

Second-Generation KM

A White Paper

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At the *KM Expo* show last fall in Chicago, attendees could be heard grumbling about what they felt was the event's conspicuously myopic obsession with technology. "Document management and imaging—that's all I've seen and heard about here," one man complained. He then amplified his discontent and shared his broader disappointment with knowledge management as a whole: "...an idea that amounts to little more than yesterday's information technologies trotted out in today's more fashionable clothes." Point well taken.

Indeed, at the heart of most KM strategies to date can be found data warehousing, groupware, document management, imaging, and data mining. By continuing to promote that kind of narrow, technology-centric brand of thinking, the nascent field of knowledge management places its own credibility at risk. Merely re-labeling yesterday's technologies in the sexy new name of today's *KM* brings nothing new to the table. And customers won't stand for it. As reported above, evidence of the backlash is already apparent. We, the community of KM practitioners, can do much better than that.

As an advocate and strong supporter of KM, I and many others hold an entirely different view of KM compared to what we have typically seen in the press and in trade shows. Recently, a new name for this hopefully more-enlightened brand of KM has emerged: "second-generation KM."

Unlike first-generation KM, in which technology always seems to provide the answer, second-generation thinking is more inclusive of human resource and process initiatives. I believe we should embrace this term, along with its expanded perspectives, as a way of differentiating the new KM from its technology-minded ancestry. A comparison of these two competing frameworks follows below.

The Fundamentals

The arrival of second-generation KM (SGKM) includes the introduction of some new terms, new concepts, and new insights that together give SGKM some real depth and distinction when compared to first-generation models. These ideas, unique to SGKM, fall into the following eight (8) categories:

1. Supply-Side vs. Demand-Side KM
2. The Knowledge Life Cycle
3. Knowledge Processes
4. Knowledge as Rules
5. Knowledge Structures
6. Nested Knowledge Domains
7. Organizational Learning
8. Complexity Theory

Each of these concepts is briefly defined in more detail below.

Supply-Side vs. Demand-Side KM

The hallmark of first-generation KM (FGKM) is its overwhelming

emphasis on the distribution of existing knowledge throughout an organization. This accounts for the heavy use of technology in most FGKM initiatives. Groupware, information indexing and retrieval systems, knowledge repositories, data warehousing, document management, and imaging systems are all classic answers to the prevailing ailment FGKM strategies are designed to address: inadequate knowledge sharing.

All of these measures are seen as far superior to serendipity and manual efforts when it comes to propagating knowledge from one part of the organization to another. Enhance the transfer of knowledge, FGKM practitioners say, and better organizational performance will follow. This is fundamentalist supply-side dogma in action.

Demand-side KM takes a distinctly different point of view. Rather than place its bets on the downstream effects of codifying and sharing *existing* knowledge, demand-side advocates suggest, instead, that accelerating the production of *new* knowledge is a far more valuable proposition. Demand-side KM initiatives, therefore, focus on enhancing the conditions in which innovation and creativity naturally occur.

Helping organizations to create new knowledge faster (i.e., to accelerate their rate of innovation) is seen as a powerful new way of increasing a firm's competitive stance in the marketplace. The emphasis of SGKM, therefore, is on high-performance learning. Not only, then, does demand-side KM signal the emergence of second-generation KM, it also marks the convergence of the knowledge management and organizational learning (OL)

communities. Demand-side KM can be thought of an implementation strategy for organizational learning (more on this below).

One other point should be made here. Unlike supply-side strategies which give little if any thought to the production of new knowledge, demand-side schemes are more balanced. While demand-side strategies arguably place a higher premium, or value, on the continuous production of new knowledge, they are no less appreciative of the importance of knowledge sharing and transfer *after-the-fact*. Demand-side strategies, therefore, are more holistic in their orientation, and deal with the *whole* knowledge life cycle, not just its downstream events.

