



Possibility thinking for business strategists: lessons from breakthrough engineering

by Robert Friedel and Jeanne Liedtka

Business strategists tend to be well-versed in the identification and analysis of constraints. But what of possibilities? If the ability to see new possibilities is fundamental to creating innovative designs – whether of products, cities or business strategies – what do we know about state-of-the-art possibility thinking?

Business strategy has historically been seen as a largely analytic endeavour, with relatively little attention paid to the creative aspects of strategy formulation. We describe here eight ways to illuminate new possibilities taken from engineering success stories and briefly discuss what each might look like if applied to business strategy.

1. Challenge assumptions

Challenging assumptions and defying convention are often the first steps in creative engineering. To produce something original, an engineer raises questions about the way things are done and entertains doubts about what is assumed to be necessary, natural or customary.

For example, 'seismic base isolation' is a system of protecting buildings from earthquake damage by using bearings or supports, typically made of layered rubber and steel pads, to separate buildings from the ground on which they sit. The bearings allow a building to move freely on shaking ground. This approach challenges the customary view that we make a building stable by fixing it firmly to the earth.

In the realm of business strategy, we see much the same process at work when managers challenge mental models and industry assumptions. New possibilities emerge when they refuse to accept existing paradigms and constraints. Consider the incremental value created at Raytheon with the development of the new "Vigilant Eagle" anti-terrorism device, designed to protect commercial airliners from over-the-shoulder missiles. Conventional wisdom (based on military experience) decreed that each plane be outfitted with its own protection device at a cost of approximately \$1 million per plane. With estimates for protecting all US commercial aircraft running to \$20 billion, creative managers at Raytheon hit upon a new possibility – that of protecting airports, rather than individual planes. They estimate that 70% of US air traffic can be protected for less than \$2 billion. Challenging existing approaches became the path to a cost-effective solution.

2. Make connections

Making connections between seemingly unrelated ideas is also often at the heart of creative Engineering. Novelty can result from going outside a single field or discipline and bringing together diverse concepts, tools, capabilities and ways of thinking.

'Tissue engineering' is a new specialty that creates usable human tissues for repairing or replacing damaged ones. Engineers have tackled this problem by relating medical and biological approaches to those of chemical engineers, materials scientists and engineers, and mechanical and electrical engineers.

Connecting can be equally powerful in the business environment. The use of analogies that connect different fields can provide a window of insight into new possibilities for value creation. While adhering to the mental models of one's own industry is limiting, trying on the mental models of someone else's can surface intriguing new opportunities. The story of Ethel M. Candies demonstrates the power of connecting across business boundaries. John Haugh, Ethel's new president, faced the daunting challenge of growing the high-end Ethel business in a confectionary market suffering from slow growth and consumers who preferred Godiva – despite Ethel's superior quality in blind taste tests. Rather than continue to pursue the existing packaged-goods strategy, John combined his own career experiences in retail with close observation of the success of Starbucks. If Starbucks could do it with coffee, why couldn't Ethel create a similar experience around chocolate? Thus was born the Chocolate Lounge.

3. Visualise

Making something new, for an engineer, often means first thinking about how it might look – picturing it in the mind's eye. Engaging the senses beyond what words describe sometimes opens new paths to engineering creativity.

Visual thinking is a key element in many kinds of engineering, particularly those dealing with large structures. In some projects, however, the visual element is particularly striking and the creative act appears to be tightly bound to thinking about problems pictorially.

The successful execution of visually unconventional and dynamic engineering projects has been considerably aided by the creation of new tools for visualising, such as complex computer systems that apply mathematical techniques like "finite element analysis" to create accurate renderings of structures while they are still only speculative ideas.

Visualising is perhaps the most challenging concept to transfer from the world of engineering to the world of business strategy. After all, strategies represent ideas, not concrete objects – they are composed of numbers and of words – how can they be made visual? Yet there is significant value in pushing the business strategist's thinking along this dimension. Designers, we are told, "think with their pencils" – allowing the emerging visual images they sketch to deepen their understanding of what they are designing as it unfolds. If strategists, on the other hand, think only with their spreadsheets, how much use of imagination can we expect?

