



INNOVATION

Exploring Fitness Landscapes

One of the key concepts in Economic Gardening is innovation must be constant with businesses. The rate at which it needs to happen depends upon the volatility of the environment. The more volatile the environment, the faster the rate of innovation.

The process of creating new products is very similar to the way nature creates new biological designs: both must be "fit" for their environment to survive. A giraffe with a long neck is fit for an environment in which the leaves are high on a tree. A Smartphone is a fit product for a market demanding mobile computing power.

However, if the environment changes for either the giraffe or the Smartphone, then the search is on for new designs that are fit for the new conditions. Since nature has a 4 billion year track record of success of finding "fit designs", scientists went to work on teasing out that formula. It has several parts:

Exploration vs. Exploitation

How does a business determine how much to spend on innovation and how much to spend on producing existing products? What is the percentage split between exploration and exploitation?

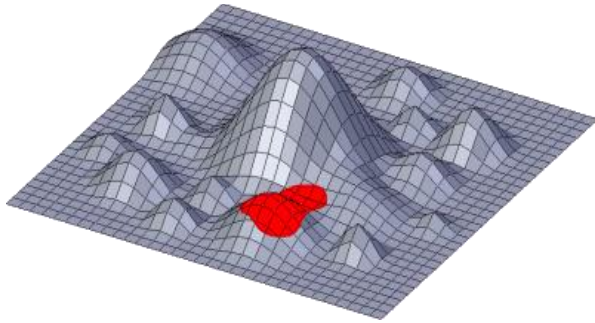
The answer is that it depends on the volatility of the environment. Since fitness is determined by how well a "design" can survive in an environment, it makes sense that when a business environment is stable and you have the most best product "design" (read largest market share), then resources should go into exploitation--making and selling your successful product.

When the environment starts to change, then a new design will be needed and resources should move from exploitation to exploration.

Small bets, Double up on winners, Crossbreed

The problem is there is no formula for what a new design should be; there is only nature's formula for exploring the various potential designs. Think of all the potential designs as a

landscape with the height of the hills corresponding to how fit the design is for that environment. Some designs are valleys; they are really bad ideas (the Ford Edsel, the Apple Lisa). Some designs are great for a given environment and are hills (the IBM mainframe, Ford's method of assembling cars).



In real life, it is pitch black on that landscape and we have no way of knowing where the good designs are. We can only explore it without seeing it. So what is the most efficient way to explore? This has been nature's formula:

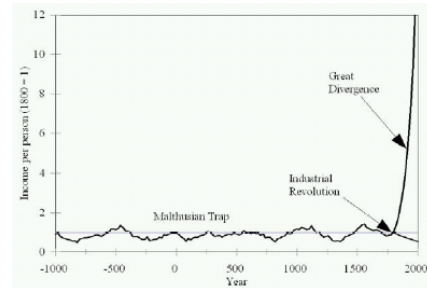
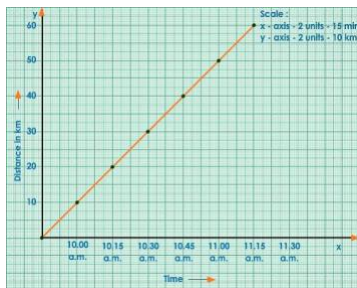
- Make lots of small bets; double up on the winners and crossbreed winners.

The reason this works is that moderately good designs are usually located close to even better designs. The original bicycle had two designs: one with the big front wheel and one with the same sized wheels. Instead of betting completely on big front wheels, bets were made on both and then doubled up on the winner. And later crossbred with other winners (like a gear system from automobiles).



The hard part for a business is figuring out when (and how fast) the environment is changing from stable to volatile--and how to get as much warning as possible. In biological systems (like the economy), change does not happen in a nice straight, predictable line. Rather things are in a stable equilibrium for long periods of time and then they change quickly. In science, this is called punctuated equilibrium. You may recognize this in the sudden drops in the stock market or the way the dot.com bubble burst or the way the auto industry is about to change.

If you graph mechanical change like turning up the volume dial on a radio, it would be a nice smooth line climbing up at a 45-degree angle. Turn the knob half way and the volume goes up half way. Biological change, on the other hand, tinks along and tinks and then all of a sudden turns up in a fast swoop.



So how does a business, which has been operating in a stable environment, detect that it is about to go volatile? All the signals are in the quick curve. By monitoring the chatter in the environment, one will notice an increase in the volume about any given subject. That volume increase is like an earthquake swarm before a volcano blows. It's not so much the magnitude of the earthquakes but rather the frequency. You may not be able to detect what the new environment is going to be at this point but you will know that it is about to change.

In periods of change, new designs will appear and disappear rapidly until stability settles back in. So for businesses, the innovation job will run in this order:

- Have a way to spot an increase in chatter about your environment-a buzz tracker
- Be ready to shift resources from exploitation to exploration
- Make a number of small bets, double up on winners, crossbreed
- Keep innovating until the environment settles back down in a new equilibrium
- Shift resources back to exploitation