially affect the rate and quality of its innovation.

These four areas of organizational life are the most important variables in human social systems when it comes to how well an organization learns and produces new knowledge. Together, they reflect certain principles that form

the foundation of practice in second-generation thinking. In other words, these are our *first principles*. It is critically important that the practice of second-generation KM – or the practice of anything, for that matter – be predicated on a set of explicitly held principles, since a failure to do so carries the risk of embarking on strategies which might be contrary to principles *actually* held, but which have not been fully expressed (i.e., tacitly held). Exposing the inconsistencies between what we *say* we stand for versus the implications of what we actually *do* can be very illuminating for even the most carefully managed firm.

Policies As Leverage

Once the matter of first principles has been sorted out, practitioners should next focus on how best to get knowledge-related social processes moving in the right direction (again, innovation is a *social* process, not an individual one). In other words, practitioners must focus on how knowledge-related behaviors and conditions in the organization can be changed, where needed, such that they become more fully aligned with first principles. There are two ways to do this. One is to simply order people into complying with a set of new behaviors by declaring new sets of rules. (Incidentally, this rule-based approach is the one typically used by practitioners of first-generation thinking: “If we order people to contribute knowledge to the KM system, they will. If they don’t, we’ll induce them to do so using incentives and rewards – or punishments. That should do the trick.”)

Unfortunately, the best we can hope for under this approach is

temporary compliance, and a real headache of enforcement.

The second approach is to elicit the desired behaviors through policy. In other words, rather than order people into forming communities of interest, adopt a policy, instead, which endorses the self-organization of workers into communities and which offers assistance to employees who wish to do so.

Similarly, a policy such as 3M's "fifteen percent rule," which makes it possible for most employees to spend up to 15 percent of their time engaging in self-directed learning, encourages people to pursue their passions, but doesn't command it.

I am convinced that because of the temporary compliance problem associated with the rule-based approach, constructive policy-making is the best means of creating an environment where sustainable innovation is possible. The practice of second-generation KM, then, ultimately takes the form of devising, implementing and enforcing new policies (knowledge-related policies, that is) which give rise to desired behaviors, but which does not command them.

Practice Implications

Examples of policy choices for implementation in each of the four areas of interest follow below.

- *Embryology (of knowledge)*: My belief in the critical importance of the four factors above as the quintessential determinants of how well an organization can learn and produce new knowledge is based on a fairly simple model of how learning naturally happens in human social systems. Rooted in CAS theory, this model begins with the assumption that

self-organized groups (aka, communities of interest, practice, etc.) are the fundamental source of new knowledge in any organization. Absent a healthy *community of communities*, one should expect to see lower levels of innovation than would otherwise be possible. Therefore, policies which invite and support the formation of communities – but which do not prescribe them – are extraordinarily important to the Embryology of knowledge.

