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Enterprise 2.0: The Dawn of Emergent Collaboration

Enterprise 2.0: **The Dawn of Emergent Collaboration**

Do we finally have the right technologies for knowledge work? Wikis, blogs, group-messaging software and the like can make a corporate intranet into a constantly changing structure built by distributed, autonomous peers — a collaborative platform that reflects the way work really gets done.

Andrew P. McAfee

B y the fall of 2005, the European investment bank Dresdner Kleinwort Wasserstein (DrKW) had just completed a rollout of three new communication technologies to most of its employees. The tools — which included blogs, wikis and messaging software for groups and individuals[1] — caught on first among IT staffers, who soon realized that the initial wiki environment lacked a feature called *presence display*. That is, it didn't offer a way to tell if another employee was at his or her computer. At 10:44 London time on Oct. 11, 2005, an IT employee posted to his blog:

> *... it's about squeezing as much as we can out of what we have in place now ... The [presence display] idea for example can be achieved with ease [in the wiki] by simply adding the link below to an image tag ... It's a bit rough round the edges and the icon could be much better but does do what you want.*

At 11:48, a colleague posted a comment on the same blog:

> *Cool, I have then taken your [link] and (pretty nastily) hacked presence display into [the wiki]. I'll let Myrto [Lazopoulou, head of user-centered design at DrKW] know ... and ask her to look into perhaps getting her team [to see] whether we can do this better ...*

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> **While all knowledge workers surveyed used e-mail, 26% felt it was overused in their organizations, 21% felt overwhelmed by it and 15% felt that it actually diminished their productivity.**

Within 64 minutes and without any project definition or planning, a presence display solution had been spontaneously taken from concept to implementation, then submitted to the person formally responsible.

Why are these new technologies particularly noteworthy? After all, companies already have plenty of communication media — e-mail, instant messaging, intranets, telephones, software for document sharing and knowledge management and so on. As the vignette above suggests, the new technologies are significant because they can potentially knit together an enterprise and facilitate knowledge work in ways that were simply not possible previously. To see how, we need to first understand the shortcomings of the technologies currently used by knowledge workers, then examine how the newly available technologies address these drawbacks. We'll then return to the DrKW case to see how to accelerate their use within an enterprise, and highlight the challenges of doing so.

Most of the information technologies that knowledge workers currently use for communication fall into two categories. The first comprises *channels* — such as e-mail and person-to-person instant messaging — where digital information can be created and distributed by anyone, but the degree of commonality of this information is low (even if everyone's e-mail sits on the same server, it's only viewable by the few people who are part of the thread). The second category includes *platforms* like intranets, corporate Web sites and information portals. These are, in a way, the opposite of channels in that their content is generated, or at least approved, by a small group, but then is widely visible — production is centralized, and commonality is high.

Knowledge management systems have tried to have it both ways. They have sought to elicit tacit knowledge, best practices and relevant experience from people throughout a company and put this information in a widely available database. It seems appropriate now, however, to refer to KM systems in the past tense; they didn't even show up in a recently published (2005) survey of the media used by knowledge workers. (See "Communication Technologies Used by Knowledge Workers," p. 23.)

This survey, conducted by knowledge researcher Thomas Davenport,[2] shows that channels are used more than platforms, but this is to be expected. Knowledge workers are paid to produce, not to browse the intranet, so it makes sense for them to heavily use the tools that let them generate information. So what's wrong with the status quo?

One problem is that many users aren't happy with the channels and platforms available to them. Davenport found that while all knowledge workers surveyed used e-mail, 26% felt it was overused in their organizations, 21% felt overwhelmed by it and 15% felt that it actually diminished their productivity. In a survey by Forrester Research, only 44% of respondents agreed that it was easy to find what they were looking for on their intranet.[3]

A second, more fundamental problem is that current technologies for knowledge workers aren't doing a good job of capturing their knowledge. As Davenport puts it, "The dream … that knowledge itself — typically unstructured, textual knowledge — could be easily captured, shared, and applied to knowledge work … [has not] been fully realized … Progress is being made … [but] it's taken much longer than anyone expected."

