



# Book Complexity and Creativity in Organizations

Ralph D. Stacey  
Berrett-Koehler, 1996

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## Recommendation

Organizations are adaptive structures that respond creatively to changing circumstances. This responsive evolution takes place on an official, surface level, and also on a deeper, personal level composed of interactions between people. So says Ralph D. Stacey, who combines insights from psychoanalysis, behavioral research, the new science of complexity and other disciplines to suggest ways for your organization to become better at learning and adapting. While the basic concepts of complexity theory presented in this book are steadily gaining popularity, the actual complexity of the book's content might make it difficult for non-experts to follow. Although the book's tight organization keeps chaos at bay, some of the language might leave you at "the edge of disintegration." Nevertheless, *BooksInShort* strongly recommends this book to executives and managers looking to build a theoretical foundation for their organizational approach, in addition to the many academics who will appreciate its systematic explanation of the organizational consequences of systems thinking.

## Take-Aways

- Management based on control leads to a vicious circle in which tighter controls increasingly alienate individuals and lead to more controls.
- Organizations are complex adaptive systems with interacting parts.
- In a complex adaptive system, all parts interact with each other according to a set of rules.
- There is no way to know how organizations will evolve over time.
- Organizations spontaneously self-organize, producing uncertain outcomes.
- Creativity is a messy process, based on spontaneous self-organization.
- The two basic types of interaction are the legitimate network and the shadow network.
- Organizations evolve due to feedback processes among individuals.
- Continual feedback loops are based on individual discovery, choice, action and interaction.
- Given adaptive systems' uncertainty, allow space for creativity and learning in organizations.

# Summary

## The Vicious Cycle of Management

Executives and managers want to stay firmly in control of their organizations. That's why you call them managers - They want to manage. Therein lies a problem for today's changing organizations. Unfortunately, the dominant management approach, one generally based on control, leads to a vicious circle in which increasingly tighter controls have an increasingly alienating impact on individuals in the organization. The result is that managers look for still another savior recipe, which provides other kinds of controls, which further alienate individuals.

Managers and executives believe that success depends on being in control. The theory is that by knowing where the organization is going and by planning its future, managers can control the process of moving toward and realizing this vision. Using this framework, you think it is possible to know what is going to happen. Thus, you believe you can foresee and control events, so you seek to set up rigid guidelines for people to follow. This kind of model doesn't work. Rather, the control steps you take to cope with increasing uncertainty and dissension only provoke more uncertainty and dissension. Thus, you make it even harder for yourself when you attempt the next save-the-organization recipe.

## Complex Adaptive Systems

You can get off the merry-go-round if you recognize the real nature of complex organizations, and switch to using an adaptive management model. The science of complexity studies the way nonlinear feedback networks and complex adaptive networks work. Your organization is such a network.

“Contrary to some of our most deep-seated beliefs, mess is the material from which life and creativity are built.”

A complex adaptive system consists of parts that interact with each other according to a set of rules. A change in behavior in any part will affect the behavior of other parts, a phenomenon that creates a learning system. In turn, such systems form nests of systems - in that organizations interact to create national economic, societal and political systems - which join to form a global system, which is itself affected by the environment. Thus, we all live in an interconnected ecology, from the individual to the vast global system.

“The very steps we take to cope with increasing uncertainty and dissension themselves provoke more uncertainty and dissension, and this in turn makes us look even harder for the next saving recipe.”

At every level, individuals and organizations are following a series of simple rules for action. These rules operate much like the digital code of computer programs and the chemical code in the genes of biological organisms. Individual actions may seem random and chaotic, but when combined over time, they produce order out of this seeming chaos.

What looks like a mess is, in effect, the essence of life and creativity. They don't depend on a prior design. Rather, as they operate according to these simple rules, they go through a period of spontaneous self-organization that produces emergent outcomes. These complex adaptive systems have an inherent order that will develop over time as a result of their experiences. But no one can know what this order will be until it unfolds in real time.

“Complex adaptive systems have an inherent order that is simply waiting to be unfolded through the experience of the system, but no one can know what that order will be until, in fact, it does unfold in real life.”

In other words, you can't control this unknowable process. But, you don't have to accept anarchy as the alternative. Rather, the process's uncertainty opens the possibility of creativity at the edge of disintegration. At this point, there is a phase transition between the stable everyday zone of operations and the unstable zone of disorder. Creativity occurs when you avoid this everyday routine, and also avoid falling into disintegration on the individual level (becoming psychotic) or on the organizational level (anarchy).

“To remove the mess by inspiring us to follow some common vision, share the same culture and pull together is to remove the mess that is the very raw material of creative activity.”

Certainly, this creativity is a messy, paradoxical process, which involves responding to change, cross-fertilization, dialogue,

competition and innovation. It might inspire you to get rid of the mess by uniting everyone behind a common vision, culture or joint action. Avoid this impulse. Instead, recognize that you can't plan exactly how these creative processes will go or what their outcomes will be, because the spontaneous self-organization process produces its own patterns and results, which are emergent strategies.

Since they are emergent, you can't know them. Rather, you must use a new management paradigm based upon self-reflection and learning from experience at all levels of the system. This will enable you to understand what you can foresee and what you can't foresee.

## **The Complexity of Human Networks**

An understanding of the complexity of human networks is the basis for viewing the system in this new way. In such networks, many agents interact to produce adaptive survival strategies for themselves and, therefore, for the system or the parts of it to which they belong. These systems interact to create a supra-system in which the agents and systems co-evolve.

“Uncertainty and disagreement about roles, purposes, tasks and outcomes are rising to a critical level that significantly reduces our ability to foresee and therefore stay in control.”