Trader Publications, a producer of free classified product guides, has taken the dictum to use visuals to heart. As part of their strategic planning process, managers not only describe competitive publications, they obtain copies of them. These copies are aggregated at corporate where managers array them in conference rooms for examination. This experience, the visual and visceral experience of handling these publications, according to Trader executives, produces far richer possibility discussions than reading reports about them. In a similar vein, organisations have begun to experiment with creating strategy maps, which act as pictorial guides that use analogies to portray both their own and competitors' strategies. The act of creating these maps often triggers profound new insights.

4. Collaborate

Many engineering innovations are the product of cooperative effort and could not be developed any other way.

A group of people brings together a range of talents and capabilities, applying them to generate results that reflect both individual skills and a collaborative creativity that is more than the sum of the separate endeavours.

A jet airliner is one of the most complicated products designed by modern engineers. It contains literally millions of individually-designed parts that must work together to meet the highest standards of performance, reliability and safety. The Boeing Company's 777 jet is a model of collaborative creativity on an extraordinary scale.

The collaboration behind the Boeing 777, however, is interesting not simply for its scope, but also for the pioneering communication methods it relied on. This was the first major aircraft designed using extensive computer networking – more than 2,200 work stations linked by eight mainframes – to bring together thousands of engineers working on every phase of the project at the same time. Although many never met in person, the computer system promoted a collaborative process so central to the project that the 777's slogan was "Working Together." At the heart of the system was software developed by IBM and Dassault Systèmes, called CATIA, for "Computer-Aided Three-dimensional Interactive Application." Boeing extended this with EPIC, "Electronic Pre-assembly in the Computer," allowing engineers in disparate locations to design and test "virtual" prototypes of crucial components of the airplane.

At United Technologies, collaboration between in-house technical talent at two separate divisions, jet engine designer Pratt & Whitney and cooling specialist Carrier, created the breakthrough Purecycle product with virtually no new components needed. Purecycle converted waste heat to electricity, an opportunity that went unrecognised until engineers who thought in terms of

power met up with engineers skilled at using heat exchange to produce cold air. Crossing such functional and business unit boundaries can provide rich sources for enhanced value creation.

5. Harmonise

In every area of human effort, creativity is intimately associated with the quest for beauty. This is most obvious in the fine arts, but it is no less true in the practical arts like architecture and engineering. Here, especially, there is an aesthetic quality that often lies in harmony, in fitting the products of human ingenuity agreeably into their environment.

Bridges are among the largest and most imposing engineered structures. In the past great bridges were built to call attention to themselves and to the engineers' ability to overcome enormous obstacles. As a result, bridges can reshape their environments.

Sometimes, however, it seems best that a structure should not so much reshape our perceptions of a space as enhance them. In Colorado's Glenwood Canyon, a key link in the USA's interstate highway system required the construction of a viaduct to carry the road over a narrow, curving, and beautiful stretch of the Colorado River. The Hanging Lake Viaduct fits aesthetically and satisfyingly into this precious natural setting while providing an efficient and reliable transportation link.

Meeting the challenge in Glenwood Canyon involved not only designing a structure that would harmonise with its environment but also minimise harm to the river and its surroundings. The builders used a giant gantry and crane to set the pre-cast concrete box girders into place from above. The number of piers supporting the road was reduced by producing spans as long as 300 feet. Bridge members were designed with straight lines to blend with the striations of the canyon walls.

In business strategy, we have a long history of paying attention to the "fit" of an organisation's strategy, both in

terms of its internal consistency and in its appropriateness for its larger environment. Good strategies, we know, are aligned along many dimensions. We have an equally long history in business, however, of largely ignoring aesthetics, of treating these as trivial adornments to high-end products and services. In fact, it is somewhat difficult to even describe what the “aesthetic” dimensions of a strategy might be.