In the practice of doing their jobs, knowledge workers use

> **Current technologies are not doing a good job of capturing knowledge. New platforms focus not on capturing knowledge itself, but rather on the practices and output of knowledge workers.**

channels all the time and frequently visit both internal and external platforms (intranet and Internet).[4] The channels, however, can't be accessed or searched by anyone else, and visits to platforms leave no traces. Furthermore, only a small percentage of most people's output winds up on a common platform. Thus, the channels and platforms in use aren't much good at providing answers to such questions as: What's the right way to approach this analysis? Does a template exist for it? Who's working on a similar problem right now? When our Brazilian operation reorganized last year, who were the key people? What are the hot topics in our R&D department these days? Indeed, it's probably safe to say that within most companies most knowledge work practices and output are invisible to most people. The good news is that new platforms have appeared that focus not on capturing knowledge itself, but rather on the *practices* and *output* of knowledge workers.

Enterprise 2.0 Technologies: Blank SLATES

These new digital platforms for generating, sharing and refining information are already popular on the Internet, where they're collectively labeled "Web 2.0" technologies. I use the term "Enterprise 2.0" to focus only on those platforms that companies can buy or build in order to make visible the practices and outputs of their knowledge workers. (See About the Research, p. 22.) The excerpts from the DrKW blogs, for example, record an interaction *and* its output, as well as the identities of three people involved. These blog entries are part of a platform that's readable by anyone in the company, and they're persistent. They make an episode of knowledge work widely and permanently visible.

Technology paradigms are often made up of several components. For example, the components of Windows, Icons, Menus and Pointers (mice) combine to yield the WIMP user interface of most personal computers today.[5] Similarly, I use the acronym SLATES to indicate the six components of Enterprise 2.0 technologies:

Search For any information platform to be valuable, its users must be able to find what they are looking for.

Intranet page layouts and navigation aids can help with this, but users are increasingly bypassing these in favor of keyword searches.[6] It might seem that orderly intranets maintained by a professional staff would be easier to search than the huge, dynamic, uncoordinated Internet, but this is not the case.

In the Forrester survey, less than half of respondents reported that it was easy for them to find what they were looking for on their intranets. A 2005 study by the Pew Internet & American Life Project, on the other hand, found that 87% of Internet searchers report having successful search experiences most of the time.[7] The second element in the SLATES infrastructure helps explain this surprising difference.

Links Google made a huge leap forward in Internet search quality by taking advantage of the information contained in links between Web pages. Links are an excellent guide to what's important and provide structure to online content. In this structure, the "best" pages are the ones that are most frequently linked to.

Search technology like Google's works best when there's a

Communication Technologies Used by Knowledge Workers

The bar chart below indicates the percentage of knowledge workers that use each medium weekly.

Percentage of knowledge workers using each medium weekly

TYPE OF AFFINITY
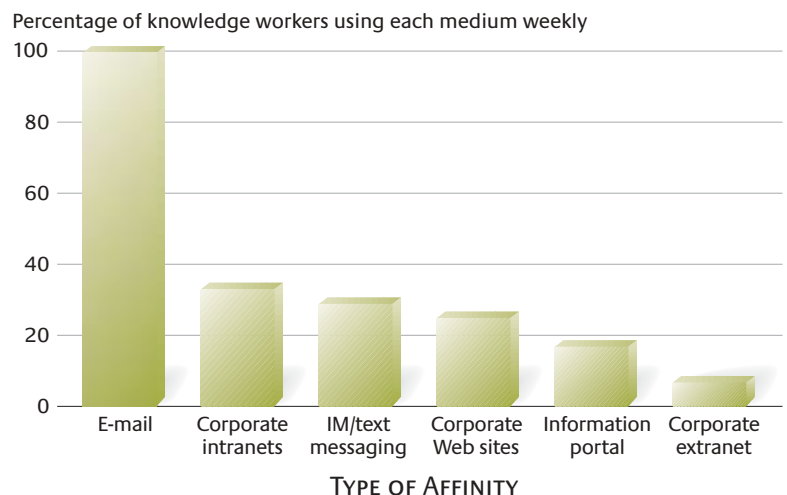
(Source: T. Davenport, "Thinking for a Living" (Boston: Harvard Business School Press, 2005).

