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## Simple, Yet Complex

A new management theory is gaining momentum in the business community. In this story you will learn why complexity theory encourages executives to

- Discard the traditional command-and-control style of management
- Develop relationships among their employees to ensure a creative and productive workforce
- Maintain a strong vision for their companies yet manage with a hands-off approach

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EXECUTIVES WHOSE BUSINESS SCHOOL CURRICULUM failed to include old episodes of Mutual of Omaha's Wild Kingdom may gain a new appreciation for Marlin Perkins--as management guru. A growing number of consultants and academics are looking at complexity theory, once the domain of the biological and physical sciences, to help managers improve the way they lead organizations.

What is complexity theory? One way to understand it is to look skyward to the avian maneuverings of birds. A lone bird follows simple rules of behavior, such as when and what to eat. However, a group of birds flying together exhibit complex, unpredictable, creative behaviors that emerge naturally from the interactions of individual birds. For example, a flock in v-formation is able to fly farther and faster than an individual bird. The flock that is formed when autonomous agents--birds--interact is known as a complex adaptive system. To fly in a flock, a bird need follow only three simple rules: Don't bump into anything, keep up and stay in close proximity. Yet following these rules leads to a cohesive, seemingly complicated group of birds flying with the speed and precision of the Blue Angels.

Complexity theorists argue that managers should allow creativity and efficiency to emerge naturally within organizations rather than imposing their own solutions on their employees. They can do this by setting some basic ground rules and then encouraging interactions or relationships among their employees so that solutions emerge from the bottom up. Managers can't predict what the solutions will be. But just as a flock of birds can achieve more than a bird flying solo, it's likely that the energy and enthusiasm that are unleashed when employees are working together will yield successful results.

Several researchers and companies are examining how an understanding of complexity theory can apply to businesses. Roger Lewin and Birute Regine are

two researchers making headway in this area. Lewin and Regine have backgrounds in biology and psychology, respectively, and Lewin has written several science books, including *Complexity: Life on the Edge of Chaos* (Collier, 1994). They are currently collaborating on a book about complexity theory called *The Soul at Work: Complexity Theory and Business, As If People Matter* (to be published in January 1999 by Simon & Schuster). "With the Internet and networks, the extent of business ecosystems is growing," says Lewin. "And the pace at which the landscape within an ecosystem changes--thereby forcing changes throughout--is increasing." That's why Lewin and Regine believe today's business climate is particularly ripe for the application of complexity theory.

Recently, Features Editor Megan Santosus spent an afternoon discussing complexity theory and its implications with Lewin and Regine at their Cambridge, Mass., office.

CIO: How do you define complexity theory for business people?

Lewin: There is no simple definition of complexity theory. Traditionally, business people think about their worlds in a very mechanistic, linear way that is [characterized] by simple cause and effect and is predictable. Most of the world isn't like that. Complexity theory looks at these systems in ways that are organic, nonlinear and holistic.

CIO: What are the principles of complexity theory?

Lewin: A few simple rules guide the interaction between the components of a system. First, in a business context, managers should attend to relationships at all levels within their organizations. The second rule is that small changes can have large effects. And third, interesting and unpredictable properties can be expected to emerge from a system. As a result, it is hard, if not impossible, to implement a strategic plan for anything but the short term. A hoped-for direction can be set but not the ultimate goal.

Regine: People often think of complexity theory as a metaphor. We certainly don't think of it like that because that is like saying it's just another fad. What we're saying is that underlying principles found in nature apply to human organizations.

CIO: So how does this organic way of looking at things apply to businesses and other organizations?

Regine: It gives them a different way of looking at their organizations. Take the property of emergence, for instance. In computer models based on complexity theory, when autonomous agents interact and mutually affect one another, patterns will emerge--an intrinsic order just waiting to unfold. But it comes about in a nonlinear way, so the order can't be predicted. When we translate computer models into human terms, the autonomous agents are people and the interactions among them are relationships.

Complexity theory underscores the importance of relationships. How people relate to one another affects what emerges in the organization--the culture, the creativity, the productivity.

So if you want a culture that is intrinsically creative, growing and learning, you have to look at the relational level: Can people be real with one another? Is there trust? Do people acknowledge each other and the good work they do? In organizations that have relationships as their bottom line, a culture of care and connection emerges--and it is palpable. In this context, people are more willing to change and are more adaptable because they feel they're not alone and that together they can manage most anything.

CIO: It sounds like complexity theory flies in the face of traditional problem-solving techniques.

Lewin: The idea of teamwork has been popular, for instance, partly because managers believe that people are happier as members of teams but also because teams can be highly effective in the workplace. The traditional approach to [implementing a team structure] would be for managers to say, "OK, we're going to make you a team," and to expect everyone to fall in with the idea. This can work, but from what we hear, it often doesn't work very well because it is imposed and artificial. When managers genuinely value relationships in the workplace and truly listen to people and act on their suggestions, a culture of care and connection emerges in which people are highly responsive to the needs of the organization. Teams can form spontaneously and powerfully in this context, and the job gets done. It's much more effective to allow solutions to problems to emerge from the people close to the problem rather than to impose them from higher up.

