

# Natural Innovation

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## Introduction

We often think of innovation as a highly conscious and intellectual process. But in fact the word 'innovation' simply means creating something new through experimentation. We can all do this. And nature is very good at doing this too. In this paper, we look at a few opportunities for businesses to innovate in ways inspired by nature.

In innovation, there is much linguistic poaching from nature by business: the seed of an idea, ideas germinating, hot-housing and growth are all described as if natural phenomena. In this paper we explore concepts like how do seeds actually germinate, what kinds of environments produce the most astonishingly innovative adaptations, and what strategies plants use to make most use of the space around them. These ideas are increasingly inspiring businesses to think and act differently.

## Germinating Precious Seeds of Ideas: How to Grow 'Em

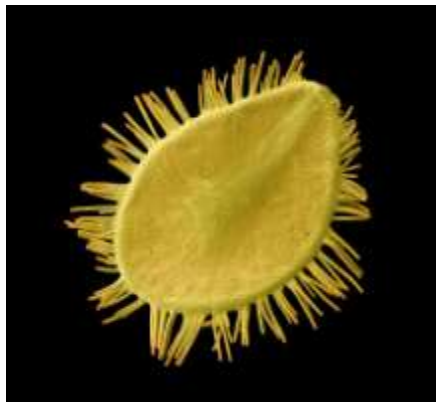


Figure 1: Images from Seeds – Time Capsules of Life © Rob Kessler, Wolfgang Stuppy. [www.papadakis.net](http://www.papadakis.net)

The seeds from every plant species have a unique germination 'protocol' – a set of conditions that must be met to trigger germination. This is designed to prevent the seed from being wasted by germinating prematurely or too late when conditions it needs to grow aren't present. Some seeds will germinate simply by being watered. Others require very specific temperature and humidity conditions, or even being exposed to smoke, or acidic conditions that would occur when they've passed through an animal's digestive system.

Ideas, like seeds, can only be realised if the right conditions are met – be they timing, economic, social or technological.

Businesses which are sensitive to the specific needs of different types of ideas, and to the conditions in their environment stand much better chances of making their ideas take root. Spreading

the analogy a little further, seed dispersal offers a good analogy for creative innovation. Plants create many more seeds than will ever even germinate, let alone grow into a mature plant. This is a deliberate strategy which means that only the seeds ending up in ideal conditions will grow, and only a very small proportion of the total seed produced needs to produce a mature plant. The seeds which don't make it are a small price to pay for the prize of an ideal plant/manifestation for the next generation. Businesses such as Google and 3M generate innovative products using a similar approach – they generate a lot of ideas, and test them in relevant conditions. Most of the ideas don't survive, but the ones that do are strong and ideally suited to their business environment. The social environment in these companies is such that the act of offering, exploring, and building on the ideas of others is rewarded. As Samuel Beckett wrote in *Westward Ho*, "Ever tried. Ever failed. No matter. Try Again. Fail again. Fail better."

Plants also show remarkable adaptation to their physical environments in order to spread their seeds. This is a microscopic image of a seed from a plant called the American Stick Seed (*Hackelia americana var deflexa*). It has evolved significant adaptations to the shape of its seeds, allowing them to cling on to

animals, and be dispersed more widely. This allows the plant to make most use of the other species that share it's ecosystem in order to improve its own chances of survival.

Companies too are finding ways to spread ideas in ways that gather energy and increase the likelihood of more ideas 'coming to life'. 'Open Space' events, 'town hall' meetings, intranet blogs and discussions are all business manifestations of this drive to spread seeds far and wide in order to secure the health of the business.

**Two Questions:**

What is your company doing to leverage its 'ecosystem' both internally and externally to spread ideas?  
How are you and your colleagues shaping ideas to make them 'sticky'?

## Environment and Its Impact on Innovation

There are many different types of innovation in plants – some are driven by scarcity and some by abundance in their surroundings. Let's look at both.

### Innovation in Adversity

*"Adversity reveals genius, prosperity conceals it." - Horace*

Contrary to expectation, there are often high levels of plant diversity in areas of scarcity. The reason for this is that the selective pressures of the environment force more dramatic or innovative adaptations.



