Five Rules for Evolutionary Management

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Introduction

Medical doctors can diagnose and cure illness. And, yet, even the finest doctor cannot improve a person who is not sick. This is not because people are perfect, but rather because people are complex. Similarly, system dynamists and other systems practitioners can diagnose and cure organizational problems. However, even the best practitioners cannot steadily improve an organization in the absence of an identified problem. A significant chance always exists that improvements in one part of the system will unexpectedly conflict with another part.

The bad news is that intelligent effort is unlikely to be intelligent enough to ensure continual improvement in our organizations. The good news is that this problem has already been solved, albeit not by humans. Nature's great organizations –tigers, penguins, and butterflies – approach a degree of inter-dependent coherence that managers can perhaps dream of and which biologists have yet to understand. Continual improvement in nature's organizations was made, and continues to be made, in the face of complete ignorance: No butterfly has ever understood why it works so well. The mechanism that drives nature's improvement is evolution. And, systems thinkers can harness the same principles.

We don't need to look far to find examples that illustrate how perilous "improvement" can be. MIT professors Nelson Repenning and John Sterman have investigated the strange case of Analog Devices. Analog's well-executed TQM program succeeded in slashing cycle times and defects in manufacturing. Unfortunately the successful changes in manufacturing conflicted with pricing policies in marketing and led to a devastating drop in the company's profit.

This example is striking because Analog, which has since recovered, is a well managed company. Ray Stata, Analog's founder and the force behind the TQM program, has been a long-time supporter of MIT's system dynamics group. He and his colleagues are among the best and most systemically-oriented of managers. The imbalance created by the TQM program is not attributable to poor management, but solely to the fact that Analog is a complex system.

Organizational ignorance means we can never reliably "figure out" what will make our organizations better. Evolution offers an alternative path to improvement. Evolutionary management replaces the impossible task of understanding our complex organizations with the merely difficult task of understanding evolutionary mechanisms.

Organizational Genetics.

Understanding evolution – whether organizational or biological -- means understanding three things: (1) The "genetic material" of evolution, (2) how novel genetic material can arise and (3) how genetic material can be manipulated so that "children" can surpass "parents".

Policy as genetic material – The need to be tough on policies, not people

So what is the genetic material? The answer is well known for the biological case: Biological evolution operates on genes. Each gene generates a continuing stream of proteins which create structure and which catalyze action in the cell. Genes are the fulcrum that nature has exploited for evolution: If genes evolve, the organism evolves.

The organizational counterpart of a gene is an *idea.* Evolutionary biologist Richard Dawkins uses the term "meme" for an idea that can evolve and be passed on from person to person. Today, the new field of "memetics" is concerned with all manner of such ideas from little tuneful commercial jingles to the idea of a wheel. We do not have to be quite this inclusive, since we are concerned only with ideas that control organizations. Jay Forrester has called these ideas "policies".

By "policy" Forrester means any rule – implicit or explicit – that produces decisions. For example, a pricing policy might be: "Raise prices when inventories are low". A marketing policy might be: "Increase promotions when market share falls". Some policies are explicit, perhaps even written in policy manuals, but most policies are implicit, rarely if ever articulated and stored only in the heads of a company's employees. Policies guide pricing, marketing, budgeting, accounting, production, research, development, construction, acquisition and every other category of activity undertaken by an organization. Policies, like genes, produce a continuing stream of action. Policies, like genes, are a fulcrum on which evolution can operate. If policies evolve, so will the company.

The first step in understanding evolutionary management is to recognize that we are not evolving people, but rather policies. Darwinian views of social institutions have gained a reputation for being hard on people. The term "survival of the fittest" has been interpreted by some as meaning that it is O.K., even mandatory, to discard human beings. In fact, however, evolutionary management mandates no such thing. **Evolutionary rule #1 is be tough on policies, not people.**

Genetic novelty – the need to control innovation.

In the imagination of horror-film directors, mutation drives evolution. People who stay up too late and watch too much TV believe (correctly) that mutation causes biological novelty and also believe (incorrectly) that the novel biology is often superior (in a survival sense) to what went before. In fact most mutations are fatal. As a consequence, even primitive cells possess sophisticated "error checking" processes that make mutations in genes exceedingly rare. The most likely time for a mutation to occur is when cells divide;

estimates vary but roughly a mutation in a gene position occurs only once in every 1 million to 10 million cell divisions.

The problem with biological mutation is that it not only can create a slightly better gene, it can also produce a much worse gene. This problem becomes more severe as the fitness of the gene increases. Evolutionist John Holland has recently offered a homey illustration of this point: Randomly changing an ingredient of your favorite recipe is unlikely to improve the dish.