The Knowledge Life Cycle

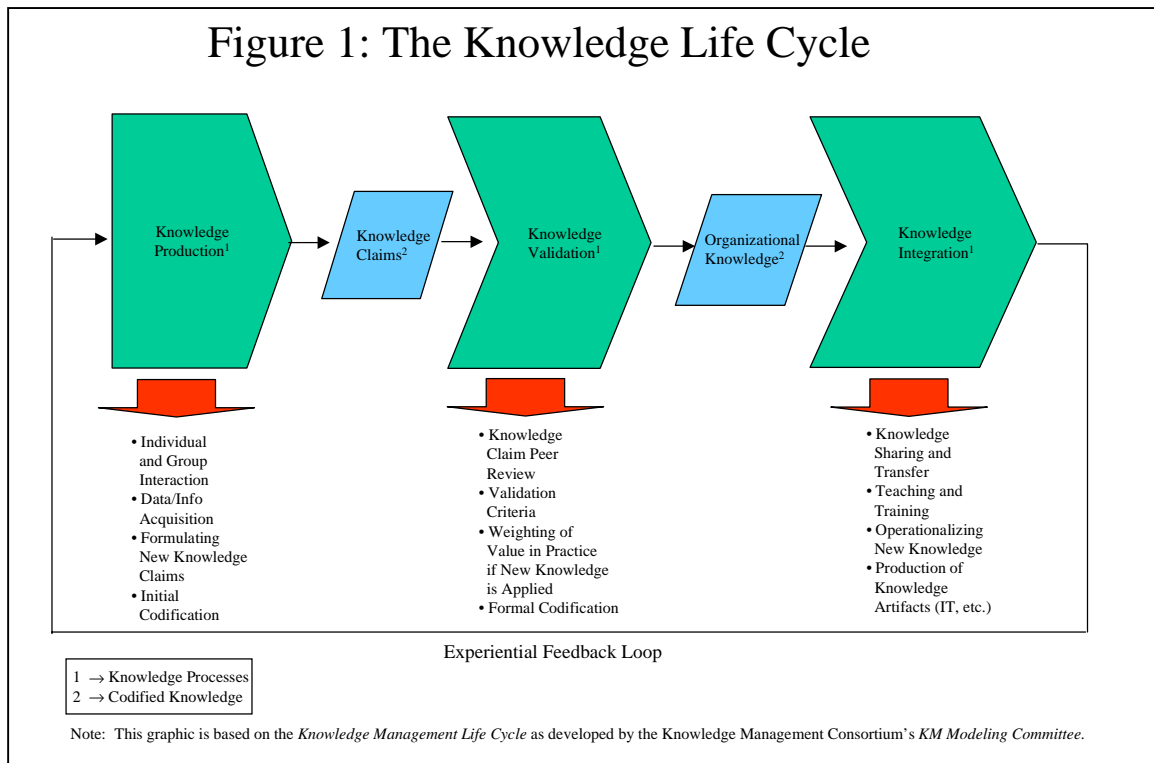
As implied above, SGKM schemes take a life cycle view of knowledge in human organizations. First-generation strategies are far less sophisticated. They tend to begin with the assumption that knowledge exists without making any attempt to understand, much less influence, how it comes about. Not surprisingly, then, FGKM schemes usually begin by stressing codification and transfer issues, in the process of which they invariably turn to technology.

Second-generation KM, by contrast, starts by invoking a life cycle view of the subject. New knowledge is created and is then subjected to a natural process of validation. Knowledge that survives the validation process is subsequently operationalized, including codification and transfer in the finest supply-side tradition. Invariably, the adoption of new knowledge leads to the

displacement of old, thereby completing the cycle (see Figure 1).