dense link structure that changes over time and reflects the opinions of many people. This is the case on the Internet, but not on most of today's intranets, where links are made only by the relatively small internal Web development group. In order for this to change within companies, many people have to be given the ability to build links. The most straightforward way to accomplish this is to let the intranet be built by a large group rather than a small one.

Authoring Internet blogs and Wikipedia have shown that many people have a desire to author — to write for a broad audience. As wiki inventor Ward Cunningham recalls, "I wanted to stroke that story-telling nature in all of us … I wanted people who wouldn't normally author to find it comfortable authoring, so that there stood a chance of us discovering the structure of what they had to say."[8] Cunningham's point is not that there are a lot of undiscovered Shakespeares out there but that most people have something to contribute, whether it's knowledge, insight, experience, a comment, a fact, an edit, a link, and so on, and authorship is a way to elicit these contributions.

Blogs let people author individually, and wikis enable group authorship. Content on blogs is cumulative (individual posts and responses to them accumulate over time), while on wikis it's iterative (people undo and redo each other's work). When authoring tools are deployed and used within a company, the intranet platform shifts from being the creation of a few to being the constantly updated, interlinked work of many.

Evidence from Wikipedia shows that group authorship can lead to convergent, high-quality content. This seems paradoxical. How can an egalitarian, editor-free authoring environment ever yield consensus and agreement? Won't people who disagree just keep disagreeing? (To understand why not, see "Convergence and Quality on Wikipedia.")

Tags The Forrester survey revealed that after better searching mechanisms, what experienced users wanted most from their companies' intranets was better categorization of content. Some sites on the Web aggregate large amounts of content, then outsource the work of categorization to their users by letting them attach tags — simple, one-word descriptions. These sites — such as Flickr for

Convergence and Quality on Wikipedia

Articles in the online encyclopedia Wikipedia are assembled by ad hoc virtual teams. Content creation and editing are highly egalitarian; any registered user can create a new article, and anyone, registered or not, can make any change to an existing article, or undo anyone else's change.

When I first heard about Wikipedia I thought it was a hopelessly naïve and utopian undertaking that would not work for controversial topics. I imagined that people who disagreed on such topics would just keep flaming each other and removing or defacing each other's work. To test this, I thought of entries where I'd be likely to see dysfunctional interactions, and the very first entry I looked at in Wikipedia was the one for "skinhead." I was surprised and impressed. Not only were the quality of the entry and the level of discourse excellent, but people with very different backgrounds and perspectives were collaborating productively and generating content that improved over time and eventually converged.

Clever engineering of two kinds — technical and social — yields this convergence. On the technical front, a key innovation is the ability for anyone not just to contribute, but also to edit or remove anyone else's contribution. As a result, the incentive to create graffiti and deface entries essentially vanishes, since negative contributions can be erased with one click. As Wikipedia founder Jimmy Wales has put it, "The wiki model is different because it gives you an incentive when you're writing. If you write something that annoys other people, it's just going to be deleted. So if you want your writing to survive, you really have to strive to be cooperative and helpful." [i]

The social engineering at Wikipedia is also aimed at creating a cooperative and helpful culture. Most decisions are made by consensus among senior members of the community. Votes are often taken, but their results are not binding; they're intended to provide information on a matter, not settle it. Overly harsh or argumentative contributors are cor-

rected by their peers, and barred if they are found repeatedly ignoring counsel and violating norms.

