

## Article Details

### Collaborative Technologies Demand Deep Change

By Maryann Lawlor

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B-52 navigators track mission progress during an operation Iraqi Freedom bombing mission. Networking enables current warfighters to monitor missions and to share that information. Future collaborative technologies will take this a step further by enabling front line personnel to contribute information and assessments to the decision-making process.

observations of past events; their predictions are founded on what they see as the inevitable speed of technological innovation and an urgent need to address new global threats.

One of the most influential effects of collaborative technologies is that they "push authority way out to the edge," according to Paul Saffo, a director of the institute. He cites early military operations in Afghanistan to illustrate his point. When al-Qaida terrorists attacked on September 11, 2001, most military leaders were stunned, he says, but special operations forces that are used to functioning independently knew immediately that responding to the attack called for their distinct talents.

"They [special operations forces] were off in Afghanistan doing their thing before anybody really knew what was going on, and we literally and truly won that war with about 150 Green Beret master sergeants," Saffo relates. "You can just imagine the image of a Green Beret master sergeant on a satellite phone calling up a B-2 bomber to drop ordnances on a specific point. Well, talk about pushing organizations to the edge!"

The important lesson to be learned from this experience applies to corporations as well as to the military, he adds. "Here is a 29-year-old master sergeant, who doesn't have to fill out any forms or ask anyone's permission, manipulating billions of dollars of equipment. The results speak for themselves, but I would also say to traditional command officers and to corporate America, 'You know every time you think you're so innovative? Well, do you trust a 29-year-old with the assets of your company?'" he states.

It was the available collaborative technologies that enabled this kind of independent action, and it was what occurred in Afghanistan afterward that Saffo says he finds worrisome. Once military leaders "got used to the new normal," they reverted to traditional military tactics, techniques and procedures. This led to incidents like those that occurred in Tora Bora, he states.

"So here's the lesson for management: It is hard to really get to the point where you are actually leveraging and living the new organizational forms that take advantage of our new technologies. It often happens by inadvertence or accident. It's

Organizations must be willing to push power to the edge.

Although transformational, today's network-centric warfare concepts may be infinitesimal compared to how technology-fueled cooperation can and will revolutionize future operations. Military leaders already have seen an inkling of the ramifications of capabilities such as instant messaging, short message service and blogging. And experts believe that these technologies not only could but should change the fundamental structure of both corporate and military organizations.

The potential changes promise to dwarf transformation in depth and breadth. Organizations will need to reshape how their elements function and relate to one another. Technology-driven collaboration will shift power from the core of an organization to its edges where tasks are carried out and goals are met. And, the concept of the human-machine interface must be revolutionized to ensure true two-way communication between the silicon- and carbon-based partners.

The Institute for the Future, Palo Alto, California, is one of the organizations examining the collaborative technology. Its researchers monitor how collaborative technologies change the way group members cooperate, and they envision how these capabilities will dramatically revamp processes and procedures. Their evaluations are based on

hard to attain to begin with, but then once you have it, it's hard to maintain," Saffo says. He also believes that Osama bin Laden has not been captured because U.S. forces went back to traditional warfighting after those first few months in Afghanistan.

Corporations and the military are at the point where they have extraordinarily powerful new tools, he adds, but to leverage that power they must think in radically new ways. "If you don't do that, you are just paving the cow path. You're wasting vast sums of money to do things in an old way, and you're kidding yourself that you're innovative," Saffo declares.

Part of the challenge of changing how organizations operate is created by the term "network" itself, Saffo proposes. People think they have a common understanding of what the word means, but networks are not all equal, and over time the label evolves either into an invitation to think creatively or it becomes "intellectual wallpaper over unexamined assumptions," he says. This confusion contributes to making some unwise decisions when leaders come to believe that because they are networked, they are collaborating. But this is not always the case, Saffo contends.

This confusion also can lead to creating larger bureaucracies instead of leveraging technology. According to Saffo, the creation of the U.S. Department of Homeland Security is one example. In his opinion, establishing this bureaucracy was "a vast error." Rather than disrupting established organized agencies, technologies should have been used to build links between them so they could collaborate easily, he says.

Saffo uses the department's response to Hurricane Katrina to illustrate the issue. "A lot of people put a lot of blame of the problems of [Hurricane] Katrina in a lot of directions, but I really think that the proximate cause was not the incompetence of [Federal Emergency Management Agency Director Michael] Brown. He's a symptom, not a cause. The cause was the disruption of the agencies," Saffo maintains.