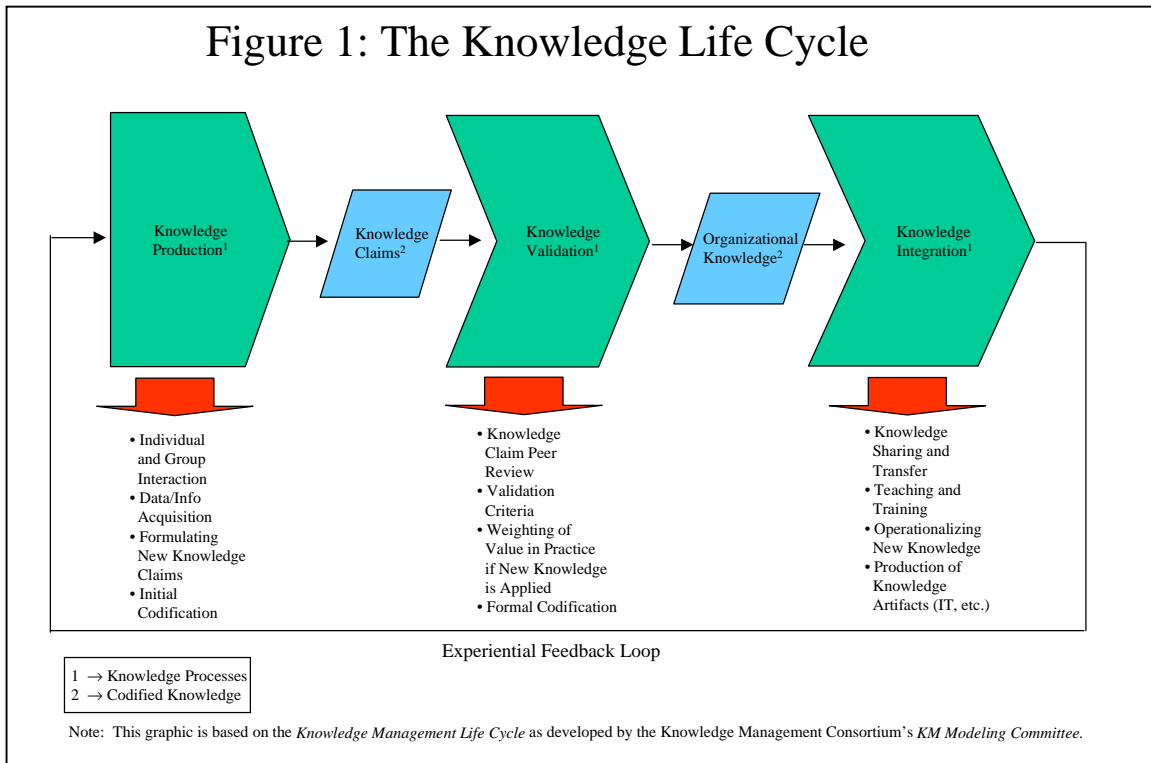
Next in the formula should be policies which make it possible for individuals to define their own learning agendas with unflagging organizational and management support. This is also part of the Embryology dimension, because as Peter Senge remarked in his book, *The Fifth Discipline*, "Organizations learn only through individuals who learn."

Just how far to extend this policy for unbridled learning is a subject for experimentation in the field, but suffice it to say that training programs which are rigidly prescribed and enforced from the top of an organization are arguably counter-productive when it comes to eliciting higher rates of business innovation. Strict training regimes, and the certification programs that often accompany them, are little more than knowledge enforcement schemes imposed from above. As such, they tend to reflect a central authority's view of what's important to know, thereby relegating employees and workers to knowledge-followers, but never knowledge-makers. I personally prefer an approach which favors individually-determined training programs over prescribed ones, although I recognize the need for both.

- *Politics (of knowledge)*: The next category of policies is the political one [Politics (of knowledge)]. Here, I should begin by reporting a minor update to the knowledge life cycle model described in my earlier paper. In the old model, the cycle was composed of three phases: *knowledge production*, *knowledge validation*, and *knowledge integration* (see Figure 1).

model as *knowledge integration* – influence diffusion, or the degree to which new knowledge leads to transformations in practice.

Last is the knowledge use (or application) phase, which refers to that stage in the life cycle of knowledge in which knowledge is actually practiced, put to use, or operationalized.



In the new model, validation is treated as merely part of the creation process, and is therefore incorporated within the knowledge production phase, accordingly (see Figure 2).

Next comes a new phase which was implicit in the old model, but is now explicitly acknowledged in the new one: *knowledge diffusion*. Once knowledge is produced, it diffuses across an organization at different rates depending on what steps, if any, people take to ensure its propagation. These steps – referred to in the old

