Selection Pressure

Taking their cue from biological models of evolution in periods of significant instability, organizations will balance rapid iteration with complex, long-term strategies.

As we enter an extremely volatile decade, the desire to simplify the problems we face will tempt us to focus on a few well-honed, well-established strategies. But when we examine how large, complex systems evolve in periods of instability, an alternative approach emerges. In biology, periods of ecosystem disruption lead to the success of a reproduction strategy of rapid proliferation with minimal investment of time and energy in any one offspring (the so-called ***r*** strategy in ***r/K*** selection theory), as opposed to one where small numbers of offspring get abundant parental investment over a long period of time (the ***K*** strategy). The next ten years will highlight the differences between these two approaches, with ***r*** strategies often outperforming ***K*** strategies in this period of instability—but both potentially beaten by strategies that shift rapidly between the two.

—Jamais Cascio

critical balances

DISINTEGRATION integration	Cycles of instability and stability in ecosystems result in the breakdown of existing environmental balances and enable the emergence of new ones.
SLOW fast	The ability to balance rapid iteration with long-term complex strategies defines the most successful approaches to resilience.
CONTAGION isolation	Social networks are a hotbed for iterative ***r*** strategies, while isolationism re-emerges as an adaptive strategy—with the cost of high vulnerability to any major change.

scale: selection pressure

r/K SELECTION:

LIVE FAST, DIE YOUNG, AND LEAVE LOTS OF OFFSPRING

Proposed by E. O. Wilson in 1970, the theory of ***r/K selection*** explains how the form and success of reproductive strategies can vary considerably depending upon the environment. Species that adopt ***K*** strategies invest a great deal of time and energy in rearing offspring, generally one at a time. Species that adopt ***r*** strategies have multiple offspring and devote little time or energy to any one of them. The success of these strategies depends upon the evolutionary environment: in periods of stability, ***K*** strategies do well: they are optimized to compete for known resources and generally have stable populations. In periods of instability and uncertainty, however, ***r*** strategies dominate as they are optimized to reproduce and spread quickly.

Examples of animals that pursue ***K*** strategies are gorillas and whales. The largest of the primates, gorillas require specialized diets (with distinct differences in the diets of mountain and lowland gorillas) and produce a single offspring once every three to four years. Whales are similarly specialized. Although they reproduce more often than gorillas, and typically have substantially greater ranges, whales rely heavily on collective rearing of offspring and are extremely sensitive to ocean conditions.

At the other end of the scale spectrum are the ***r*** strategists, like rats and even bacteria. Evolving quickly under constant pressure, bacteria take advantage of a variety of mechanisms to adopt new genetic instructions, including Horizontal Gene Transfer—the exchange of DNA between otherwise unrelated species of bacteria. And while not evolving as quickly as bacteria, rats nonetheless have proven able to adapt quickly to new and rapidly changing environments. They can have up to five litters per year, each with up to 14 offspring.

The driving difference between ***r*** and ***K*** strategies is specialization. In unstable environments, generalist species (like bacteria, weeds, or rats) do well. They make up for less-than-optimal adaptations through fecundity. By contrast, ***r*** strategies promote rapid iteration, experimentation, and a willingness to sacrifice unsuccessful "offspring" (whether ideas or progeny). As long as the environment remains in flux, competitors who are temporarily better optimized maintain their positions. Once the environment stabilizes, the less-optimized species fade, and species that employ ***K*** strategies (like gorillas) can evolve to fit their environmental niche as optimally as possible, seeking out the last bit of advantage over ecological competitors. ***K*** strategies can result in complex interdependence between species and ecosystem. When the environment changes, however, the optimized adaptations may no longer be of value, and may even be actively harmful to the survival of the species.

> "In the United States, the financial crisis and the mortgage crisis are shaking a lot of communities to their core. Some communities that have been in existence for hundreds of years now have to question the next 10 or 20. So instead of looking for national or global solutions, how can we provide tools, resources, or strategies to communities that not only help us deal with issues like climate change or economic instability, but also strengthen those communities, give them new capacity, help them evolve, and help them be resilient in the long term? So we're solving global problems, and we're strengthening local communities."

Mark Rembert
Co-Director, Energize Clinton County

SELECTION AND RESILIENCE:
SUCCESSION STORIES

When an ecological community has been hit with a significant disturbance, the process by which various species come to inhabit the area is known as *ecological succession*, and it follows a fairly well recognized pattern. The first colonizers are ***r*** strategists, but as environmental volatility declines, ***K*** strategists come to dominate. Sometimes the ***r*** species will evolve towards ***K***; other times, ***K***-oriented species will come in from outside ecosystems and overwhelm less-optimized competitors. Subsequent disruptions can reset the succession cycle, but the process will continue to drive towards ***K***.

