Systematic Innovation

e-zine

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In this month's issue:

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Our guarantee to the subscriber is that the material featured in the e-zine will not be published elsewhere for a period of at least 6 months after a new issue is released.

Readers' comments and inputs are always welcome.
Send them to **darrell.mann@systematic-innovation.com**

Balance & The Icarus Paradox Revisited

It can often be difficult allowing yourself to use the word ‘balance’ when you spend so much of your time telling people about the importance of uncovering and solving contradictions. ‘Balance’ implies trade-off, compromise and optimization rather than innovation. Which then leaves us with a potentially intriguing contradiction in its own right: how can we simultaneously find ourselves advocating the need for balance and contradiction solving?

We were first struck by the question when re-reading the lost-classic management text, The Icarus Paradox (Reference 1) recently. The book is a rare thing – it was written in 1991 and still contains a lot of sense that we can see applying today. One suspects part of the reason for the book’s disappearance from view is that it uses companies like Apple and P&G as examples of ‘failing’ companies that fall victim to the titular ‘Icarus Paradox’. How can we contemplate taking seriously a book that takes a dig at two of the world’s most successful organisations? Even if, when the book was published, Apple was in its fallow years when Steve Jobs had been kicked out, and thus had some kind of excuse for getting things wrong.

The answer is that author Donny Miller, made a decade long study of failing organisations from a bottom-up perspective. In many ways, the book may be seen today as one of the first antidotes to the Tom Peters ‘classic’ In Search Of Excellence, from the early eighties. Miller was the first to spot the many flaws we now see in Peters’ work – most notably that the very things that Peters was busy declaring were the things that caused an organisation to be classifiable as ‘excellent’ very often turned out to be the things that ended up causing them to become the precise opposite. Hence the Icarus Paradox of Millers title, Icarus being the character from Greek mythology who came crashing to Earth when he flew too close to the sun and melted the wax that was bonding his feathered wings together.

Over the course of his research, Miller identified four distinct Icarus Effects. Four aspects of an enterprise, in other words, that somehow managed to become so dominant over the rest of the organisation that they were able to drag everything else down. The first thing we noticed when looking at the four different aspects was their strong connection to four of the elements in the business version of the TRIZ Law Of System Completeness. Figure 1 illustrates a comparison between the Law as we know it and the labels used by Miller to describe the four aspects of an organisation that he could see Icarus Effect growing from:

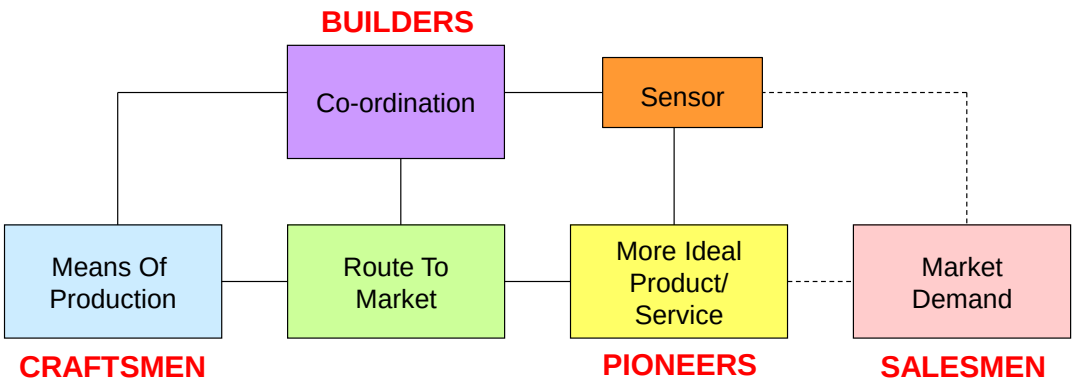


Figure 1: The Icarus Paradox Sources & TRIZ Law Of System Completeness

So, in Miller's terms, 'Builders', for example, was a category of organisations whose initial success came from the fact that they had a very strong outward-looking entrepreneurial senior management team (hence the link with 'Coordination') that had found success for their organisation through a 'building' strategy of mergers and acquisitions. 'Pioneers' on the other hand, were organisations – like Apple – that had initially been successful because they had a very strong technical team intent on delivering more ideal products to customers.