Turning to human organizations, consider the business policy: "When inventories are low raise prices". A random mutation might be to replace the word "low" with the word "yellow": The policy "When inventories are yellow raise prices" is unlikely to improve matters, unless, perhaps, the business happens to involve selling ripening bananas.

Of course changing "low" to "yellow" is a rather unusual policy change. Most changes to policies are either misunderstandings or improvement attempts. A misunderstanding is similar to a biological mutation, but what of attempted improvements?

In order to improve market share we might change the pricing policy to "price below the competitors". Unfortunately, because we are operating in a complex system, it is far from certain that the change will have the intended effect. Perhaps, competitors will match our price decrease, so we will not improve market share but will decrease our revenues. In a complex environment, a policy change will likely have unforeseen consequences and, in this sense the policy change will produce unpredictable or random effects, just like a biological mutation.

If innovations in policy correspond to mutations in genes it is likely that organizations need to control innovation for the same reason that organisms control mutations, and for the same reason that you stick to the recipe: A policy innovation is much more likely to disrupt a well functioning business policy than it is to improve it.

I suspect that policy innovation is too frequent in business today. People always want to try something new, managers want to make their marks. It would seem that our policies mutate rapidly, at least when compared to the one in 1 in a million probability of a gene mutating during cell division. My guess is that for most organizations, evolution could be speeded by putting the breaks on policy innovation. **Evolutionary rule #2 is to control policy innovations.**

Surpassing the parents – the need to foster contact
Compared to their miserly attitude toward mutation, cells are positively profligate with a less well known evolutionary process, recombination. Consider your own cells. Half the chromosomes in each of your cells comes from our your mother and half from your father. In recombination, a chromosome from your mother crosses with a similar chromosome from your father to create a chromosome which is part Mom's and part Dad's. You package these combo-chromosomes into your sperm or your eggs (depending on obvious

parameters) and pass them on to your children. In the process you might just produce a child who is better than either of your parents, just as combining the best part of eggs Benedict with the best part of a sandwich produces an Egg McMuffin, which is better than either "parent", at least if you happen to be driving in the morning.

A numerical example might help. Say we have two "chromosomes" made of 5 digits each. Say the two "chromosomes" are 32,955 and 87,010. A recombination event at the coma will produce two children: 32,010 and 87,955. Assuming that bigger numbers are better numbers, one of the children is better than either parent (or course, the other one is not as good). The process of recombination can speed up evolution by combining good parts of different parents to produce offspring that are even better.

The organizational analog of recombining chromosomes or culinary dishes is the recombination of policies. "Policy recombination" goes under the more common name "learning". Say that my pricing policy is "increase prices when inventories are low", and your pricing policy is "set prices at a margin of 200% over variable costs." My policy is good because it responds well when demand exceeds supply causing inventories to fall. Your policy is good because you will never price below costs. Perhaps you will learn from me, combining my idea with your own. Your policy afterwards might be "set prices at a margin over variable costs, and raise those margins when inventories are low". Your new policy still ensures that prices never drop below costs, but it also responds to supply and demand.

Evolutionary principles suggests that putting people with good policies together so that they can learn from one another will foster the more rapid evolution of even better policies. Managing through teams, for example, is good from an evolutionary perspective because it brings people together so that they can learn from one another. **Evolutionary rule #3 is mix people together.**

Organizational Selection

It might seem that Rule number 3 implies that the more learning the better. This is false, or at least incomplete. Imagine a team of managers who's job it is to set price. They meet to decide on a good policy. Each manager airs his view and a calm dialogue ensues which eventually leads to consensus. Each manager learns from his colleagues; that is, the managers combine what they think are the best points to construct the "killer" pricing policy. Sound idyllic? Its not. This scenario is exceedingly unlikely to result in a superior policy.

The problem lies in the phrase "what they think are the best points". Remember, we began this whole discussion with the idea that organizations are too complex to figure out. If you believe that, then you're stuck: No person and no team of people can know what the "best points" are. Reaching a consensus on what people *think* are the best points is about as likely to lead to a good policy as reading the answer off a monkey's typewriter. The monkey may type out a policy of Shakespearean greatness, but you wouldn't want anything important – such as your livelihood – to depend on it.

If people are not guided in their learning, they will be as likely to learn the wrong thing as the right thing. On average each idea learned will be neutral. In biological systems, neutral changes result in *genetic drift*, a process in which a species changes its form, but without any corresponding increase in fitness. The organizational counterpart is *learning drift* in which people learn from one another – that is they recombine ideas – but without any corresponding improvement in corporate performance.

Pointing and pushing mechanisms –the need for selective learning

How can evolution create a better company if no one can be relied upon to specify what people should be learning? Consider nature's answer.