When the instability-to-stability progression is subject to frequent, sporadic disruption, as we will continue to see over the next decade, the process is more complex. Quiet periods may allow optimizers to begin to take root, only to be knocked back by renewed volatility. Brief instability doesn't eliminate the ***K*** strategists, however; they can rise quickly once stability returns. ***K*** approaches and ***r*** approaches trade off, neither gaining dominance. Under these conditions, strategies that enable a single actor to shift rapidly between ***r*** responses and ***K*** responses can win out: optimizing when possible, rapidly iterating when necessary.

Homo sapiens provide the iconic example here: native to planet Earth, the human species has been able to adapt to changing environmental conditions through technological innovation, using rapid iteration of tools to enable biological stability.

This ability to navigate between ***r*** and ***K*** is another way of thinking about resilience. Many of the characteristics of resilience, such as diversity, decentralization, and flexibility, fit nicely in the ***r*** strategy. But within the resilience model, these ***r*** approaches serve to support a more complex, lasting goal: in essence, it's ***r*** in service of ***K***. This more complex, resilient approach is likely to become commonplace over this decade.

EVOLUTION IN ACTION:
A DISTURBANCE IN THE FORCE

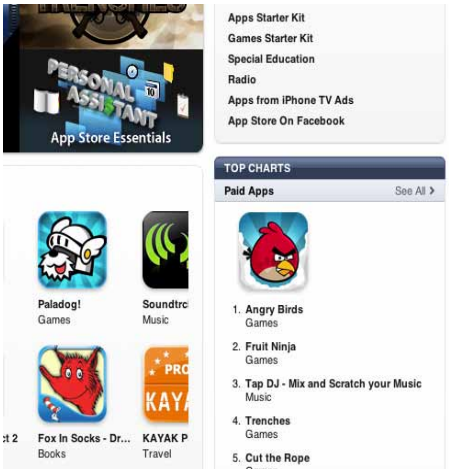
In ecosystem terms, the globe has been going through a major "disturbance," harming incumbent "species" and niche players alike. Under normal conditions, the period of recovery would start with ***r*** strategy innovators and surviving ***K*** strategy incumbents fighting it out to become the next set of highly-optimized actors. This ecological succession-style model has taken place after most previous recessions.

This current disturbance, however, appears to be more chaotic in nature, with fragile recoveries of specific industries or regions subject to the next wave of disruption—and with numerous drivers of disruption, such as climate, demography, and water, ready to strike. The standard ecological succession parallel is not likely to hold.

Whether business, government, or civic organizations, actors that expect the same ***r***-becoming-***K*** progression to occur will be disappointed. More importantly, actors who are able to adopt a more resilience-focused, "***r*** in service of ***K***" model are the likely success stories of the decade. They will be able to adapt rapid-iteration and rapid-experimentation techniques to support complex, longer-term organizational processes. Organizations able to carry off this form of resilience will come to dominate the 2020s.

> "I'm going to offer *Slow Money*'s tips for solving large complex-systems problems. We need to put back as much as we take out. Really simple idea. We need to ask questions like, "What would the world be like if we invested 50% of our money within 50 miles of where we live?" We're not necessarily suggesting that as a practical idea, but the more that I'm at this, the more I realize that may be where we're headed. And this move in the direction towards the slow and the small and the local is deceptively simple, but this is an important step towards solving the biggest system problems we face."

Woody Tasch
Author, *Slow Money*



Apple App Store

A signal of the heightened success of ***r* selection** strategies is the growth of mobile applications. The emergence of new mobile technology platforms has allowed for a surge in innovation, with multiple competing and evolving devices.

theinfosphere.org/30th_Century_Fox

Focusing on size and consolidation (***K* selection**), global media corporations have attempted to adapt to sudden changes in technological (and sometimes regulatory) conditions through increased scale. However, as the media environment continues to shift rapidly, they are finding their ecological niche(s) increasingly bounded.

google.com

Google is perhaps the exemplar for ***r*** in service of ***K***. Constant experimentation, willingness to see experiments fail, and rapid iteration of ideas have marked Google's trajectory. But all of these strategies have focused on the larger goal of linking users to advertisers.

the quick list

- *Collapse: How Societies Choose to Fail or Succeed,* Jared Diamond. New York: Penguin, revised edition 2011
- *The Pattern of Evolution,* Niles Eldridge. New York: W.H. Freeman and Company, 2000
- *The Theory of Island Biogeography,* Robert MacArthur & E.O. Wilson. Princeton: Princeton University Press, 2001 reprint of 1967 edition (the book where Wilson first describes ***r*/*K* selection** theory)

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