For all four of the possible domains, Builders, Pioneers, Salesmen or Craftsmen, Miller describes a similar model of success turning into decline. What is strong within the organisation inherently becomes viewed as the source of the success of the organisation and thus creates for itself a virtuous cycle of dominance over the other segments of the enterprise. This comes in part from managers within the success driving parts of the business being able to talk down any kind of criticism or complaint from other parts ('we're the ones that make all the money, so you should bow to our wishes'), a self-reinforcing aspiration on the part of employees to go work in the successful part of the business, and external stakeholders that demand more of what's already being done and only know one place where to go look for it.

The problem starts when the growing powers of the dominant part of the business begin to turn into something that becomes damaging to the health of the overall enterprise. When a CEO makes a successful acquisition, it creates a desire to make another one. And another. And an even bigger one. Until the successful 'Builder' strategy has devolves into what Miller labels as an 'Imperialist' one, in which the size and 'wow'-factor of the latest acquisition becomes more important than any kind of strategic fit with the rest of the organisation. And as with any kind of growth-seeking Imperialist, everything eventually hits a limit – the organisation borrows too much to fund the latest acquisition, or the management systems become incapable of handling all of the inter-company complexities. Whatever it is, some kind of contradiction has to emerge. Table 1 summarises Miller's discoveries concerning how the 'successDNA' of the four problem types gradually devolved into a DNA that no longer serves the best interests of the business:

Type	Success DNA	Devolves To… DNA	Resulting In
Craftsmen	Quality, Engineering & Production-Driven Cohesive Clans	Intimidating, Controlling Leadership Insular, Monolithic Technocracy	Tinkerers
Builders	Entrepreneurial CEOs Generalist, Growth-Oriented	Grandiose, Reckless CEOs Chaos or Gamesmanship	Imperialists
Pioneers	Visionary CEOs 'R&D' Cultures	Blind Utopianism	Escapists
Salesmen	Professional Administration Competitive Sub-units Market-Share Driven	Remote Leadership Warring Units Numbers Oriented	Drifters

Table 1: How SuccessDNA Devolves To Create Dysfunction
(adapted from Reference 1)

Figure 2 shows the four different decline trajectories on the original Figure 1 Law of System Completeness model:

