

Enterprise Mandelbrots and Self Organization

By Rick Dove, Paradigm Shift International, e-mail: dove@parshift.com, Senior Fellow, Agility Forum

Twenty-four months ago this series began with an essay entitled “The Meaning of Life & The Meaning of Agile”. We now close the series with an essay that could have been entitled “The Secret of Life & The Secret of Agile”.

Isaac Asimov’s robotic laws of fiction fame had three rules which governed all robotic interaction with humans. Asimov’s many books repeatedly show how these three simple rules result in the best possible response to all possible interactions. Interesting that he didn’t, instead, hand each robot a policies and procedures manual at birth; but maybe understandable: he would have never finished this manual sufficiently to christen the first robot. Nor could that robot, no matter how wonderful its *positronic* brain, ever finish integrating the apparent but necessary contradictions. The brain would either loop among contradictory procedures or infinitely recurs into catatonia.

Asimov’s three simple laws that allowed a vast population of thinking robots to beneficially serve

humankind:

“A simple set of ideological beliefs generates a highly successful response capability.”

1) A robot may not injure a human being or, through inaction, allow a human being to come to harm.

2) A robot must obey orders given it by human beings except

where such orders would conflict with the First Law.

3) A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Another robotist, Rodney Brooks, builds autonomous robots at MIT’s Artificial Intelligence Laboratory. One famous six-legged graced many magazine covers a few years ago, uncannily exhibiting behaviors of insect life when faced with obstacles and problems in the real world. What set the Brooks approach apart from others was its lack of any overall world-view or master control - the behavior emerged from the combined interactions of many independent simple-ruled decision mechanisms. There was no master control that understood how to coordinate six legs into forward motion, how to climb over or circumnavigate an obstacle, or how to right itself after being turned upside down. There were, instead, independent joint controls with very simple rules that could sense stimulus from the environment, including the actions of fellow joint controllers. Eventually the collection of independent decision makers/effectors learn which coordinated responses result in goal attainment. Again, simple rules capable of complex behaviors and new responses to unanticipated events.

What Brooks came to believe in later stages of his research was that the emergent behavior could not easily be determined in advance. That is, humans that designed the rule systems for the myriad of autonomous units could not predict the collective results. That makes it difficult if you’re trying to design such a system to a precise behavior specification. On the other hand, it makes it possible for the system to cope with unanticipated situations.

We have examples all around us that say we can design emergent systems purposefully. The free market economy is one - though we constantly screw around with the core equations it is not necessary - but somebody always feels that there are better ways so we explore things like MIT’s economic intervention, Sweden’s socialized medicine, and the USA’s anti-monopolistic laws. Actually, these perturbations act as mutation experiments that can make the economic organism more fit for epochal cycles.

These are examples of self-organizing systems. In the business world we see experiments with empowerment, teaming, listening to the voice of the customer, organizational learning, and other concepts as movements toward self organization - though not necessarily with that end in mind.

The Unshackled Organization by Jeffery Goldstein offers a highly readable and cogent discussion of self organizing enterprise: “Self-organization is not hierarchically driven. Instead it is a process of system transformation that is self-generating. Self organization happens when a work group or an organization is facing a challenge and is allowed to respond to that challenge in a spontaneous, unshackled manner.....a work group or organization as a natural system will spontaneously know how to reorganize in the face of a challenge, *if the obstacles hindering its capacity to self-organize are removed.*”

Let’s return to teams for a moment. A concept sweeping the corporate cultures of the world, and generally misunderstood. Goldstein says it well: “We need to be careful that we are not simply imposing a participative corporate culture on what was previously not a teamwork environment. Real teams emerge out of the process of self-organization. To be sure, the emergence of greater coordination and coherence in a system is similar to cohesive teamwork. A close look at self-organization, though, reveals that emergent coherence is not based on a premature consensus among the parts of the system, but is, instead, the result of the amplification of *differences* in the system. Read him for the examples. Read him to understand the linkage of non-

linear systems (*chaos theory*) to organizational complexity. Read him for the secret.

Chaos theory sounds like something that should explain the workings of today's organizations. It does, actually, with very valuable insight; but too deep for these two pages. Fractals are one of the aspects of chaos math that have gained general exposure, and the *Mandelbrot set* is the most famous fractal graphic. Named after the inventor of fractal geometry, the infinite complexity of the Mandelbrot graphic (seen in the accompanying figure) is obtained from a simple equation with three terms.

Overlaid on that graphic is the Collins and Porras quotation from *Built to Last*, the book that identifies a strong corporate ideology as the secret to long term corporate viability. In their research comparing numerous well known companies they showed how those with a strong ideology consistently outperformed those without; and they suggested that having a clear corporate ideology is so overwhelmingly powerful that its specific content is not important. Basically they see the ideology as the core values of the corporation that guide the decisions of all employees, creating an organizational result that emerges from the collective actions of truly empowered employees.

Collins and Porras show us that any ideology is better than none. But we have come to believe that the content of an ideology does make a difference, and that some ideologies are vastly better than others. We reached this conclusion upon completing an *Agile Enterprise Reference Model and Case Study* for the Agility Forum, where Remmele Engineering was examined across twenty five critical business practices for change proficiency. We chose Remmele as a case study because we saw that they exhibited broad-based maturity at change; but without any real understanding of the causes when we started.

To our surprise and delight, the more practices we analyzed and the more instances of change proficiency we examined, the more they all owed their adaptability to a very few common ideological beliefs plainly stated in the corporate Guiding Principles. Among those Guiding Principles are the beliefs in

constant change and continuous learning. These two, as well as a few others, form the generating function for the organizational entity called Remmele Engineering. Like Asimov's robotic laws and Brooks's distributed control, a simple set of ideological beliefs generates a highly successful response capability to unanticipated change. And like the Mandelbrot set, infinite complexity emerges from a few simple terms.

This work has led me to think of a well ordered ideology as the *Enterprise Mandelbrot*. The Reference Model contains Remmele's entire set of Guiding Principles. Sorting through them to find the core set that forms the generating equation can be an enlightening exercise.

Technology alone cannot make an enterprise change proficient - that is first and foremost dependent upon people making decisions. Self organization is the secret here; and the work by Collins and Porras taken together with the insights of Goldstein make the case and show the way. To implement those decisions, however, requires an architecture that enables and facilitates change. This first series of 24 essays laid a foundation of definitions, metrics, and analysis for change proficiency. Now, in the next series, we will focus on the implementation and design principles for self organization and high change proficiency.

THE ENTERPRISE MANDELBROT

“Companies seeking an “empowered” or decentralized work environment should first and foremost impose a tight ideology, screen and indoctrinate people into that ideology, eject viruses, and give those who remain the tremendous sense of responsibility that comes with membership in an elite organization. It means getting the right actors on the stage, putting them in the right frame of mind, and then giving them the freedom to ad lib as they see fit. It means, in short, that cult-like tightness around an ideology actually *enables* a company to turn people loose to experiment, change, adapt, and – above all – to *act*.”

(Built to Last, pg. 139.)