By the end of 2005, Wikipedia had more than 850,000 entries in English and more than two million entries in other languages. But are they any good? In December of 2005, the magazine *Nature* published the results of a study in which experts compared the accuracy of 42 science entries in Wikipedia with that of the online edition of the *Encyclopedia Britannica*. Each source was found to have four serious errors. The Wikipedia entries had a total of 162 minor errors; Britannica's total, at 123, was not far behind.[ii] The Wikipedia community doesn't turn out perfect output (what does?), but it's clearly doing some things well.

i. M. Rand, "Best of the Web: Extreme Blogging," Forbes, Dec. 13, 2004, ttp://www.forbes.com/best/2004/1213/bow001.html.

ii. J. Giles, "Internet Encyclopaedias Go Head to Head," Nature, Dec. 15, 2005, http://www.nature.com/nature/journal/v438/n7070/full/438900a.html.

> **The technologists of Enterprise 2.0 are trying not to impose preconceived notions about how work should be categorized or structured. Instead, they're building tools that let these aspects emerge.**

photos, Technorati for blogs and del.icio.us for Web site bookmarks — don't try to impose an up-front categorization scheme; they instead let one emerge over time as a result of users' actions.

The categorization system that emerges from tagging is called a folksonomy (a categorization system developed over time by folks).[9] A folksonomy is in some ways the opposite of a *taxonomy*, which is an up-front categorization scheme developed by an expert. Folksonomies have some disadvantages relative to taxonomies: They're not usually multilevel, for one thing, and they can be redundant. Their main advantage is that they reflect the information structures and relationships that people actually use, instead of the ones that were planned for them in advance. (For an example of how this works, see "Tags and Folksonomies at del.icio.us," p. 26.)

In addition to building folksonomies, tags provide a way to keep track of the platforms visited by knowledge workers. Imagine a tool like del.icio.us deployed within an enterprise. Employees could use it to keep track of useful intranet and Internet pages they've consulted, and to assign tags to these pages as reminders of content. They also could see which other employees are using the same tags, and what sites *they've* visited. As a result, patterns and processes in knowledge work would become more visible.

Extensions Moderately "smart" computers take tagging one step further by automating some of the work of categorization and pattern matching. They use algorithms to say to users, "If you liked that, then by extension you'll like this." Amazon's recommendations were an early example of the use of extensions on the Web.

To see another example, download the browser toolbar available from stumbleupon.com. With it, users simply select a topic they're interested in, then click the "stumble" button. They're taken to a Web site on that topic. If they like it, they click a "thumbs-up" button on the toolbar; if not, they click a "thumbs-down" button. They then "stumble" on to another site. Over time, StumbleUpon matches preferences to send users only to sites they'll like. It's surprising how quickly, and how well, this simple system works. It reasons by extension, and homes in on user tastes with great speed.

Signals Even with powerful tools to search and categorize platform content, a user can easily feel overwhelmed. New content is added so often that it can become a full-time job just to check for

updates on all sites of interest. The final element of the SLATES infrastructure is technology to signal users when new content of interest appears. Signals can come as e-mail alerts, but these contribute to overloaded inboxes and may be treated like spam.

A novel technology called RSS (which usually refers to "really simple syndication") provides another solution. Authors such as bloggers use RSS to generate a short notice each time they add new content. The notice usually consists of a headline that is also a link back to the full content. Software for users called "aggregators" periodically queries sites of interest for new notices, downloads them, puts them in order and displays their headlines. With RSS, users no longer have to surf constantly to check for changes; they instead simply consult their aggregators, click on headlines of interest and are taken to the new content.

Enterprise 2.0 Ground Rules

As technologists build Enterprise 2.0 technologies that incorporate the SLATES components, they seem to be following two intelligent ground rules. First, they're making sure their offerings are easy to use. With current tools, authoring, linking and tagging all can be done with nothing more than a Web browser, a few clicks and some typing. No HTML skills are required. It seems reasonable to assume that anyone who can compose e-mail and search the Web can use all of the technologies described in this article with little or no training.