In the past, organizations worked from the middle out, but the lesson learned from the Hurricane Katrina response should be that leveraging technology means that organizations must work from the edges in, he adds. "You push your sensing and your collaboration tools out to the edges of the organization. Your organization almost becomes an organic form where everything that's touching the outside world is collecting and sifting information," he explains. After empowering the people at the edge, organizations must create safety net systems in case activity spins out of control, he adds.

However, Saffo admits that transforming into a technology-based organization poses challenges, and decision makers themselves can contribute to the problem. Most of today's leaders were raised with different capabilities than what is available in the 21st century, and they are uncomfortable using them. Solving this problem requires some relearning, he explains. "The decision makers at the center have to understand in their guts how this stuff really works. It's the difference between understanding something intellectually in your head and understanding it emotionally in your heart," he maintains.

One way to achieve this understanding is called reverse mentoring, a technique Saffo recently used to help a large corporation. Executives were paired with newly hired personnel—"freshly minted Ph.D.s," Saffo calls them—as teachers. "We said to the new hires, 'This is not warm and fuzzy because at the end of the year, we're going to give your executive an exam and we're going to give him a grade. How he does on that exam is going to affect your career.' This is the kind of learning attitude you have to create if you're going to do this stuff," Saffo relates.



Knowledge about collaborative technologies is important because executives must be able to appreciate their employees' experiences with them. However, more importantly the nature of networking itself demands this knowledge. Saffo contends that when serious disasters occur, the effects move through a network a lot faster than they move up a hierarchy.

Early in operation Enduring Freedom, special operations forces camped in undisclosed areas of Afghanistan. According to Saffo, the autonomous decisions these forces made contributed to defeating terrorists quickly.

Learning from young employees is just one transformational step military and corporate leaders must take. An operational model metamorphosis also is required to combat today's threats, and collaborative technologies can support this change.

Saffo uses the games of chess and Go as an analogy to describe how the terrorist threat has transformed the battlespace. In chess, the center of the board is the important real estate to control; in the game of Go, the edges are critical to winning. While chess pieces are hierarchical, each stone in Go is equally powerful. And whereas the goal of chess is to amass forces, the point of Go is fluidity. These same principles need to be applied to the military organization, Saffo maintains. "It really is that simple. We have left the world of chess behind. War is no longer chess; it's Go," he states.

Technologies that facilitate collaboration move organizations from the chess to the Go framework. They require that leaders experience the technologies themselves, seek out the people within their firm or command that are intuitively doing the most creative work with it then spread the ideas. "What you do is take new technology and work it, but you also realize that digital technology is the solvent reaching the glue of our organizational structures. Once you make a change, don't do what we did in Afghanistan and sit back and say, 'What a good boy am I; that was really clever' and stop, because you'll slide backward. What you have to say is, 'These are transitional forms, and we're going to keep changing the form,'" Saffo maintains.

These changes already have begun in current operations. The circular contrails above the skies in the Middle East illustrate the new strategies and tactics collaborative technologies enable, Saffo maintains. In previous conflicts, aircraft would fly to a target, drop a bomb then leave the area. He describes this tactic as "ready, aim, fire." The new model is "ready, fire, steer," which increases individual warfighter effectiveness in operations, he says.

But this capability leads to an even more challenging change: the need for humans to communicate with machines. "As if it weren't bad enough that we haven't figured out how to have sensible conversations with our colleagues, the new challenge

is how to have sensible conversations with our machines," he observes. This will be the issue of the next decade, he predicts.

Ubiquitous sensor capabilities are one example of why this skill is so important. They provide so much data to personnel in command centers that information overload can cause humans monitoring the systems to ignore warnings. Learning how to filter and understand information will be a big challenge in the future. "The next Pearl Harbor, I can assure you, is going to come. It will come because they always come from the failure to understand what our machines are trying to tell us," Saffo states.

Instituting organizational changes will help decision makers tap into the knowledge networking generates, and the terrorists' tactics indicate that they already have learned some of these lessons. The events of September 11 revealed that terrorist groups use networks to collaborate and employ the skills required to take advantage of them. "I think it's worth looking at the terrorist for lessons in management," Saffo states.

