

God's Laws for Adaptable Systems

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By nature I am a control freak. I feel most comfortable when I am directly involved in all the decisions and most of the execution. I know from long experience that nothing's likely to turn out the way I envision it if I don't actually do it myself. And I have no patience for communicating infinite nuance to someone else so that they can do it the way I want it done. I'm old enough to know better now, but I don't really want to change the way I am - I get too much joy from creating exactly what I want to see, and nothing short.

In moments of deep truth I suspect it's really because I have insufficient skills for perfect static planning. I can't play the chess game forty-seven moves in advance so I want my hands on the controls as the creation takes form. I know things will happen that I haven't foreseen or would fail to convey to someone else, and that I'll need to be there to make the corrections and guide the result to the end I envision.

One of my creations is now a well-adjusted and quite capable grown-up daughter. The management style that brought this creation to the "operating" mode was completely different. There was no micro-managed hands-on control here. We rarely told her what to do, or

what to think. Instead, we showed her how to reach her own decisions and how to think, and suffered quietly as she learned. Today she is everything we envisioned, and we don't have to stand at the controls to keep it that way.

Two completely different management styles. One builds things that are static and lifeless, requiring constant attention and energy to remain useful and relevant over time. The other builds a self-organizing system capable of dealing with unforeseen challenges; able to adjust, correct, and augment its own capabilities to meet the needs of new environments - it evolves. From the designer/builder's perspective, one is under control and the other is out of control.

Out of Control is the name of a book written by Kevin Kelly (Addison Wesley, 1994). The flyleaf says "[It] chronicles the dawn of a new era in which the robust adaptability and autonomy of living organisms becomes the model for human-made systems, for everything from telecommunications to movie-making technology, from the global economy to manufacturing processes and drug design."

If you've been following this essay series you'll know that we are now searching for business design principles - specifically, principles that can guide the design of highly

adaptable business practices, processes, strategies, structures, cultures, products, services, and whatever else it takes to keep the business entity viable and successful in a changing environment.

Kelly's already done this on a broader scale. His book explores adaptable natural systems like bee hives, prairie ecologies, and the evolution of species, and also looks at man-made systems like computer viruses, the Internet, and artificial life. In the final chapter he postulates a set of common laws at work in natural evolving systems, calling them the "Nine Laws of God".

In the accompanying table we have reproduced them in condensed form as they are worth exploring in some detail. Not because they are the ones we seek, but because they clarify the nature of our search and offer serious food for thought - his examination of adaptable natural systems and eventual synthesis of underlying laws is a model for our pending examination of adaptable business systems and the extraction of the physics at work.

The principles we seek may well end up to parallel and include many if not all of the principles he has found. We will, however, be focused on business systems and business environments, and will build a physics of adaptability and a descriptive language that speaks in business terms rather than biological terms.

Kelly goes out of his way to recognize that the nine laws he offers are not the only laws necessary to make complex sustainable systems; but he suggests that "these principles are the broadest, crispest, and most representative generalities" of all the observations noted in the science of complexity.

Complexity. That word keeps coming back whenever we talk about highly adaptable systems. Actually, it's skulking in the background whenever we talk about today's business environment. Nobody wants to hear it but it's right there in front of you - business today is a complex endeavor, even when it looks simple. Your business operates in an environment that is re-shaped daily by the interactions of countless independent unpredictable events. We're not talking about supportive events like individual end-user sales transactions, we're talking about the effects of cataclysmic technology (overnight delivery, microprocessors, Internet, virtual reality, genetic engineering, antigravity, cold fusion), the effect of broad-reach communications on markets (Intel's microprocessor fiasco, Wendy's raw beef problem, Nike's Michael Jordan shoe demand), the actions of governments (end of cold war, NAFTA, European Union, emergence of China), and much more in this vein.

Apple Computer. Apple of a large market's eye - right up until the day they became irrelevant. It can

The Nine Laws of God

Out of Control, Kevin Kelly, 1994, Addison Wesley (Get the book to see the expanded ... condensations)

Distribute being. The spirit of a beehive, the behavior of an economy, ... and the life in me are distributed over a multitude of smaller units (which themselves may be distributed). When the sum of the parts can add up to more than the parts, then that extra being ... is distributed among the parts. ...

