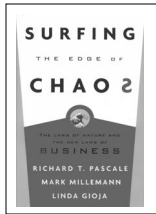# ACHIEVING INNOVATION BY WAY OF CHAOS

BY KALI SAPOSNICK

Surfing the Edge of Chaos: The Laws of Nature and the New Laws of Business
by Richard T. Pascale, Mark Millemann, and Linda Gioja

For centuries, discoveries in science have influenced the development of management theory. In the 1800s, business leaders applied Newton's linear logic—output is directly proportional to input—to control economic activity and build enterprises. In today's volatile business environment, some corporate executives have begun to question that model's efficacy. Recognizing that organizations share more similarities with nature than machines, they're beginning to translate core principles of the life sciences into business applications. As a result, their companies are innovating in ways that give them a competitive advantage in the global marketplace.

What in particular are these corporate leaders extracting from natural laws? According to Richard T. Pascale, Mark Millemann, and Linda Gioja in *Surfing the Edge of Chaos: The Laws of Nature and the New Laws of Business* (Crown Business, 2000), they're recognizing that organizations are living systems. Like other species, organizations have enormous potential to innovate, proliferate, and aggregate to achieve dominance in their environment. In the natural world, species strive to reproduce more rapidly than their rivals and thereby dominate by sheer strength of numbers. Similarly, in the business world, organizations that learn from and adapt to their environment by harnessing their employees' intelligence and creating opportunities for innovation can significantly increase market share in their respective industries.

Using numerous examples from both nature and business, the authors illustrate the power of emulating a living systems model. For instance, Mexican-based Cemex, the world's third-largest cement company, delivers its product guided by the same simple—and yet effective—rules that ants follow when they scavenge for food. Cemex drivers, with trucks loaded with wet cement, determine their own daily routes with the goals of (1) delivering as much cement as possible and (2) avoiding duplicating the efforts of other trucks. By dispatching its fleet of cement mixers without a preordained direction, the company is able to deliver cement where and when customers want it on two hours' notice. In this way, Cemex has wiped out competition in eight countries to date.

Lessons from Complexity Theory

Underlying such breakthrough results are the ideas of complexity science. According to the authors, complexity science represents a radical departure from what they call "social engineering," the long-entrenched management tradition based on the ideas that leaders are more knowledgeable than others and that change is predictable. The authors contend that social engineering failed to achieve significant organizational transformation because it neglected to honor the basic principles of living systems.

According to complexity theory, people cannot be engineered. As a company's most valuable intellectual resource, employees must be given ownership of organizational initiatives, and leaders must find ways to fully utilize their staff's potential in order to achieve breakthrough change. To redefine the role of leadership for the next century, the authors explore how managers can apply the following principles from complexity theory to revitalize their organizations:

1. *Equilibrium is death.* The authors advise companies to avoid staying in one place or using one strategy for too long; otherwise, their mechanisms for coping with change will erode. IBM, for example, lost its competitive advantage in the 1980s at a time when its mainframes dominated the market. Senior executives ignored the advice of strategic planners, who foresaw the impact of the coming computer revolution, including PCs and open architecture. Unwilling to deal with the turmoil that responding to the change would bring—even as the mainframe's market share began to decline—company leaders "simply went behind closed doors, quantified the gap, and raised prices."

General Electric's CEO Jack Welch, on the other hand, squarely faced the fact that his company's businesses lacked a competitive edge. In the early 1980s, he deliberately sought to shake his staff's complacency, increase the pace of change, and improve quality. For example, he initiated "Workouts," public events in which lower-level employees gave feedback to senior executives. He also launched the Change Acceleration Process, in which he trained the top 100 executives to be change agents and then gave them a specific business project to build and demonstrate their skills. These initiatives provoked fresh ideas and innovative responses.