What SGKM has that FGKM lacks is a fundamental theory of knowledge and social cognition. According to SGKM theory, organizations not only hold collective knowledge, they learn as well. The proper scope of KM, then, should be to enhance organizational learning. And the way to do that is by understanding the natural life cycle of

processes. These processes are *natural* in the sense that they lie behind the production of all knowledge in living systems, including human organizations. Thus, SGKM has turned to cognitive science and anthropology, which together for years have known what the knowledge management crowd (including me) is just now discovering. *It's not knowledge management, stupid, it's knowledge **PROCESS** management.*



knowledge and how living systems produce, validate and institutionalize it. FGKM has no such framework. Its credo is, *knowledge exists, round it up, codify it, and share it through technology*. Many of us now believe we can do much better than that.

Knowledge Processes

In second-generation knowledge management, life cycles are seen as continuums of natural knowledge

Feed the processes that spawn the production and integration of new knowledge in human affairs, and innovation and better organizational performance will follow. This kind of thinking is unique to SGKM, particularly in light of its emphasis on innovation (i.e., demand-side strategies), versus the downstream, supply-side preoccupation with codification and transfer.

In general, there are three fundamental knowledge processes: production, validation, and integration.

Knowledge *production* speaks to the creation of new ideas, new insights, and outright innovation as a function of interaction between people and/or the acquisition of knowledge from outside sources. This is where *communities of interest* and, yes, technology come into play as people self-organize to collaborate on the one hand, and rely on information systems to gather and share data on the other.

Knowledge *validation* refers to the process by which new “knowledge claims” are subjected to peer review and a test of *value in practice*. For some organizations, knowledge validation is a highly formalized process; for others, it is not. Increasing the formality of the process (i.e., making it possible for people and groups to challenge the status quo without having to put the organization through a veritable *coup d’etat*) is a potentially valuable KM intervention. In any case, understanding how validation occurs today, in practice, versus how it could be improved is very much within the scope of SGKM thinking.

Knowledge *integration* is what happens after new knowledge has been validated. It boils down to the implementation of new knowledge within the organization to whatever extent is required. New procedural knowledge, for example, might lead to the discontinuation of how work is being done today in favor of a new set of business processes. Business processes are, after all, nothing more than codified procedural knowledge (know-how). Most of the work envisioned by FGKM schemes falls into the knowledge integration phase, whereas SGKM is more end-to-end in scope.

Knowledge As Rules

Organizational knowledge, the subject of SGKM, is generally expressed by what an organization believes, does, or by how it behaves. That is, organizational knowledge is embedded in *organizational practice*—we do what we do because of what we believe (our *know-what* knowledge), and we do what we do *the way* we do it because of our *know-how*. These two categories of knowledge are otherwise known as *declarative knowledge* (know-what) and *procedural knowledge* (know-how).

Declarative knowledge generally consists of all the factual assertions an organization makes about itself, its capabilities, and the marketplace. Declarative knowledge, therefore, generally lies behind most business strategies in all of their dimensions. Procedural knowledge, on the other hand, is most often expressed in the form of business processes. How an organization goes about marketing or manufacturing is a reflection of its best procedural knowledge about how to do so. As new knowledge emerges.—better methods, shorter cycle times, etc.—procedural knowledge evolves, and business processes change accordingly.

The theory of SGKM sees both declarative and procedural knowledge as rules held collectively by people in organizations that are practiced *en masse* from one day to the next. Think of them as business rules, if you like. All knowledge, then, can be expressed in the form of *rule sets*.

One of the challenges of second-generation KM is to find ways of capturing and expressing organizational rules. Moreover, the extent to which rules held by an organization are periodically refreshed points to some

promising metrics for how the effectiveness of KM initiatives and related costs might be measured. Investments that yield higher rates of innovation (i.e., increased turnover in the production of new rules) would be seen as justified, while those that do not might be judged ineffective.

the rules that lie behind it. The same thing is true for, say, business strategies in that they are heavily laden with declarative knowledge, which reveals an organization's perspective on itself and the state of the world (i.e., their *know-what* knowledge).