Although terrorists have been using networks effectively, Saffo observes that winning battles is about more than collaboration. "In the short term, I'm very worried. But I'm a long-term optimist because basically this is a battle against modernism. This battle has been fought before. The fact is that history is on our side. The very act of fighting against modernism means that the whole opposition is going to lose force and energy, and I think it's going to burn itself out within 10 years. The public who are either sitting on the fence or leaning toward the anti-modernists are going to come around," he adds.

In the meantime, however, U.S. organizations that are willing to embrace change will use collaborative technologies, Saffo believes. "In organizations, people look for something that is constant. It may be the mission or the cohesion. In the military, it is loyalty to colleagues in the same foxhole. What we have never found, and I find it fascinating, are people who find their sense of constancy in constant change. The best kind of organization in this environment is a true learning organization that is so unafraid of change, it really understands this [battle] is Go, not chess," he says.

#### **Web Resources**

*Institute for the Future:* [www.iftf.org](http://www.iftf.org)

*Go:* [http://en.wikipedia.org/wiki/Go\\_\(board\\_game\)](http://en.wikipedia.org/wiki/Go_(board_game))

#### **Digital Devices Retool Industry From the Bottom Up**

Commanders and corporate executives who want to ride the collaborative technology wave need to take note of how its capabilities already are infiltrating society. Experts studying collaboration and cooperation have identified several trends that are likely to accelerate as devices become more capable and users design their own ways of using them.

A team led by Andrea Saveri, research director, and Howard Rheingold, research affiliate, at the Institute for the Future, Palo Alto, California, conducted a technologies-of-cooperation study with funding from the Defense Advanced Research Projects Agency. Their research revealed that collaborative capabilities are beginning to emerge in organizations from the bottom up rather than the top down. Creators of software applications, plug-ins and add-ons are distributing their products free on the Web, and employees are bringing them to the office and using them to facilitate cooperation. These tools will be quite powerful, Saveri says.

One way they are likely to affect corporate and military operations in the future is by increasing the value of what Saveri calls weak links. Although users may have worked with certain colleagues on an occasional basis, collaborative technologies will make it easier for them to connect to friends of these acquaintances even though the relationship is far removed. These bridges will grow the network, increasing the knowledge available.

Weak links can challenge traditionally structured organizations, Saveri says. Forming cooperative relationships can be useful to learn new ways to save time and money; however, the collaboration often occurs outside conventional boundaries. As a result, processes must be developed to determine how to make these social networks visible.

Ubiquitous collaboration can challenge organizations in other ways. Peer production networks allow people to dedicate their time and talent to work that interests them. "That's a whole dynamic in organizations that is very risky. It challenges traditional methods of leadership and control, yet it leverages very local tacit experience and knowledge," Saveri offers. Some corporations, such as Toyota, are using this approach very effectively with their supplier networks, she adds. And in some ways, this is the methodology terrorist cells use, she notes. Each cell is semi-autonomous, meaning that while no one is directing them, their individual visions and objectives focus their efforts.

This tactic calls for the structure and purpose of the leadership of an organization to be re-examined. "It

does create a different relationship between a CEO level and leadership level and the rest of the organization. It certainly means that issues of trust must be addressed," Saveri states.

And although she calls trust "a huge issue," Saveri believes technology may be able to act as a surrogate for the in-person networking that has been the foundation for building trust in the past. Informal discussions that take place in chat rooms or through e-mail can strengthen links, facilitating formal discussions.

But according to Rheingold, most corporate executives are not yet comfortable with technology-enabled social interaction and are not familiar with many of the latest collaborative technologies. "This is not just using the telephone in a new way. It's the thin edge of a wedge of a device that is combining the telephone, the PC and the Internet into a new medium. We see these things morph and change as the technology becomes more powerful and the literacy about its use becomes more widespread," he says.

Literacy about new capabilities is very important, Rheingold maintains, yet there is a generational gap that can affect organizations. Most executives over the age of 30 use e-mail and the Internet. However, personnel under the age of 25 also are adept at text messaging, blogging, instant messaging and other emerging capabilities. The challenge to large organizations is to determine how to ensure that the younger employees' knowledge can move up the corporate ladder and be used to support a firm's mission.

Rheingold's experience in working with industry confirms the research that says these new capabilities are moving through organizations from the bottom up, and he adds that this trend requires that companies examine organizational structure. Traditional human resources department responsibilities may have to expand so that they can adequately train employees at various corporate levels to understand and utilize new collaborative technologies.

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