Nature never specifies *what* to inherit; it specifies *who* to inherit from. Nature does not tell baby tigers which genes to choose, it tells them *whose* genes to choose – namely, its parents'. More conventionally, nature does not tell an amorous adult tiger *which* tiger to (re)combine with, instead it limits the choice to those other tigers who happen to be alive, those who have been fit enough to survive. Once Nature selects with *whom* one should team, it *pushes* team-formation (so to speak) via the sex drive.

This implies that organizations do not need to specify *what* to learn, but only *who* to learn from. Having pointed out the good teachers, the organization then only needs to push learners to learn. We call organizational features that promote learning from selected teachers "pointing and pushing mechanisms" and they are the organizational counterparts to natural selection and the sex drive.

Organizations must somehow find or invent pointing and pushing mechanisms that will single out people who have been successful and will encourage others to learn from (or imitate) them. It is a remarkable feature of the evolutionary process that that is all you have to do. People will imitate the wise things and the foolish things; just as offspring will inherit the good and the bad. But as long as the people being imitated are successful, imitation and recombination are powerful enough to amplify the wise and attenuate the foolish. **Evolutionary rule #4 is find or create an effecting pointing and pushing mechanism.**

Requirements of Pointing and pushing mechanisms

Effective pointing and pushing mechanisms have their own set of requirements. To implement rule #4 requires a pointing and pushing device that is powerful, public, pointable, and persistent.

Powerful. A powerful mechanism imparts a very strong push. In biological organisms, from penguins to presidents, the sex drive is quite powerful. What might be an example of a powerful pushing mechanism in organizations? Consider position in the management hierarchy.

I used to be depressed by the effort managers expend in analyzing their bosses; trying to figure out why their bosses do the things they do, trying to understand what their bosses think, and what attitudes they have. I stopped being depressed when I realized that position was pushing people lower in the hierarchy to imitate or learn from people higher in the hierarchy. People *want* higher position and they believe they can get it by imitating (or learning from) the people who have it.

Public. A spotlight under a bushel-basket is no spotlight at all. In order for a pointing device to point, people need to be able to see it. The pointer must be public. Again, consider position in the hierarchy. Unlike, say, kidney-size, position is public. Many companies even hang little signs on office doors pointing out the occupant's position.

Pointable. A powerful and public pointing and pushing device is still useless if you can't aim it where you want. The device needs to be controlled by the organization. Again, position provides a good example. The organization creates position out of thin air; the organization can confer position on anyone it chooses – that is, the organization can point to whomever it pleases. The mechanism must be pointable.

Persistent. The final requirements for a good pointing and pushing device is consistency. If nature's criteria of success were to change every week – one week, say, being small size, the next week being large size, and the following week being the number of spots on the left hind leg – species would not evolve in any consistent direction. The result would be genetic drift, the same result as if there were no selection at all. Similarly organizations with pointing devices that use one definition of success one week and another definition the next week will not evolve in a consistent direction. Such organizations, like their biological counterparts, will drift. The definition of success must persist.
When hierarchy fails to promote evolution, lack of persistence is most likely to be the cause. In many companies, the definition of successful behavior changes -- the selection mechanism is not persistent through time. In even more companies the definition of success differs from superior to superior and so promotions are inconsistent, that is they do not persist across space.

Any organizational pointing and pushing mechanism that is powerful, public, pointable and persistent will tend to foster evolution. If, in addition, innovation in policies is kept in check, the company will automatically evolve in *some* direction. This is not to say that people within the company will think that its getting *better*.

Getting what you want – the need to choose direction

Consider hierarchy one last time: If the definition of success in a company is persistent, hierarchy will possess all the characteristics of an effective pointing and pushing mechanism. Lately, I've been asking people what determines success (i.e. promotion) in their companies. Sometimes I hear what I hope to hear, but often I've been surprised. People have variously told me that promotions in their companies are based on (1) having

a particular personality type, (2) the ability to play politics, and even (3) the ability to lie. A pointing and pushing device that points to people who succeed in these aspects will produce a company increasingly dominated by personality, politics, and lying. Evolution will work in the sense that such a company will move further and further along these dimensions, even though the direction of evolution is not desired by anyone within the company. Perhaps the most important responsibility of evolutionary management is **rule #5: choose an evolutionary direction which people really want**.

Conclusion

I have suggested five rules for evolutionary management. Implementing these rules is where the challenge begins. Executives need to tackle the difficult task of making explicit the hundreds or thousands of implicit policies which govern our organizations. Managers must find a way to control policy innovation without quashing creativity. Organizational designers need to creating pointing and pushing mechanisms that do not have the damaging side effects of existing management hierarchies and which permit the mixing of people for learning. Leaders need to chart evolutionary directions that can tap the allegiance of all members of a business. The five rules are far from a simple recipe for success. On the contrary, I believe they outline the extraordinary challenge of being an effective evolutionary manager.