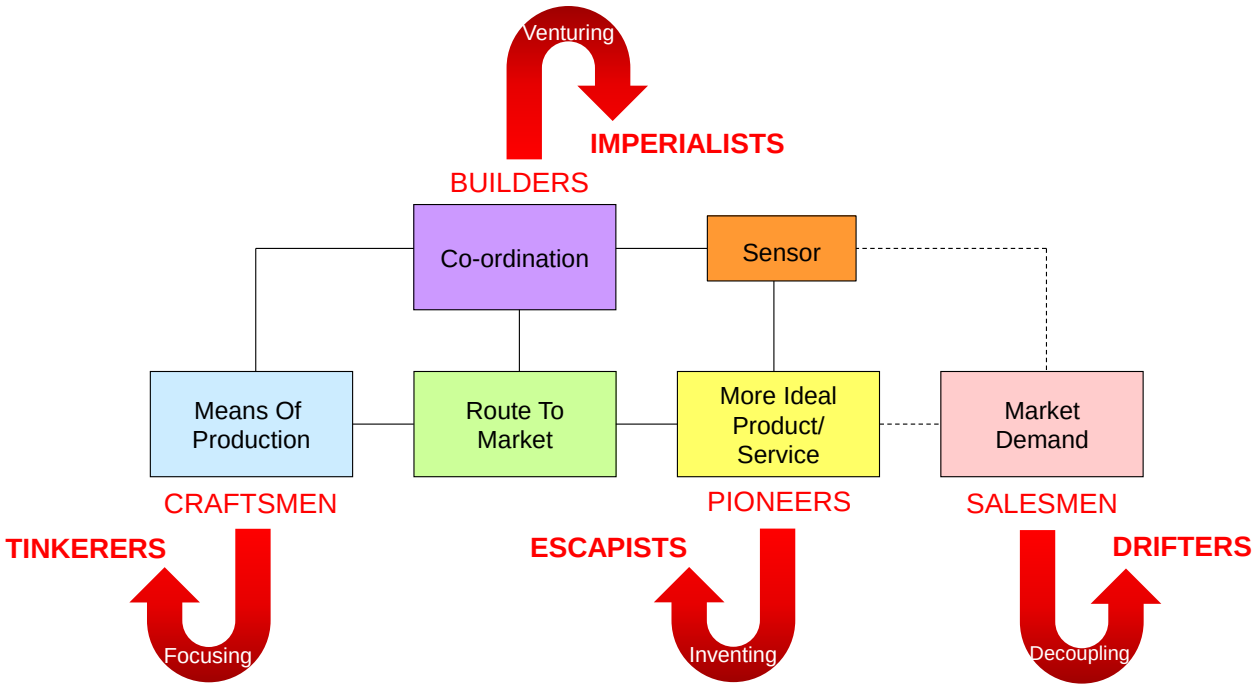


Figure 2: Icarus Paradox Trajectories & TRIZ Law Of System Completeness

The basic idea behind each of the arrows is to summarise the start and end points of the Icarus Paradox and the main activity that causes the decline. So, Craftsmen (organisations that focus on doing a really good job of low cost production, or very high quality production of their products and services – i.e. a large proportion of Six Sigma oriented organisations) devolve to become Tinkerers by focusing too much on what eventually becomes the minutiae of continuous improvement. Tinkerers, in other words, are the archetypal manufacturer that finds themselves making perfect versions of a product that no-one wants anymore.

Now, as far as we can tell, there is no reason why, in theory, the other two parts of the Completeness model – 'Route To Market' and 'Sensor' – couldn't also be prone to the same Icarus Paradox. Miller probably wasn't looking, and now we have done that job for him, we haven't been able to see a meaningful example of an organisation that has declined or failed because they paid too much attention to their Routes to Market. Whether it is theoretically possible or not, though, the important point emerging from Miller's work, and from the connection we've made here to the Law Of System Completeness, is that when one part of a System gets out of balance with the other parts, it will tend to cause the overall system to decline and potentially fail.

In many ways, that has to count as some kind of blinding flash of the obvious – a system is a System and, according to our evolved version of the TRIZ model, that System needs six different elements that must all work together in a balanced harmony.

That blinding flash, however, should also allow us to solve the contradiction stated at the beginning of this article: how can we have both balance *and* contradiction solving. Miller's findings tell us that it's okay for us to solve contradictions in any part of the System, but whenever that happens, we need to be cognizant of the fact that the moment it has

occurred, it may have necessitated some kind of compensating contradiction resolution on one or more of the other parts of the System.

And that, finally, takes us right to the heart of the Innovation Capability Maturity Model, and the reason why we say that it is not possible for organisations to 'leap-frog' stages of the Model: as soon as one part of an organisation works out the importance of solving contradictions, the other parts can't be allowed to be too far behind.

Reference

1) Miller, D., 'The Icarus Paradox: How Exceptional Companies Bring About Their Own Downfall', HarperBusiness, 1991.

Mapping Customer Frustration

Back in March (ezine Issue 144) we introduced a two-by-two matrix designed to show how well served customer needs were against tangible and intangible axes – Figure 1.

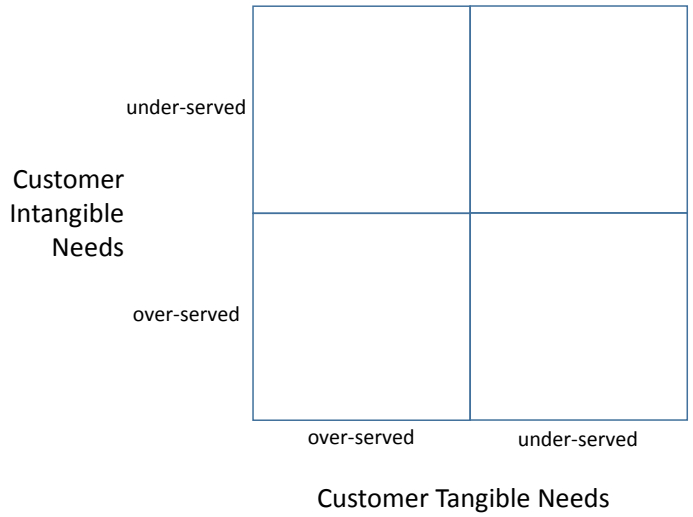


Figure 1: 'Real World Market Opportunity Landscape'

Since March, the basic idea seems to have gone a bit viral, and as such we've had the opportunity to evolve the model. This article describes a couple of those initial evolutionary jumps.

The first started with a customer request to try and find a way of measuring customer frustration. Their idea being that frustration is a terrific source of innovation opportunities. The more we thought about the subject, the more it seemed that the Figure 1 model was pretty much what was needed to be able to map the various different kinds of frustration that a customer might experience. One of the first consequences of this realization was that it allowed us to rename the rather cumbersome 'real world market opportunity landscape' as the rather more succinct 'Frustration Grid'. Very likely its official name from now on (unless readers can find a way of chopping even more syllables from the name?).