Human relationships in organizational systems operate in much the same way, since every human organization is a network of individual agents who interact with each other and with the agents of other organizations. The two basic types of interactions or links between people are: 1) The legitimate network, which corresponds to the notion of formal networks described in earlier sociological writings, and 2) The shadow network, which corresponds to the notion of informal networks.

“Such spontaneous self-organization produces emergent strategies; that is, the interaction itself creates patterns that no agent individually intends or can foresee.”

The legitimate network is the organization's formal, intentional structure, created by its most powerful members or otherwise established by well-understood principles. It is designed to create a predictable, regular, system-wide pattern of behavior that carries out the organization's primary tasks. But, since these shared rules are not always followed, a shadow network also exists. This is the spontaneous, informally created network of links developed by individual agents among themselves. While small groups share some of these rules, other rules are specific to individuals, so they may or may not follow the group rules. Over time, the organization develops as a result of the feedback processes that occur among individual agents. These agents respond through three processes:

1. In discovery, they gather information and make sense of the rules of the organization.
2. In choice, they decide what to discover, how to make sense of it, and what action to take.
3. In action, they take actions based on the choices they made.

In the process, those involved are affected by various factors, including emotion, power relationships, strategic thinking based on self-interest and other factors. These actions, in turn, affect other agents, so they respond, and their response then influences the actions of the first actor. There is a continual feedback loop based on discovery, choice and action, which provides the basis for a co-evolutionary feedback process that leads to learning and change. At every level, from the individual to the organization, co-evolving parts and individuals co-construct their individual selves and the organization as a whole over time.

## **The Chaos State**

Since individual agents have their own unique way of responding to this feedback process, individuals and organizations adapt over time. Thus, rather than thinking of feedback networks as deterministic, regard them as adaptive. A deterministic network occurs when a few rules are fixed over time, much like a pendulum swings back and forth, or a population of ants depends on the number of ants that are born and die and the food constraints on growth. These deterministic feedback systems are most suited to a stable equilibrium or environment. Negative feedback processes reduce any disturbances that might create change.

“At each level the whole constitutes a networked feedback system of co-evolving parts, or agents; this whole is in turn a component of, or agent in, a co-evolving whole. Thus, an agent at one level is a system one level below.”

However, as networks become more complicated, at some point, the system is drawn to a state that exists between stability and

instability. This state might be considered a "strange attractor," which has come to be called, "chaos." Under such circumstances, the outcome becomes indeterminate, although the behavior in the system might be patterned. This patterning is the basis of a dissipative structure in which - despite some kind of underlying structure - a new structure emerges. Essentially this emergence occurs because as negative and positive feedback occurs, the system moves back and forth and may eventually come to generate a new order through a process of self-organization.

“Individuals co-construct both their individual selves and the world of other selves, and they do so in interaction with each other.”

Just as these processes operate in the chemical, physical and biological worlds, so they operate in organizations as well. Thus, as much as you might like an organizational system to be subject to controls, the controls won't work because human systems are not deterministic. They are adaptive, self-organizing, learning systems that exist at the edge of chaos.

## Applying the Theory

In an adaptive system, all agents or individuals adapt their behavior in light of its consequences for their purpose. They respond as they learn how their behavior impacts on others and on the whole system. Even birds in a flock do this, by adapting their behavior when they get too close to other birds. Computers can be programmed to respond adaptively.

A community of evolving systems forms a fitness landscape based on the survival strategies individuals or agents use. Ironically, steady, smooth evolution will typically get you stuck on the first peak, since any smooth, small step from a peak only leads downhill, reducing fitness. So if you just try to climb incrementally, you will stay on the first peak. By contrast, to get to the highest peak, you need to accept a decline in fitness and efficiency before you seek to improve again. Likewise, for superior organizational improvement, you need to go through a period of discovery and exploration before moving up and ahead.

“The new discovery is that past some critical point in the level of the control parameter, the system is attracted to, or caught up in, a paradoxical attractor that is both stable and unstable at the same time, an attractor lying in the borders between stability and instability. This 'strange attractor' is now called chaos.”

Given these principles of complexity, adaptive systems and feedback, you need to provide space for novelty or creativity in your own organization. This space is located just at the edge of system disintegration, so you need to be open to creating this kind of system. As uncertain and unpredictable as this may seem, it is effective, since the human brain and mind are complex adaptive networks, as are human groups, organizations and societies.

An individual's fitness landscape depends on how he or she behaves with others in the group. So creativity never is just an individual process, but involves an interaction with others in a group. The space for novelty in a group in turn exists in the paradoxical space in which people are their individual, different selves, yet conform enough to play. It exists in the state of tension between the legitimate system seeking to maintain the status quo and the shadow system seeking to undermine that status quo and replace it with another approach based on increased fitness.

Your goal should be to encourage this creativity in groups, since managers and executives cannot control the kind of complex co-evolutionary process that drives all nonlinear feedback networks, but can only participate in emergent processes. In other words, you can't know exactly how people will interact and what the final outcome will be, but you should provide the space for this creativity to emerge as people work to find the highest peaks in the co-evolving fitness landscape they create together.

## About the Author

**Ralph Stacey** is a professor of management and director of the Complexity and Management Center at the Business School of the University Hertfordshire. He is also a visiting lecturer at universities in Sweden and the Netherlands, and a visiting professor at the University of Malta. He is an active consultant to major companies and the author of several books on management and organization, including *Dynamic Strategic Management*, *Chaos Frontier*, *Managing Chaos*, *Managing the Unknowable* and *Strategic Management and Organizational Dynamics*.

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