Second, the technologists of Enterprise 2.0 are trying hard not to impose on users any preconceived notions about how work should proceed or how output should be categorized or structured. Instead, they're building tools that let these aspects of knowledge work emerge.

This is a profound shift. Most current platforms, such as knowledge management systems, information portals, intranets and workflow applications, are highly structured from the start, and users have little opportunity to influence this structure. Wiki inventor Cunningham highlights an important shortcoming of this approach: "For questions like 'What's going on in the project?' we could design a database. But whatever fields we put in the database would turn out to be what's not important about what's going on in the project. What's important about the project is the stuff that you don't anticipate."[10]

Wikis and blogs start as blank pages, and folksonomies begin when users start entering tags. After using them for a while, the

degree of structure and lack of flexibility in other platforms can begin to seem strange. It also starts to seem odd that companies and technologists ever proposed highly structured KM systems to capture highly unstructured knowledge work.

Their different approaches to structure, however, do not mean that Enterprise 2.0 technologies are incompatible with older ones. They can be added to the channels and platforms already in place. In addition, existing channels and platforms can be enhanced by adding discrete SLATES components; many e-mail clients, for example, now have the ability to receive RSS signals. In other words, technologies that let users build structure over time can coexist peacefully with those that define it up front.

Enterprise 2.0 technologies have the potential to let an intranet become what the Internet already is: an online plat-form with a constantly changing structure built by distributed, autonomous and largely self-interested peers. On this platform, authoring creates content; links and tags knit it together; and search, extensions, tags and signals make emergent structures and patterns in the content visible, and help people stay on top of it all.

Enterprise 2.0 technologies are subject to network effects; as more people engage in authoring, linking and tagging, the emergent structure becomes increasingly fine-grained. This suggests an intriguing possibility. It has historically been the case that as organizations grow it becomes more and more difficult for people within them to find a particular information resource — a person, a fact, a piece of knowledge or expertise. Enterprise 2.0 technologies, however, can be a force in the opposite direction. They can make large organizations in some ways more searchable, analyzable and navigable than smaller ones, and make it easier for people to find precisely what they're looking for. The new technologies certainly don't overcome all the dysfunctions of corporate scale, but they might be able to address some of them.

The Role Managers Will Play

It's tempting to conclude that managers are just another group of users and have no special role to play in helping the Enterprise 2.0 platform take off within their companies. After all, they didn't need to do much to encourage use of the current channels of e-mail and instant messaging, and they can't really look over their people's shoulders all day saying, "Tag that! Make a link! Now blog about what you just did!" More fundamentally, if the new technologies are so compelling, won't people just start using them without being directed to? Indeed, the apparently spontaneous success of Wikipedia, the blogosphere and some Web 2.0 tools could convince many companies that "if we build it, they will come." Four aspects of the DrKW case illustrate, however, that use of Enterprise 2.0 technologies is not automatic and depends greatly on decisions made and actions taken by managers:

A Receptive Culture. By most accounts, DrKW's culture was a fertile one in which to cultivate new collaboration practices. In 2005, DrKW's employees voted it the best place to work among global financial services companies,[11] and the company's managers continually strive to build a robust community and gain the trust of the work force. As DrKW CIO J.P. Rangaswami says, "I'm not sure wikis would work in a company that *didn't* already have 360-degree performance reviews."

A Common Platform. Rangaswami and his team chose to have one large wiki at the bank instead of many unconnected ones. This common platform allowed collaborations to emerge that probably never would have happened otherwise. If a company's collaboration infrastructure consists of many mutually inaccessible "walled

Tags and Folksonomies at del.icio.us

Del.icio.us is a Web site that lets members store all their bookmarks on the Web itself so they're accessible from anywhere. More importantly, it allows members to add tags to those sites — simple, one-word descriptions that serve as reminders of what the page is about and also enable grouping sites together. My del.icio.us tags include "blogs," "web2.0" and "business," which I designated on my own, instead of selecting them from a predefined list. All sites can have multiple tags. I can view how often I've used each of my tags, as well as all the sites I've included under a particular tag.