What makes a strategy more than merely functional and makes it a thing of beauty? The origin of the word “aesthetic” lies with the Greek “aisthetikos” meaning “of sense perception.” Thus, we might conjecture that it relates to ideas, strategies that appeal to the senses, rather than merely to cognition – new possibilities that have an emotional appeal, a “presence” that commands attention and invites engagement. We know that the most successful innovations combine the familiar with the novel to produce something interesting. Yet consider how banal and clichéd so many corporate missions are – no wonder they fail to command even attention, much less emotion. Then consider instead the emotional engagement the Body Shop evoked from its clientele when it committed to natural products and no animal testing coupled with a recycling ethic. These simple aesthetics created a unique and compelling value proposition for targeted customers who shared their values. Change, psychologists tell us, is primarily driven by desire – it is in that sense of the term aesthetic that we can learn from designers how to make business strategies more compelling and new possibilities more evident.

6. Improvise

Engineers, like most of us, are sometimes at their most creative when they are forced to be. Circumstances may require solving problems quickly or may place overwhelming constraints on what seems possible. To improvise is to create “on the fly,” and the results can be most ingenious.

Outer space exploration is one of the last places we expect engineers to improvise.

Few activities appear to be so thoroughly planned from start to finish. But in space, improvisation becomes essential to the creative engineer’s contribution. Whether planning and executing repairs on a device millions of miles away or devising clever ways to extend the work of multimillion dollar instruments, the spacecraft engineer may work with the most extreme constraints of all.

The Voyager 2 space probe has been constantly re-engineered, repaired, reprogrammed, and reconfigured by earth-bound engineers working with the constraints of a device which receives its communications in a dead language minutes after the commands are sent.

In the business context, limitations to action are often seen as “stop signs,” signals to give up the quest for an innovative solution. For designers, the response is the opposite; constraints act as triggers, rather than barriers, to seeing new possibilities. Some of the most successful business strategies were not the result of careful forethought. Instead, they were the products of improvisation, created out of necessity when familiar options were unavailable.

IKEA, the well-known Swedish furniture innovator, offers a case in point. Nearly every element of IKEA’s now famously harmonised strategy, which is based on furniture packed flat in pieces, customer home assembly, and self-service in their warehouses, was a clever response to an unanticipated problem. Customer self-service, for instance, originated with the opening of the Stockholm store, which was so unexpectedly popular (and hence understaffed) that frustrated customers grew tired of waiting for scarce warehouse personnel to bring their purchases to them, and went in search of them themselves. What distinguishes IKEA is not that such problems developed, but that IKEA was able to find new possibilities inherent in them and to build these serendipitous discoveries into their strategy.

7. Reformulate

New possibilities can emerge from new formulations of problems rather

than new solutions. When people change goals or revise notions of what is important and what is not, different priorities and approaches may be more appropriate.

Engineers’ goals and priorities may shift for a variety of reasons. Changes in fashions, markets or politics may make approaches that were once considered desirable or necessary seem unattractive or inappropriate. Or engineers and society at large may learn new things that lead to a re-evaluation of results and a re-orientation of efforts. Few better examples of this can be found than the re-engineering of South Florida’s rivers and wetlands. The Kissimmee River begins near Orlando and flows southward for about 100 miles into Lake Okeechobee. Historically, it meandered through a one- to two-mile wide flood plain, covering all but a small portion of the land for most of the growing season. In periods of large storms or hurricanes, waters from the Kissimmee and other rivers would destroy homes and crops over a wide area. To reduce flooding, the US Army Corps of Engineers straightened the river in the 1960s and drained much of the nearby wetlands.