2. *Going to the edge of chaos evokes higher levels of mutation and experimentation*. The authors describe the edge of chaos as "the sweet spot for productive change." Rather than indicating a location, chaos refers to a condition "through which order and disorder flow," an uncomfortable state that forces people to toughen up or fade away. As the authors put it, "Innovations rarely emerge from systems with high degrees of order and stability." Recognizing how tricky it is to navigate the edge, they offer three devices that can help leaders do so successfully:

- *A strange attractor.* An attractor acts like a magnet drawing a system toward the edge of chaos. For example, in the face of poor product quality during the 1980s, Ford's leaders used a vision statement as a strange attractor by declaring to both employees and customers, "Quality is number one." Continued reinforcement of this statement inspired remarkable quality improvement.
- *Amplifying and damping feedback.* Feedback slows or speeds up the change process. John Brown, managing director of British Petroleum Exploration (BPX), used this device in 1989 to reverse BPX's fortunes in oil exploration. By asking top leaders to conduct an extensive organizational audit with strict deadlines and public presentations, he highlighted the company's challenge to discover oil and moved the organization out of its stagnation.
- *Fitness landscapes.* A fitness landscape depicts in three dimensions how competitive an organization is. "Higher degrees of fitness are depicted by linear height on the landscape; a loss of fitness is visualized by going downhill. . . ." To develop fitness requires finding ways to motivate—not direct—people to descend into turmoil and discomfort in order to innovate. Federal Express management learned this lesson the hard way when they tried to optimize pilot productivity without involving the pilots. The resultant rigid policies led pilots to strengthen their union and ultimately bargain for higher pay, fewer flight hours, and increased retirement benefits.

3. *In chaos, the components of living systems self-organize and cause new conditions to emerge.* The authors describe how the parts of a system, when faced with turmoil and instability, will network in new ways and undergo dramatic metamorphosis. In business, self-organization occurs when leaders fully utilize the intelligence of each employee, making it possible for the company to unleash its potential to seize opportunities and solve problems as they arise.

> Leaders that can help their organization operate on the principles of living systems can maximize their business's ability to solve problems, innovate, and remain viable.

Direct sales organizations fuel their operations on this principle. Tupperware, for instance, is arranged like a pyramid, where self-employed dealers are responsible for finding others to host home parties; outstanding hosts are recruited to become dealers; and highly successful dealers get promoted to protégé dealers. Social capital and economic incentives bind these groups together. These self-organizing networks are highly successful; 80 percent of all American homes have at least one Tupperware product.

The principles of self-organization and emergence also apply to societies and economies. In Silicon Valley, for example, scientists, academics, entrepreneurs, and investors network to create partnerships, temporary project teams, and strategic alliances between their companies and institutions. In its size and in the wealth it generates, Silicon Valley dwarfs all other regions worldwide.

4. *Living systems cannot be directed along a linear path.* This last principle requires organizations to accept that certain consequences cannot be predicted; at best, managers are able to create conditions that will most likely produce the outcomes they want to realize. The authors provide three guidelines of how to do so:

- Design, don't engineer.
- Discover, don't dictate.
- Decipher, don't presuppose.

For instance, in 1990, Monique and Jerry Sternin went to Hanoi for Save the Children to help alleviate malnutrition in Vietnamese children. The Sternins tested a new model called "positive deviance." By weighing children in the poorest villages, they identified the few who were "positive deviants," that is, those who were not underweight. They learned that those children's eating habits differed from others in that their parents supplemented their rice-based diets with freely available seafood and sweet potato leaves, and fed them more frequently. The Sternins then helped the rest of the community incorporate these foods into their diets, and within 6 months, more than two-thirds of the children gained weight; 24 months later, 85 percent were in the acceptable nutritional status category.

Leaders as Context Setters

As the authors illustrate with countless examples, the role of corporate leaders has shifted. They must let go of traditional command-and-control leadership styles and instead become context setters; to that end, they must establish the conditions that unfreeze their organizations; harvest, not hide, conflict and instability; and allow stakeholders to self-organize so that greater levels of creativity can emerge. The authors frequently remind us that "'living systems' isn't a metaphor for how human institutions operate. It's the way it is." Leaders that can help their organization operate on the principles of living systems can maximize their business's ability to solve problems, innovate, and remain viable. ◘

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