This is all well and good, but the real power of del.icio.us is that it shows me how many other people have applied the same tag to a page that I did, and what other tags they have applied to that page. I can thus explore del.icio.us either by looking at the tag collections of different users (anonymity is preserved because I see only their usernames) or by looking at the universe of all tags. A recent review of the site revealed the following to be the most used tags, in descending order: "design," "blog," "web," "software," "programming," "reference," "news" and "tools." These tags are predominantly technical because technophiles have been the first people to take up tagging, but this is likely to change with time. By clicking on any tag I can see the most popular sites it's been applied to, the newest ones and so on. In other words, del.icio.us shows me a personalized view of the emergent structure of the Web, and my self-interested use of del.icio.us improves its ability to do the same for others.

To explore the power of tagging, you can set up a free account at del.icio.us. Point your browser to del.icio.us (not www.del.icio.us.com).

gardens," then search, links, tags, extensions and signals can't work across them. Rangaswami didn't want this to happen, so groups at the bank can get a private workspace only by making a special request. Other companies might make different choices about the degree of fragmentation they will allow, depending on how they evaluate the trade-offs between commonality and customization.

An Informal Rollout. The team also decided not to publicize wiki and blogging software heavily at first, or to do anything like a formal rollout of the new tools. They instead encouraged a few groups and individuals to start blogging and creating wiki pages with the hope that the content they generated would be compelling enough to draw people in. "We wanted people to come to these tools because there was something of interest already there, not because they were told to," says head of user-centered design, Myrto Lazopoulou.

Also, Rangaswami believed that by posting policies up front he'd implicitly be telling people how to use the new tools (in psychological terms he'd be *anchoring* and *framing* usage norms), and he wanted employees to define uses for themselves. He wasn't concerned when employees started using the platform for non-work purposes like setting up a poker club and asking advice on camcorder purchases. As he says, "These uses don't consume any scarce resources, and they might encourage people to use the tools more." He also felt that explicit policies about hate speech and harassment were unnecessary. Any employee familiar with the organization's culture and norms would already know that such content was forbidden, regardless of medium.

Still, for any company building a new collaborative infrastructure, online norms and culture certainly will evolve, whether or not explicit policies are in place at the start. It is likely that over time some contributions to the new infrastructure will be inappropriate — demeaning to a co-worker, boss or subordinate, or wrong on important facts. How managers deal with these contributions will be critically important, and highly visible. Wikipedia has shown that it's possible for a large group of people to interact productively and collegially, even while disagreeing, as they build a digital resource over time. It remains to be seen whether this will be true within companies.

Managerial Support. Line managers at DrKW had to do a great deal of work to make sure the new platform would be used once it was in place. Darren Lennard, DrKW's managing director, became a believer in wikis as soon as he saw a demonstration because, as he said, "I was getting 300 internal e-mail messages a day. The great majority of them were completely irrelevant to me, but I still spent hours each day going through them. I saw that wikis were a better tool for a lot of our collaborative work, and I wanted my team to start using them."

To encourage usage, Lennard put up an initial wiki page with a vague mission statement on it, e-mailed everyone to tell them about the new tool and what it could do, and encouraged them to start using it. Nothing happened. People weren't clear on what it was, what it should be used for or what its advantages were, so they stayed away. "I realized that I had to be a lot more directive if I wanted behaviors to change," says Lennard, "and I also had to put up wiki content that required users to get involved." Lennard posted the agenda and action items for an upcoming meeting, suggesting that people use the wiki for their responses to them. "I told my desk that I would no longer read e-mail on some topics," he says.