This strawberry cactus (*Echinocereus stramineus*), for example, creates mounds to prevent water loss. Having stems compressed together reduce transpiration – the equivalent to plant perspiration - while still offering a larger surface area for receiving light energy. The straw-white spines reflect and filter intense sunlight as well as trapping a layer of still air around the plant, which reduces transpiration. They also defend the plant

against hungry herbivores. The succulent stem tissue stores water against prolonged drought.

All of these adaptations have been made because of the harsh desert environment in which it lives, and particularly the selective pressure of lack of water. Plants have ended up in these regions because they can largely avoid competition by adapting to find their own niche.

Businesses can learn from this approach; it is somewhat counter-intuitive to equate lack of resources with innovation, but in fact lack of resource – be it financial, technological or simply variety of suppliers can drive some of the most interesting innovations.

Many experts are saying that we are in a business environment which is changing dramatically and fundamentally. It is not a matter of 'hunkering down and waiting it out' – we are in an environment which requires creative business adaptation and transformation.

In a recent paper<sup>ii</sup>, the Boston Consulting Group describe several businesses that have grown during difficult times, including:

- U-Haul truck rental business broadening its offering to high-margin moving-related consumables during the recession in the early 90s to protect it from the fierce pricing competition on rental trucks.
- Five major airlines creating Orbitz to take advantage of the online travel sites instead of be exploited by them.