Control from the bottom up. When everything is connected to everything in a distributed network, everything happens at once, wide and fast moving problems simply route around any central authority... governance must arise from the most humble interdependent acts done locally in parallel, and not from a central command. ...

Cultivate increasing returns. ... Anything which alters its environment to increase production of itself is playing the game of increasing returns. And all large, sustaining systems play the game. ... Life on Earth alters Earth to beget more life. Confidence builds confidence. Order generates more order. Them that has, gets.

Grow by chunking. The only way to make a complex system that works is to begin with a simple system that works. Attempts to instantly install highly complex organization ... inevitably lead to failure. ... Complexity is created, then, by assembling it incrementally from simple modules that can operate independently.

Maximize the fringes. ... A uniform entity must adapt to the world by occasional earth-shattering revolutions, one of which is sure to kill it. A diverse heterogeneous entity, on the other hand, can adapt to the world in a thousand daily minirevolutions, staying in a state of permanent, but never fatal, churning. ...

Honor your error. A trick will only work for a while, until everyone else is doing it. To advance from the ordinary requires a new game, or a new territory. But the process of going outside the conventional method, game, or territory is indistinguishable from error. ...

Pursue no optima; have multiple goals. ... A complicated structure has many masters and none of them can be served exclusively. Rather than strive for optimization of any function, a large system can only survive by "satisficing" (making "good enough") a multitude of functions. ...

Seek persistent disequilibrium. Neither constancy nor relentless change will support a creation. A good creation, like good jazz, must balance the stable formula with frequent out-of-kilter notes. Equilibrium is death. Yet unless a system stabilizes to an equilibrium point, it is no better than an explosion and just as soon dead. ...persistent disequilibrium -- a continuous state of surfing forever on the edge between never stopping but never falling. ...

Change changes itself. ... When extremely large systems are built up out of complicated systems, then each system begins to influence and ultimately change the organizations of other systems. That is, if the rules of the game are composed from the bottom up, then it is likely that interacting forces at the bottom level will alter the rules of the game as it progresses. Over time, the rules for change get changed themselves. ...

happen to you too - if you still think business has simple rules and simple answers.

We're not just talking total corporation here. The same complexity scales to the favored-vendor and plant level. Which plant stays open and which one gets closed. Which gets the new investment and which doesn't. Which gets the hot product to build and which gets the Edsel. These are not straightforward simple decisions that happen to a vendor or a plant - they are the result of countless events at the plant, in the market, with the Union, among the management, in materials science, with acts of government, and in many other areas that on one crucial day shift the balance to a completely different point.

If you're part of the plant and you don't like where things went, who's to blame? The environment you operate in is so complex that you generally have the most single-point leverage on the outcome. In complex systems control really is bottom up - no matter what the org chart says or who issues the decisive memo. Learn how to adapt and learn how to read the forces of change - move out of the way, move into the light, and keep moving. Read the Laws again. They are at work in your environment whether they are recognized or not. If you abdicate responsibility for understanding them they will work against you.

Reread "Cultivate Increasing Returns" and think Microsoft. Often the very fact that their success breeds more success is presented as an evil big-business

conspiracy - yet it is the most natural and rational of all directions for a company to travel.

Reread "Grow By Chunking" and think about the failures of automation in your process and information systems history. These environments are just as complex as business strategy and plant operation. Training, work rules, prior skills, compatibility, vendor competency, vendor viability, management support, and many more factors impact the viability of these systems every day.

There are very close parallels between these Nine Laws and the RRS principles (Feb 97) we will be looking for in business systems. The notion of a self-organizing distributed system of independent but interrelating elements is both central and pervasive in both.

"You can't teach a kid to ride a bike in a seminar" said David Sandler. If you want to understand the principles of adaptability at work in your work, consider being part of the Discovery Workshop series this year. If you qualify as a site, you'll see them in your terms. As a participant on the site teams, you'll see them objectively as generic principles in someone else's environment. Either way or both, you won't just read about it, you'll be building your own physics of adaptability.