One of the most surprising aspects of Enterprise 2.0 technologies is that even though they're almost completely amorphous and egalitarian, they appear to spread most quickly when there's some initial structure and hierarchy. "Information anarchy is just that," says Lennard. "You have to give people a starting point that they can react to and modify; you can't just give them a blank workspace and say, 'Use this now.' I'm confident that we'll hit a 'tipping point' after which tool use will grow on its own, but we're not quite there yet." Blogging at DrKW, for example, has increased gradually but steadily (see "Growth of Blogging Inside DrKW," p. 28.)
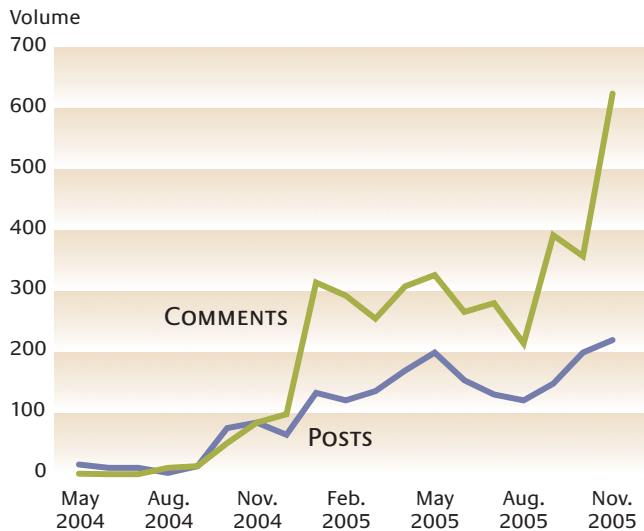
Challenges and Opportunities

Even if managers and technologists do everything correctly when initiating Enterprise 2.0 technologies within their companies, two potential threats remain. The first is that busy knowledge workers won't use the new technologies, despite training and prodding. Most people who use the Internet today aren't bloggers, wikipedians or taggers. They don't help produce the platform — they just use it. Will the situation be any different on company intranets? It's simply too soon to tell.

The second threat is that knowledge workers might use Enterprise 2.0 technologies exactly as intended, but this may lead to

Growth of Blogging Inside DrKW

Internal blogging at DrKW has grown steadily, but still only a small percentage of employees have actively participated.

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unintended outcomes. Intranets today reflect one viewpoint — that of management — and are not platforms for dissent or debate. After blogs, wikis and other voice-giving technologies appear, this will change. However, the question remains: Will the change be welcomed?

Management scholar Chris Argyris has noted a distinction between people's *espoused theories* and their *theories-in-use*. An espoused theory, for example, might be, "I'm sincerely interested in learning, improvement and empowerment. I want to give the people in my organization all the tools they need to interact." Argyris found, though, that most people's theory-in-use is driven by (among other things) the need to remain in unilateral control and the desire to suppress negative feelings. When the two theories come into conflict, the theory-in-use usually wins, which helps explain why so many corporate empowerment initiatives fail, or at least disappoint.[12]

It's easy to see how these insights apply to Enterprise 2.0 technologies. These tools reduce management's ability to exert unilateral control and will be used to express some level of negativity. Do a company's leaders really want this to happen? Will they be able to resist the temptation to silence dissent? What will happen, for example, the first time someone points out in their blog that an important project is behind schedule and that corners are being cut? What will happen if the content on the new platform is uncomfortable for powerful people within a company?

Because no one's in charge of the Internet, no one can shut it down when it veers in directions they find uncomfortable. But a company's Enterprise 2.0 technologies can be shut down. They also can be influenced by people in authority — bosses can exert

all kinds of subtle and not-so-subtle leverage over online content.

This means that leaders have to play a delicate role, and one that changes over time, if they want Enterprise 2.0 technologies to succeed. They have to at first encourage and stimulate use of the new tools, and then refrain from intervening too often or with too heavy a hand. If they fail at either of these roles — if they're too light at first or too heavy later on — their company is liable to wind up with only a few online newsletters and whiteboards, used for prosaic purposes.

Enterprise 2.0 technologies have the potential to usher in a new era by making both the practices of knowledge work and its outputs more visible. Because of the challenges these technologies bring with them, there will be significant differences in companies' abilities to exploit them. Because of the opportunities the technologies bring, these differences will matter a great deal.

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