Figure 2: Organizational Knowledge Structures

	Declarative Knowledge	Procedural Knowledge
•Business Strategies	X	
•Products and Services	X	
•Business Processes		X
•Organizational Structures	X	
•Policies and Procedures	X	X
•Culture and Values	X	X
•Information Systems*	X	X

*(Note: Includes automated, hard-copy and other *knowledge artifacts*)

Knowledge Structures

If all organizational knowledge can be expressed in the form of rules and rule sets, where do these rules reside? In general, they can be found in organizational practice. Companies, for example, codify what they know in the form of their collective behavior and the artifacts they produce to record their knowledge (see Figure 2).

Information systems and business processes, then, have much in common. Both are nothing more than codified expressions of organizational knowledge. If you can “read” business processes, for example, you can decipher

Business processes and business strategies, then, can be thought of as knowledge structures, each one of which holds embedded organizational knowledge, or codified rule sets. Translate these structures into to their underlying rule sets, and an organization's knowledge is laid bare (see Figure 3).

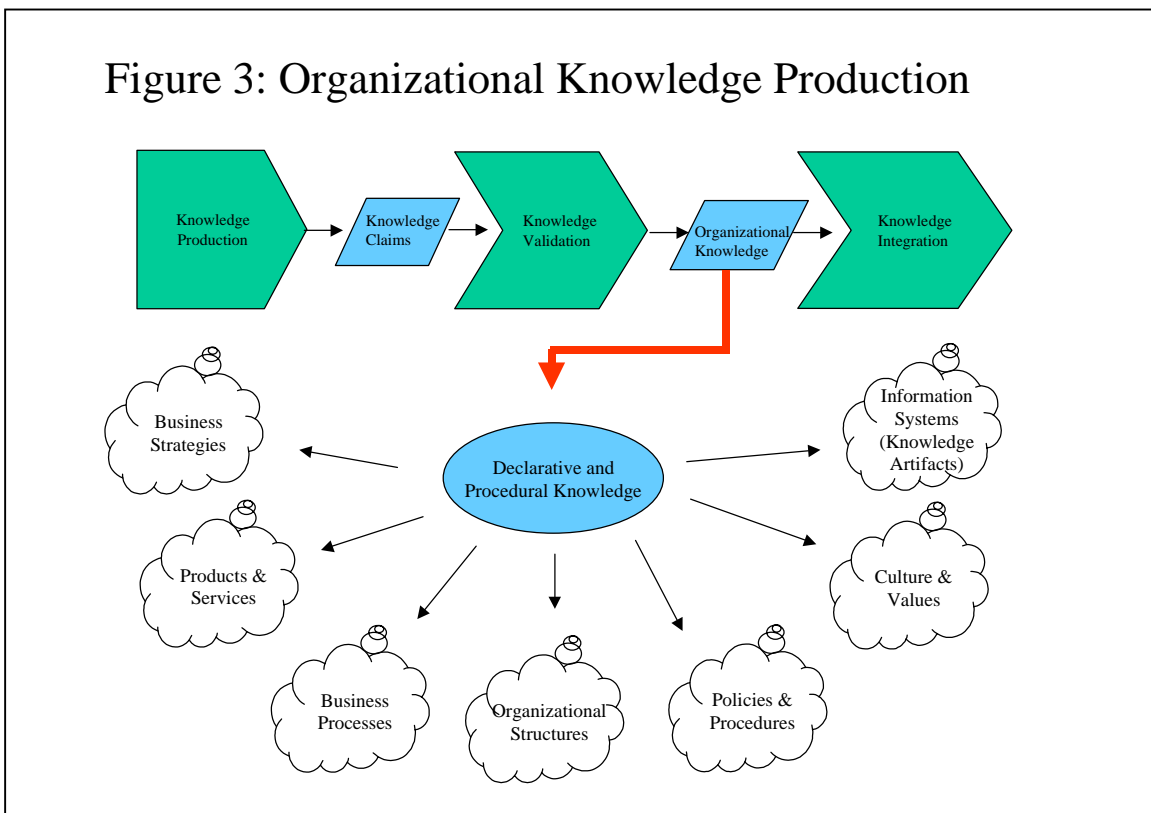
The most common knowledge structures in human organizations include the following:

