[print this page]

Welcome to the World of Complex Adaptive Systems

More and more, business is a function of increased specialization. We see this in the form of outsourcing. We also are witnessing how technology is used to respond instantly to the distribution of products. For example, Wal-Mart now requires its top 100 vendors to use smart tags to track inventory items. These smart tags, referred to as Radio Frequency Identification or RFID relies on satellites to pickup the movement of inventory items anywhere anytime. Eventually, we will see this technology at the consumer level, shopping carts displaying your items and amount due as you drop them into the cart.

So what's behind this trend? Many leading experts have characterized it as Complex Adaptive Systems – the next evolution beyond the so-called learning organization. Most businesses are bogged down in major planning activities – things like formal strategic planning sessions. In an effort to break out of this stalemate, many businesses are in hot pursuit of knowledge management, business intelligence, and other techniques to make planning dynamic, real-time, and responsive to the fast changing world we now live in. But this may not be good enough in such a fast changing turbulent world. Organizations must adapt continuously to a changing environment, similar to how living things adapt in the natural world. This has led to the study of complex adaptive systems and its applicability to organizations.

Nature is always changing and adapting – experimenting with doing something different. These natural variations create some degree of confusion and chaos, but they also help ensure long-term survival. It's worth noting that most variations are useless to nature, but the few that stick make the difference between extinction and continued existence. These lessons have great merit for all organizations - some degree of chaos is natural for ensuring that systems are adaptive, enabling the survival of the organization. The study behind this connection between chaos, adaptability, and survival is grounded in complex adaptive systems.

"How does the natural world create such brilliant strategies? Put simply, nature is constantly considering a massive set of experiments through the generic process known as natural variation. These variations, apparently random in nature, test a wide range of survival strategies – changes in size, shape, color, mating behaviors, food preferences, internal chemistry, and much more. Most of these variations are failure, but a few of them succeed. The lucky few – those gifted with favorable variation – will live longer, reproduce in greater numbers, out-compete other species, and eventually come to dominate future generations."
- Reinventing Strategy: Using Strategic Learning to Create and Sustain Breakthrough Performance by Willie Pietersen

Complex adaptive system's is the study of natural systems – how they interact, adapt, and survive over time. But increasingly, the world of complex adaptive systems is making its way into the business world. We can learn a lot by simply understanding many of the characteristics behind complex adaptive systems:

1. Boundaries are not imposed from outside, but the organism is always testing boundaries, using them as focal points to force needed change for long-term survival. For most organizations, these boundaries represent management hierarchies, department silos, division offices, and so forth.

2. Continuous feedback is always in place to control the complex adaptive system. Two types of feedback take place – positive and negative. Positive feedback elevates the outputs whereas negative feedback would reduce the outputs. For example, as the temperature in your house drops, your thermostat gets the feedback and kicks on your heater, raising the temperature. This is negative feedback – adjusting the outputs up in relation to inputs that are dropping.

3. Emergence not planning is how things really get done. Complex adaptive systems follow certain natural laws or rules, but nothing is formally planned in advance. Unpredictability is a natural event in a nonlinear world. If things are linear, then you can influence the value of outputs through inputs. When confronted with complex interdependencies, you will have to "emerge" with a solution. For example, the weather is a complex adaptive system and we adjust our clothing according to local weather forecasts (feedback).

4. Small changes in the world of complex adaptive systems are not ignored. These are referred to as "butterfly effects" – small change that ultimately brings about huge outcomes. For example, Enron failed to pay attention to inside warnings about its accounting problems. These small, butterfly type events can mushroom over time and lead to total collapse of the system. In the world of complex adaptive systems, there is extreme sensitivity to butterfly effects.

The world of complex adaptive systems has given great insights into what an organization must do to avoid extinction. For example, in the old days, we bought cameras that lacked film, flash bulbs, and other important sub-systems. Now we buy a camera with everything built in, connected and working together simultaneously. This is one of the lessons for business with complex adaptive systems – the need to get all parts of the business highly connected and working together for rapid adaptability.

If you have a strong command of the so-called learning organization, popularized by Peter Senge in his landmark book The Fifth Discipline, then you should seriously consider the next level of learning - Complex Adaptive Systems.

"To make a healthy organism, you have to put its fundamental systems into balance so the parts are working with each other rather than against each other. Organizations that are out of balance become stuck – unable to move forward. What's more, Darwin might have argued: Those organizations that remain stuck, become dead."
- Unstuck: A Tool for Yourself, Your Team, and Your World by Keith Yamashita and Sandra Spataro, Ph.D.