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The Allure of Chaos

By J.C. Herz

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Why are executives so drawn to the science of complexity?

Business leans on science the way Ginger Rogers leaned on Fred Astaire - for legitimacy and cachet. Science lent 20th-century business the aura of quantitative certainty, starting with Frederick Winslow Taylor's scientific management and Ford's assembly line. As science moves away from Newtonian notions of cause and effect to study complex systems like global climate and the human genome, which have too many variables to accurately predict, business follows. If there were a Hollywood Stock Exchange for business buzzwords, "complexity" would be trading high.

Compared to buzzwords that fueled the dot-com boom ("disintermediation," "synergy" and any acronym beginning with the letter "b"), complexity theory has had a long time to bake. In the '80s, large-scale manufacturing companies like **Motorola (MOT)** sponged up systems dynamics concepts that led to Total Quality Management - and a wave of downsizing and corporate flattening. In the 1990s, MIT management guru Peter "The Fifth Discipline" Senge proposed the kinder, gentler theory of the "learning organization," pushing management theory closer to the complexity-driven idea of self-organizing systems and organizations that emerge from intelligent parts, rather than driving strategy from the top down. Corporate intranets and telecommuting accelerated that process, spawning a cadre of knowledge managers to figure out how the cogs should communicate in an increasingly virtual workplace.

"Roughly speaking, I'd say about five years ago, the management literature using complex systems as an idea began to explode," says Yaneer Bar-Yam, president of the New England Complex Systems Institute, which conducts workshops on complexity theory for executives. "The ideas of complex systems were appealing because they were talking about the fact that you can have effective systems even in a world that is hard to predict, even in a world that doesn't always make sense in the traditional way."

As the dot-coms boomed, random, nonlinear financial events seemed more the rule than the exception. Here was a set of scientific theories that quantified the mayhem. And those theories were put forward by physicists, chemists and biologists with no vested interest in the revolutionary rhetoric. Science may have changed, but its promise of rational analysis remains a beacon.

The trouble is that compared with other ideas that wash through the corporate group-mind - "the customer's customer," "permission marketing," "the experience economy" - complexity theory is not something you can grok with a 200-page book filled with bullet points. You can't wave it around in a meeting and have everyone walk out doing things differently. Business books about complex systems bend over backward to keep mathematical formulas off the page, but the fact is it's easier to understand this stuff if you got a B+ or better in calculus.

On the other hand, executives know they can always put eggheads on the payroll as consultants. Perhaps the biggest direct beneficiaries of complexity theory's rise to prominence are consulting companies like the Bios Group, which uses insect behavior to simulate things like shipping networks and supply chains. Backed by Ernst and Young, Bios boasts two Nobel laureates and 50 doctorates on the payroll - flyphaper for the dozens of Fortune 500 companies that Bios counts as clients. As an MBA, you know you've arrived when you're cutting checks to Ph.D.s.

Executives may be lured by exotic science, but they stick around because complex systems solutions do what they're designed to do: improve performance. **Southwest Airlines (LUV)**, for example, took a complex systems approach to cargo operations and got written up in the *Harvard Business Review* under the headline "Swarm Intelligence."

But beyond the operational mechanics, these ideas have cultural resonance, because they acknowledge the complication and messiness of the world, and of human beings, and of organizations, which don't need to be perfectly understood in

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order to function well. Complexity theory accommodates the fact that things break and that decisions need to be made in the absence of full information. It recognizes that a little redundancy (aka slack) is necessary to keep systems from burning out or becoming brittle. It values diversity, biological and otherwise, and underscores the case with ecological metaphors that make corporate executives feel like lions in a *National Geographic* special.

Most important, it assumes that individuals (even ants) are autonomous and work in their own local interest, and that management should organize on that basis, rather than trying to instill ideology about sacrifice for the sake of shareholder value. "People used to think that when you had a group of people together, the individual was less important," says Bar-Yam. "But in a complex system, each individual becomes important in the context of the whole, and that's what's so startling. You can have both individual importance and group importance at once."

This circle-of-life ethos strikes a near-perfect philosophical chord with a business culture that yearns to resolve cooperation and competition, enlightened management and ruthless execution, personal freedom and corporate focus. Complexity theory pushes all the right motivational buttons. Better yet, it does so with computer simulations, intelligent agents and references to physics, biochemistry and global climate change. It's got visual imagery that blows away the pies and flowcharts of industrial-age management. Fractals. Snowflakes. Fireflies. Not epic things like stars and planets anymore. In management, as in science, it's the small things that fascinate us now. Industrial-age business had the big bang to inspire it. We have termites. There is progress after all.

J.C. Herz is the founder of Joystick Nation, a consulting firm in New York.



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