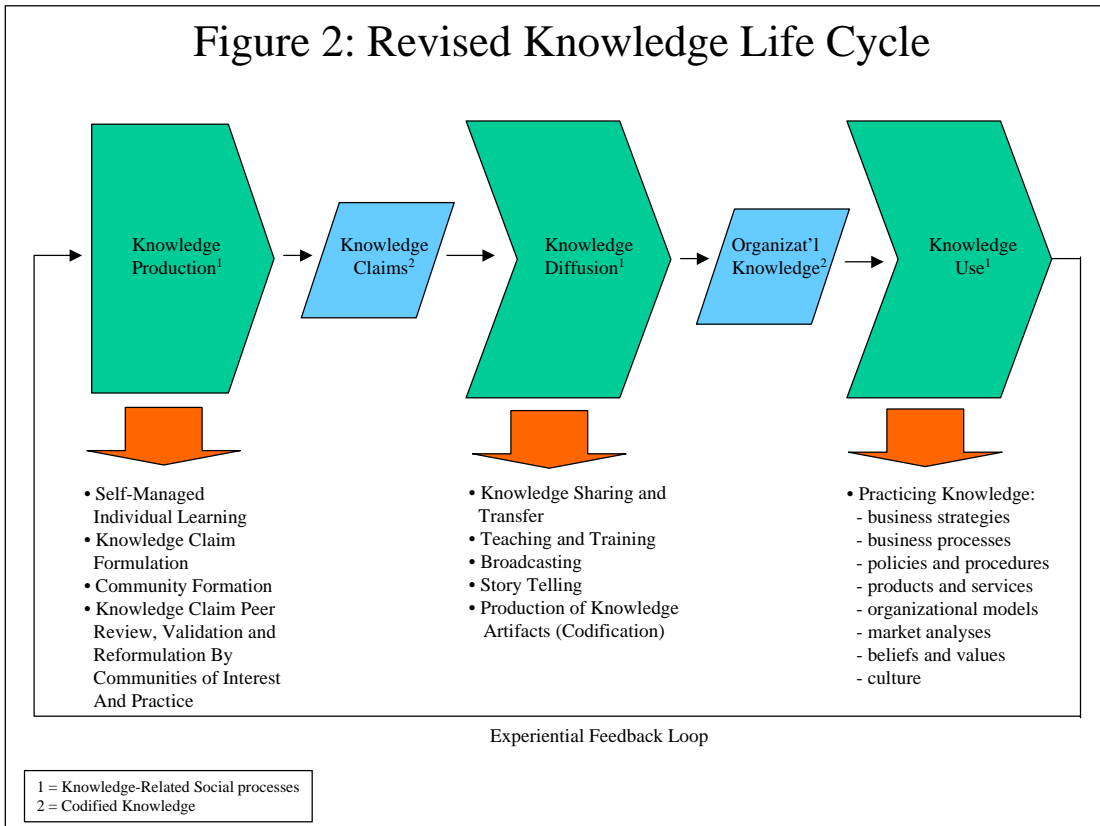
Given the new model of *knowledge production, diffusion and use*, policies in the area of Politics generally address the question of who gets to participate in the process; under what circumstances; and why? Here, most firms tend to operate as oligarchies when it comes to the politics of knowledge. A central authority of some kind, such as a management team or a board, makes the knowledge that everyone else is expected to practice. In addition, they tend to exploit their executive power by

monopolizing knowledge production, regulating diffusion and mandating that only certain approved knowledge be used or practiced by workers.

This need not be the case. There's no reason why management couldn't be just as effective in running the day-to-day affairs of a business without the attendant monopoly on knowledge-

any case, all policies which deal with the distribution of power to create, share, use and own knowledge fall into the category I refer to as the Politics of Knowledge.

- *Intellectual Diversity*: The third area of policy is Intellectual Diversity. I'll use two extreme cases here as examples. There's a big difference between



making found in most firms today. After all, this is how most democracies operate – the administrative branch is separate from the legislative branch. In return, these governments and the societies they serve reap the benefits of everyone's creativity, not just the people who happen to hold administrative power at a particular point in time. I see no reason why policies couldn't be adopted in business that would lead to the same structure, behaviors and benefits in the areas of learning and innovation. In

hiring policies which are aimed at recruiting *well-rounded individuals* and alternative policies by which a firm might seek to become a *well-rounded organization of individuals*. In the former case, people are screened and hired in accordance with how well they fit a target profile, so that virtually everybody hired tends to think alike, has a common worldview, and so forth. In the second case, people are screened and hired in accordance with how well they come across as individuals with *unique*

interests, *unusual* capabilities and *different* worldviews. Following the latter strategy leads to *well-rounded organizations*, which places a far greater range of ideas and possibilities at the disposal of an organization than would otherwise be available.

Needless to say, I favor the latter approach.