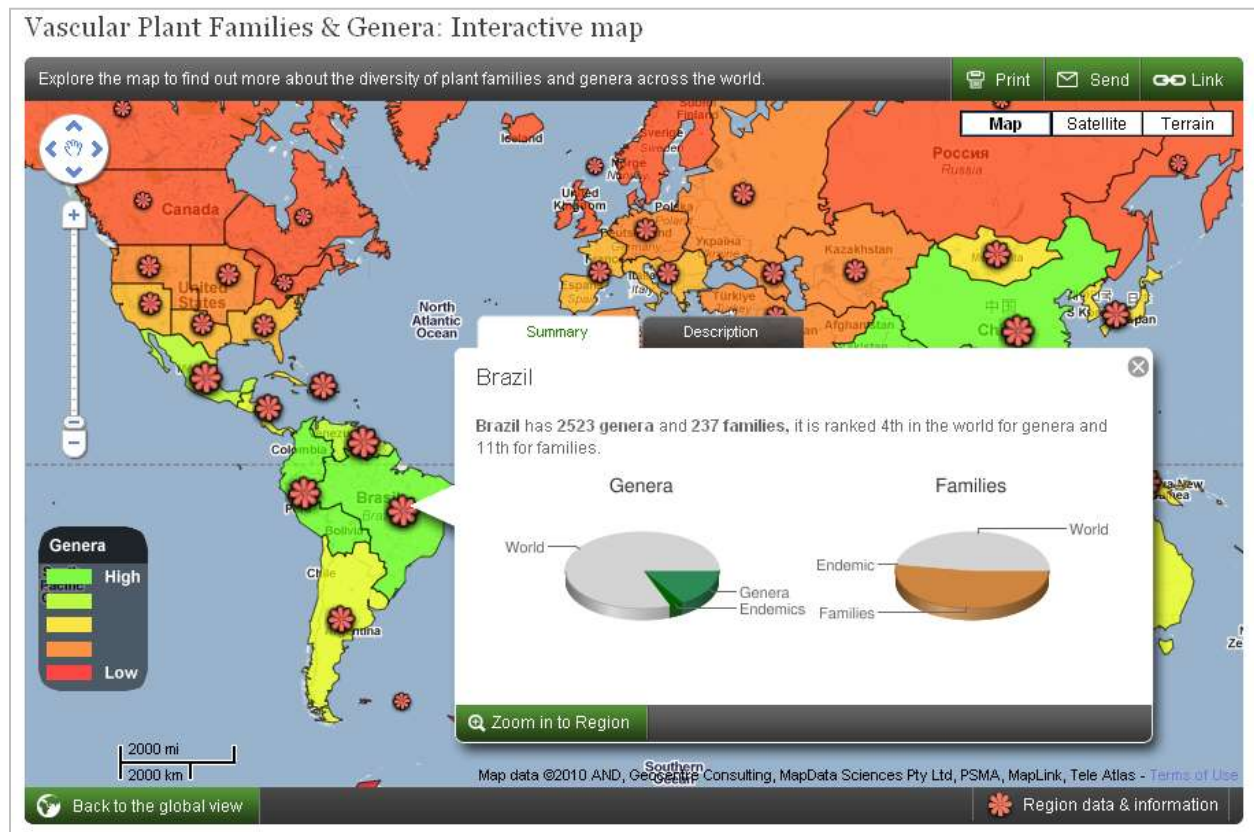
**Two Questions:**

How can your organisation expand its focus beyond cost reduction in this recession, to rethinking how to do business in a smarter, more innovative way?

How will you create conditions conducive for change during a recession when there is a lot of fear?

## Innovation in Abundance

How does environmental abundance shape innovation?



Although there is more diversity of plants in abundant tropical regions (there are 2523 families [or genera] of plant in Brazil compared to only 625 in Siberia), there are often relatively few dominant species in tropical rainforests, with much of the diversity appearing on the niche fringes of the forests. Contrary to what you would expect, competition often reduces diversity because you often end up with a few highly competitive, dominant species. Diversity is highest in areas where there is not intense competition.

So if, as the BCG paper says, a key aspect of a company's ability to innovative and adapt to a changing environment is its diversity of perspectives – companies need to get good at cultivating and leveraging this diversity. Gordon MacKenzie wrote a book called 'Orbiting the Giant Hairball'<sup>iii</sup> about his 30 year battle to foster creativity by working (and inviting others to work) at the fringe of the very bureaucratic Hallmark cards.

**Two questions:**

How is diversity of perspectives nurtured in your organisation?

How often are your colleagues invited to visit the fringe of the organisation in search of creative innovation?

## The Shape of an Idea



Unlike most animals, which all come out more or less the same shape, plants, like most ideas, are non-determinant in their shape. This means that they grow to meet the space that is available to them, or in order to maximise the amount of sunlight they can reach. Plants are very modular – made up essentially of flat things (leaves) and long things (stems). Each plant can assemble these in an infinite number of permutations to meet the requirements of the environment.

In business, organisations can change the shape of their business model. They can, for example, change the way they charge for their services, like Rolls Royce and GE did by shifting their pricing from engine parts and financing and service to 'power by the hour' which bundled many things together. Businesses can also change their terms, method of delivery and much more.

**Two questions:**

Is the shape of your business model the best it can be?

Is your organisation creating mini-experiments of new business models to see which thrive in the current economic climate?

## What's This All Mean?

In this paper, we've looked at natural and business innovations ranging from how to spread seeds/ideas, to how adversity/abundance impacts and how shape. The next bit is your turn...

## What Happens Next

To meet the challenges businesses are facing, Biomimicry for Creative Innovation (BCI) and The Royal Botanic Gardens Kew (RBG Kew) have formed a unique partnership focused at helping organisations adapt to a more sustainable future, as 'Business Shaped By Nature'.

To find out more about how nature can help your organisation develop a culture that fosters creativity and co-operation please contact Biomimicry for Creative Innovation (BCI) or The Innovation Centre at the Royal Botanic Gardens, Kew.

To learn more, visit our websites:

BCI: <http://biomimicry-bci.squarespace.com/>

Kew: <http://www.kew.org/news/kew-blogs/business-shaped-by-nature-about-us.htm>



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<sup>i</sup> For a great book on how to make ideas 'sticky' see 'Made to Stick' by Chip and Dan Heath

<sup>ii</sup> the Boston Consulting Group's May 2009 paper 'Thriving Under Adversity'

<http://www.bcg.com/documents/file15490.pdf>

<sup>iii</sup> Orbiting the Giant Hairball: A Corporate Fool's Guide to Surviving with Grace, by Gordon MacKenzie