However, even before the project was completed in 1971, it was clear that this effort had resulted in devastation of wildlife habitats and the displacement of many animal and plant species. State and federal agencies decided that engineers’ efforts needed to be reoriented toward undoing the damage. Recovery of the Kissimmee River became one of the most ambitious restoration projects ever undertaken. Slowly the Corps of Engineers and the South Florida Water Management District are returning major portions of the Kissimmee from a canal back into a meandering river, to make the environment of South Florida once again hospitable to its historic inhabitants.

Re-examining the definition of the problem holds great potential for generating new possibilities in the business realm. One of our favourite stories is that of P&G’s creation of the Swiffer mop. After decades of focusing

on the problem of producing more effective detergents, P&G re-oriented its thinking to focus on creating a cleaner floor, as well. This led to the realisation that the detergent was only part of the solution, and that significant opportunities existed in producing a better mop.

A similar shift occurs, at a generic level, whenever business strategists move from focusing on the problem of “How do we sell more of product X?” to “What need is the customer trying to satisfy?” For, as one of the fastest growing companies in the traditionally staid construction air compressor market explained to us, it was the realisation that “nobody needed an air compressor – what they needed was efficient, reliable compressed air” that allowed customers to complete their projects on time and budget. This re-orientation caused them to rethink their entire portfolio of products and services and to see the possibilities inherent in offering energy efficiency monitoring and a host of other services that complemented their traditional product offerings and drove dramatic new growth.

8. Play

To an extent that is often unrecognised, even by engineers and designers, play is a key element of the creative act. Perhaps the best known example is the design firm IDEO, which stocks each of the firm’s offices in North America, Europe and Asia, with an identical “tech box.” As the firm’s web site describes it, “each Tech Box has several drawers holding hundreds of objects, from smart fabrics to elegant mechanisms to clever toys, each of which are tagged and numbered. Designers and engineers can rummage through the compartments, play with the items, and apply materials used by other designers and engineers within the company to their current project.” Computer and database linkages allow sharing of tech box play among the firm’s offices, and each box has a “curator” who constantly updates the contents.

The idea of play may appear ill-suited to the business environment, but the

single-minded pursuit of efficiency and optimisation can lead to ‘analysis paralysis’ and leave little room for the emergence of new possibilities. To play is to try to do something, not merely to think about it. Play does us the great service of calling attention to the value of the experiment, the willingness to forfeit certainty in the name of learning. Organisations good at finding new possibilities are quick to conduct the low-cost experiment rather than detailed market feasibility studies. For example, consumer products companies are increasingly likely to talk their key retailers into just a small amount of shelf space in a few stores to test new ideas, preferring to fail early and on small volume rather than do major roll-outs based on predictions of consumer behaviour that may prove incorrect. This kind of ‘serious play’ is likely to pay big dividends in opening up new possibilities.

In closing

We suggest that business strategists begin by asking themselves a simple set of questions that draw on the approaches described here and provide a warm-up for the possibility-thinking muscles of our strategic brains:

1. Take an absolute industry ‘truth’ and turn it on its head. Ask “what if anything were possible?” and look at the new opportunities that appear.
2. Look outside the boundaries of your usual world. Ask, “what if we were operating in an industry quite different than ours – what would we be doing instead?”
3. Put the numbers aside and get some images down on paper. What emerges?
4. Find a partner and go forth and co-create. Ask, “what can we do together that neither of us can do alone?”
5. Push yourself beyond the ‘workable.’ Try to get ‘intriguing.’ Ask, “What is really worth doing – what can I get excited about?”
6. Act as if necessity truly was the mother of invention and make surprises work for you instead of against you. How can you turn an

unexpected development into an asset?

7. Try on a different definition of the problem. Step away from your product and ask, “what is the problem my customers are really anxious to solve?”
8. Go out and conduct low-cost experiments instead of forming a committee. What can you do today to move a new possibility forward?

As we look across the approaches for surfacing new possibilities outlined here, their applicability to business strategy is clear. Engineers have long viewed design as a core activity. As managers – particularly strategists – come to share this view, we would be wise to turn to them for creative inspiration. 🧠

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