- *Connectivity*: Last is the area of Connectivity which is also something that can be controlled or influenced by policy. The frequency and quality of communications between individuals and groups can obviously have an impact on the evolution of ideas in business. Individuals collaborating in groups can hardly be expected to practice knowledge-making as a social process if their ability to communicate with one another is somehow curtailed or restricted by policy, practice or limited infrastructure.

This not only points to technology as an important element of business innovation, but also to the realm of protocol and hierarchy as issues worthy of attention by second-generation practitioners. Protocols which state that I can only talk directly to my boss but not to her boss arguably dampen innovation. The issue here is freedom of communications, not just the density of telecommunications networks. Here again, constructive policies can be embraced which are designed to instill higher levels of dialogue between individuals, regardless of their administrative rank or place in the pecking order.

Conclusions

If there has been a breakthrough in thinking in the evolution of second-generation KM – and I believe there *has*

been – it lies in the realization that human social systems engage in certain regular patterns of behavior by which they collectively *produce, diffuse* and *use* knowledge. When taken together, these patterns can be seen as an integrated life cycle model which can serve as a foundation for practice in our efforts to improve organizational learning and business innovation. This is clearly a contribution that can be traced to the influence of complexity theory on knowledge management.

Indeed, the fundamental essence of human social systems is that they fall into the category of *complex adaptive systems*, or CASes, as defined by the science of complexity. As such, they survive over time by continually adapting themselves to changes they encounter in both their internal and external environments. They do this by engaging in collective sensing and responding activities, which manifest themselves in the form of social processes.

On the *responding* side of the pattern is the continual production of new knowledge in response to new experiences and new conditions. New knowledge is then operationalized at the level of individual and collective practice, and the organization adapts itself to its environment, accordingly. When reality changes, new knowledge is yet again *re-produced* in response. That's what complex adaptive systems do – *they're persistent knowledge-making regimes!*

What's of such fundamental importance in this view of human organizations as *knowledge-making systems* is that no management whatsoever is required for these patterns to unfold. The behavior of interest is utterly emergent and bottom-up in

origin. Human social systems come *predisposed* to make knowledge in accordance with the same endemic social patterns found in all complex adaptive systems. Human CASes, on the other hand, are more deliberative in nature and are *social* CASes. We make knowledge by mutual consent – innovation in the realm of human affairs is an entirely social process.

That being said, in order to improve either the rate or quality of innovation in business, we must ultimately focus on the social patterns of behavior that account for organizational *knowledge production, diffusion and use*. All organizations are hereditarily endowed with the same basic patterns in these areas. The most effective approach to take, then, is to adopt policies which are aligned with these innate patterns of behavior, and which support, strengthen and even amplify them.

Policies which fail to meet this test (of alignment) are doomed from the start, and can only be expected to engender temporary behaviors of an disingenuous kind. Social systems exposed to that kind of stress will invariably return to their natural state, in which knowledge making, diffusion and use are carried out in the form of *unmanaged* social processes. Better to

accept and embrace the natural knowledge-making proclivities of human social systems than to ignore or supplant them with managed alternatives of an artificial kind. After all, there's no need to manage or prescribe knowledge-related behaviors, much less *rules*, in human social systems – they're already in there. We just come that way. Human social systems are *predisposed* to create new knowledge, even in the complete absence of management. That's what we fundamentally do. But we do it in a particular way -- *our way*. Recognizing and acknowledging the characteristic shape of *how we do so* is critical to our success in business and in life.

If we're really serious about wanting to improve organizational learning and business innovation, the smartest thing we can do is to embrace policies which are *in agreement with how we naturally do those things*, such that our management policies and our native tendencies are mutually supportive and resonate with one another.

We're not machines, we're human social systems. Our knowledge management strategies should be crafted accordingly.

About The Author

Mark W. McElroy is the president and founder of Macroinnovation Associates, LLC, a business innovation consultancy and methodology shop (www.macroinnovation.com). He is a 23-year veteran of management consulting, including time spent at KPMG Peat Marwick, Price Waterhouse and IBM's Knowledge Management Consulting practice in Cambridge, MA. Mr. McElroy also serves on the Knowledge Management Consortium's (KMCI) Executive Committee, and is the Chairman of the KMCI Institute's Governing Council as well. Mark can be reached at mmcelroy@vermontel.net.