- Business strategies (declarative knowledge)

- Products and services (declarative knowledge)
- Business processes (procedural knowledge)
- Organizational structures (declarative knowledge)
- Policies and procedures (declarative and procedural knowledge)
- Culture and values (declarative and procedural knowledge)
- Information systems (artificial codifications of declarative and procedural knowledge – includes automated, hard copy and other *knowledge artifacts*)

organizational knowledge. We see this all the time in business. General Electric, for example, is full of tales of what Thomas Edison and other GE visionaries did decades ago. The values embedded in these stories are thereby thoughtfully conveyed from one generation of GE to another. Mythology served the same purpose for our ancestors. Stories, too, are knowledge structures.

Once again, again, anthropologists have known these things for years. Second-generation KM, then, can be seen as a kind of neo-classical social



This notion of knowledge structures sheds additional light on the value and role of story-telling in business, a subject popularized by an IBM colleague of mine in the U.K., David Snowden. Stories are ways of capturing and transferring cherished

anthropology with a modern organizational-learning spin to it.

Nested Knowledge Domains

One of the major problems of first-generation KM was its failure to

recognize the distinction between individual and organizational learning—knowledge is held at both levels. People, as individuals, hold and practice individual knowledge, while people, as collectives, do so as well. Every one of us is walking around with an understanding of not only our own personal knowledge (rule sets), but also the knowledge held by the collectives in which we belong (i.e., our employers, our churches, our clubs, our associations, our communities, etc.).

It really is quite difficult to say what the focus of first-generation KM has been from a knowledge domain perspective. Has it been individual knowledge? Organizational knowledge? Both? Something else? Second-generation KM, by contrast, is clearly aimed at organizational learning first and foremost.

At the same time, however, SGKM recognizes the importance of individual learning, since all organizational knowledge begins with learning and innovation by individuals. Knowledge held by individuals, therefore, is nested within the domain of organizational knowledge.

This concept of nested knowledge domains, in its simplest form, actually points to *three* levels of knowledge in an organization: knowledge held by individuals, knowledge held by groups of individuals, and knowledge held by the organization as a whole. At any point in time, disparities are bound to exist between these three levels, thereby prompting disagreements and differing points of view on, say, what strategy to embrace (declarative knowledge) or what process to follow (procedural knowledge).

The tension between these levels, however, is actually a good thing,

because out of this *creative tension* comes the production of new knowledge. Organizations that do a good job of managing this tension effectively (another type of SGKM intervention) will experience higher rates of innovation and organizational performance when compared to those that don't.

SGKM, then, makes the distinction between individual, group, and organizational knowledge domains, and fashions its interventions accordingly.

Organizational Learning

Perhaps the most striking distinction between SGKM and its first-generation parents is the explicit connection now being drawn between knowledge management and organizational learning (OL). Popularized by Peter Senge in his hugely influential book, *The Fifth Discipline* (1990), OL has attracted an enormous following and is widely regarded as a reference to the only sustainable advantage in business: *the ability to learn faster than your competitors*. Second-generation KM is all about beefing up an organization's ability to do just that—to learn, and to learn effectively.

I like to think of SGKM, then, as *a management discipline that focuses on organizational learning with business innovation and competitive advantage in mind*. In other words, SGKM is an implementation strategy for organizational learning. Knowledge management and Senge's OL movement have much to gain by embracing this convergence of thinking, the whole combination of which is much greater than the sum of its parts. What a fitting tribute to Senge's OL ideas, which after

all, highlighted holistic *systems thinking* as the *fifth* discipline he spoke of.

Complexity Theory

What many people may find surprising is that most of the ideas expressed in this paper 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 cognition in the conduct of human affairs. Indeed, second-generation KM owes much of its seminal thinking to complexity theory.