CIO: Do you know of any organizations that have used complexity theory to solve problems?

Regine: At Muhlenberg Regional Medical Center in Plainfield, N.J., it took up to 24 hours to admit patients and give them their first dose of antibiotics. [The hospital] used a complexity approach--[implementing] small changes and bottom-up solutions, then allowing things to unfold--to solve the problem. The vice president of nursing put together a diverse team of people--secretaries, doctors, administrators--to try different things, to experiment, to make small changes and see how they could reduce the wait. First they tried having all the admissions procedures done in one place. Then they looked at duplication of services. One thing led to another, and within only four or five months they had reduced the admission time to one hour. No one could have anticipated that the new way of doing admissions would have emerged so quickly and so efficiently.

CIO: How does complexity theory apply to strategic planning?

Regine: Everybody knows that in most industries long-term strategic planning is near impossible, and this is often viewed as a failure on the part of management. When you recognize that the business environment is a complex system that is inherently unpredictable, you understand that the failure of long-term strategic planning is not a failure of management but an expected outcome of the business environment. The challenge for managers is to feel comfortable merely setting the direction for the future and to be ready to adapt and evolve as the environment changes.

The Industrial Society, a London-based business consultancy, was on the brink of financial collapse three years ago. A new CEO was brought in, and he said, "Forget about a strategic plan. The first things to get right are the relationships among top management." He then asked the workers in the lower levels of the organization what they thought they could achieve in their wildest dreams. Some responded with wildly unrealistic profit targets--and many were met. The energy tapped was incredible because a project was available for anyone who wanted to participate [on a team], whether it was a secretary or top manager. The company is now financially healthy.

CIO: Traditional consultants who are in the business of providing solutions may find themselves at odds with complexity theory.

Regine: Many consultants often get in the way of emerging solutions because of their need to prove they have answers. There is a role for consultants, but it's a very different kind of role and leadership.

CIO: How should the role of consultants change?

Lewin: Of course, corporations will always need consultants to go in and fix many operational problems, such as line scheduling. But when you are dealing with organizational issues, particularly those that require change, it's appropriate to consult in a different way. A complexity theory perspective is particularly helpful to disheartened, disconnected companies where workers lack commitment--rather, they just watch the clock and work to pick up a pay check. For instance, a big steel-making company in Australia was having terrible industrial relations problems, with workers and managers battling each other. Not surprisingly, productivity was way below its potential. Consultants went in and simply got people talking to each other. Before very long, these big, muscular Aussies were building relationships with each other. Workers and management began to empathize with each other's problems. And productivity went up 20 percent. The consultants didn't have a strategic plan to increase productivity by a certain amount. They attended to relationships, as the complexity approach says, and the productivity enhancement followed.

CIO: Wouldn't the role of executives have to change as well?

Regine: CEOs and CIOs are used to thinking that they have to have all the answers, that they are in control of everything. Well, control is not something you can have over a complex system, at least beyond some very general parameters. So yes, executives do have to change. They have to give up the illusion of control and concentrate instead on setting a larger vision for their organizations so that the creativity of their people can emerge.

Lewin: It's not about saying let's look at business organizations as if they are complex systems. They are complex systems. Managers have been operating within them in a very controlling way, which dampens the potential creativity of employees. What we're saying is shift the way you [lead] organizations, loosen control to encourage more creativity. A culture of care will emerge, as opposed to a culture of command and control, and your company will be more creative and productive, too.

CIO: What are the qualities executives need in order to be successful in a complexity environment?

Regine: Be accessible, respond immediately to others, acknowledge and value people's contributions at all levels, create opportunities for people, take the time to build trusting relationships and walk the talk--you are the embodiment of the organization's values. If you can't be honest, then how can you expect others to be? [Wouldn't dishonesty] affect the culture, the organizational identity and how you develop relationships with other organizations? It all starts with you.

CIO: Are there any qualities employees need to have in a complexity environment?

Regine: The people on the front lines have to conquer the fear of freedom that comes when they are given the leeway to do something important.

CIO: What about organizations? Are there particular qualities that characterize a complex adaptive system?

Regine: There's a tendency in business to focus at the macro level. One thing complexity theory says is that the most powerful processes happen at the micro level--the people, relationship dimension. [To initiate these processes,] start small, experiment, include others and promote a "just try it" environment. Set up a few simple rules, then let go. Small successes will [encourage] other people to start pilot projects, and a comfort with change will catch on.

Complex adaptive systems have three ways of functioning. There is the stable zone, in which the company is in a state of inertia, not responding to opportunities nor adapting to changes. However, stability is not something to strive for because it leads to an unresponsive system. Then there is the chaotic zone, in which the organization is bouncing off the walls, haphazard, led by

events rather than choices and overreacting. And there is a zone in between these two, the creative zone, which is the place to be--not so stable that [little] changes, nor so unstable that everything falls apart. There's a lot of fluctuation in the creative zone--ups and downs and paradoxes keep occurring. For example, leaders in complex adaptive systems need to be strong and have vision, yet they also need to be comfortable managing with a hands-off approach. Also, companies may know the direction in which they're moving, but they don't know exactly where they will end up. Creativity emerges from tolerating such ambiguity.

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