Of particular relevance 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 *in fact* and *in practice*.

Knowledge, according to CAS theory, consists of rules that agents follow in their eternal quest to adapt themselves successfully to their environment. CAS theory, then, is the direct source of thinking behind the notions of *Knowledge Life Cycles*, *Knowledge as Rules*, *Knowledge Processes* and *Knowledge Structures* as discussed above. Moreover, living systems are *nothing* if not *Learning Organizations*. Understanding how knowledge forms at the level of individual agents and then rises to the level of *the collective* to become shared

organizational knowledge is a lesson taken directly from complexity theory. So, too, is the notion of *Nested Knowledge Domains*, which CAS theory sees as groups within groups, each of which is capable of evolving its own rule sets.

The application of complexity theory to a broad range of business and organizational development issues is widening in practice. Examples include the *New England Complex Systems Institute* in Cambridge, MA, whose members have been actively studying the application of complexity and CAS theory to the management of human organizations for years now.

Major corporations have also risen to the occasion by investing in dedicated resources, such as Citibank's *Complexity and Organizational Behavior Project*, to explore and embrace ways of applying complexity's lessons to the management of their own affairs. Even the *Wall Street Journal*, thanks to the pioneering efforts of journalist Tom Petzinger, has been closely following the trajectory of complexity theory as practiced by business since the mid-'90s.

But it wasn't until 1997, when the *Knowledge Management Consortium* was formed—a think-tank in Washington, D.C.—that the profound connection between complexity theory and knowledge management was identified. By simply recognizing human organizations as living systems—consistent with CAS theory's definition of *complex adaptive systems*—all of the theory's insights on how knowledge *happens* in such systems were suddenly seen as applicable to business and industry. This, coupled with the influence of organizational learning on KM, accounts for the strikingly new and different brand of *second-generation*

knowledge management that we now see before us—a practitioner’s framework firmly rooted in the study of living systems.

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The major themes of second-generation KM thinking can be summarized as follows:

- SGKM schemes emphasize knowledge production (demand-side thinking) without discounting the importance of FGKM codification and sharing (supply-side thinking)—a new and balanced view has emerged;
- This emergent emphasis on *knowledge production* points to a much higher-value proposition for KM than has been proffered to date: the prospect of increasing an organization’s rate of learning, and hence, its rate of innovation;
- SGKM has identified both the structure of organizational knowledge (declarative and procedural rule sets in knowledge structures), as well as a process-based life cycle that must be nurtured and cared for if healthy organizational learning is to occur;
- Lastly, SGKM convincingly makes the powerful connection between

KM and OL, out of which comes the recognition of nested learning domains and the role that KM can play in helping organizations, not just individuals, learn faster and more effectively than their competitors. The value-proposition implications, here, are tremendously important.

Perhaps the most important breakthrough in moving from first- to second-generation KM thinking is the new theoretical framework that has emerged, a theory of knowledge, if you like. First-generation schemes were rather shallow in this regard—again, little more than yesterday’s technologies trotted out in today’s more fashionable KM clothes.

But in the spirit of *theory and practice*, practice without theory is not only guesswork, it’s professionally amateurish and irresponsible. We, the KM community of practitioners, can do much better than that. As one of them/us, I urge us to do so. Let’s rise to a higher standard of performance. Let’s put technology-centric KM thinking in its proper place and move on to help our constituents become the high-performance learning organizations that they desperately want to be.

About the Author

Mark W. McElroy is a Principal in IBM’s Knowledge Management Consulting Practice. In addition, he is an active member of the New England Complex Systems Institute (NECSI), and serves as Chairman of the Knowledge Management Consortium’s KM Modeling Standards Committee. Mr. McElroy is also a board member of the Sustainability Institute, a think-tank in Vermont that applies system dynamics tools to the study of social, economic and environmental issues. He can be reached at mmcelroy@vermontel.net.