In the March article we also showed a version of the Grid in which we had plotted a number of different organisations into different quadrants. This kind of composite way of plotting data onto the grid is the sort of thing we would do if we were taking a high level view of, say, a whole industry. Another set of emerging uses for the grid involves taking a much more hierarchical and progressively more fine-grained view of the world. This might mean plotting each product or service offered by a given company or its competitors onto the grid in order to observe which parts of a portfolio might need more innovation attention than others, Or, as illustrated in Figure 2, we might focus in to look at individual attributes of a single product.

Frustration, when looking at a grid picture like Figure 2 is simply the distance of the plotted point from the centre of the picture. The centre, of course due to the manner in which the two axes have been defined, represents the point where both tangible and intangible needs of the customer are exactly as wished for by that customer (noting that different customers may have a different perspective of where they would plot the various points, naturally – another way we find ourselves using the basic Grid). What this means in the (hypothetical) Figure 2 image is that the customer is frustrated about the attribute 'speed',

less so about quality, and barely at all about cost. Consequently, all else being equal, if this plot was representative of an actual situation, it suggests that innovation efforts would be best focused on improving speed. The Grid is this role thus becomes an activity prioritization tool.

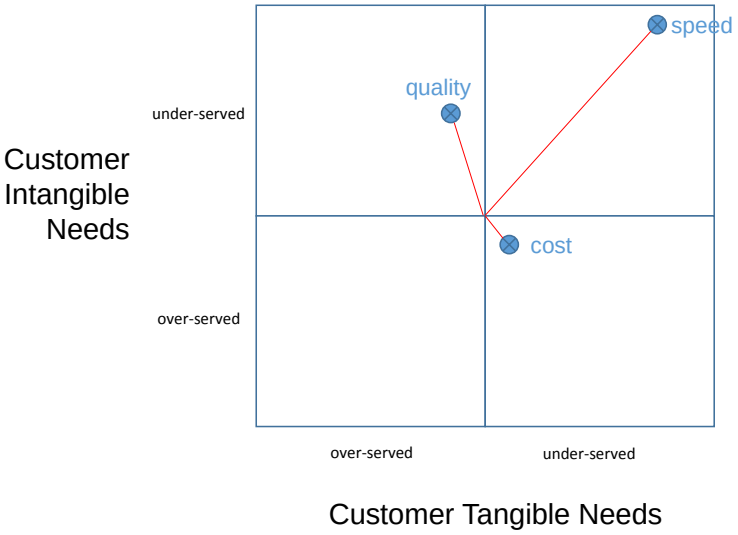


Figure 2: Frustration Grid Constructed To Show Attribute Frustration

Having made this connection to frustration increasing as distance from the centre of the Grid increases, obviously, when a point is plotted at the centre of the picture this is indicative of the fact that the customer has zero frustration. One conclusion that might be drawn from such a situation is that there is therefore no longer a need for innovation. We would expect to continue to monitor that the situation doesn't change (we're doing this right now by building automated PanSensic tools to automatically draw and update the Grids for clients), and so long as the frustration level continues to be zero we might be better to focus our innovation efforts elsewhere.

We wondered, however, whether it was completely appropriate to suggest that zero frustration meant no need for innovation. Can we see evidence of organisations that continue to innovate when their customers are in this situation became a new question.

A good example of an organisation and product range in precisely this kind of position right now is Jaguar Land Rover (JLR). Since being released from their Ford-shackles, the company has gone from strength to strength, breaking all sorts of sales records in the last couple of years. While it might not be everyone's cup of tea, the 2011-launched Range Rover Evoque (Figure 3), can be seen as an intriguing step change made at a time when even the most skeptical JLR competitor would have to admit the company was riding the crest of a wave.

Figure 3: Range Rover Evoque

The Evoque – a step change not just because of its radically changed ‘squashed roof’ styling, but also because it’s the lightest, most fuel efficient Range Rover ever – seems to us to be a classic example of a Kano ‘exciter’ type of innovation (Reference 1). JLR ‘wow’ed customers with a completely unexpected step-change design.

It’s perhaps too early to say definitively that this kind of ‘exciter’ step is the only effective innovation strategy when there is no tangible or intangible frustration across the customer base, but it does already suggest an important modification to the other intended use of the Frustration Grid – that of helping innovators to identify the type of innovation strategy they should be looking to undertake. Figure 4 shows a modified version of the Grid, featuring a new fifth zone at the centre of the picture:

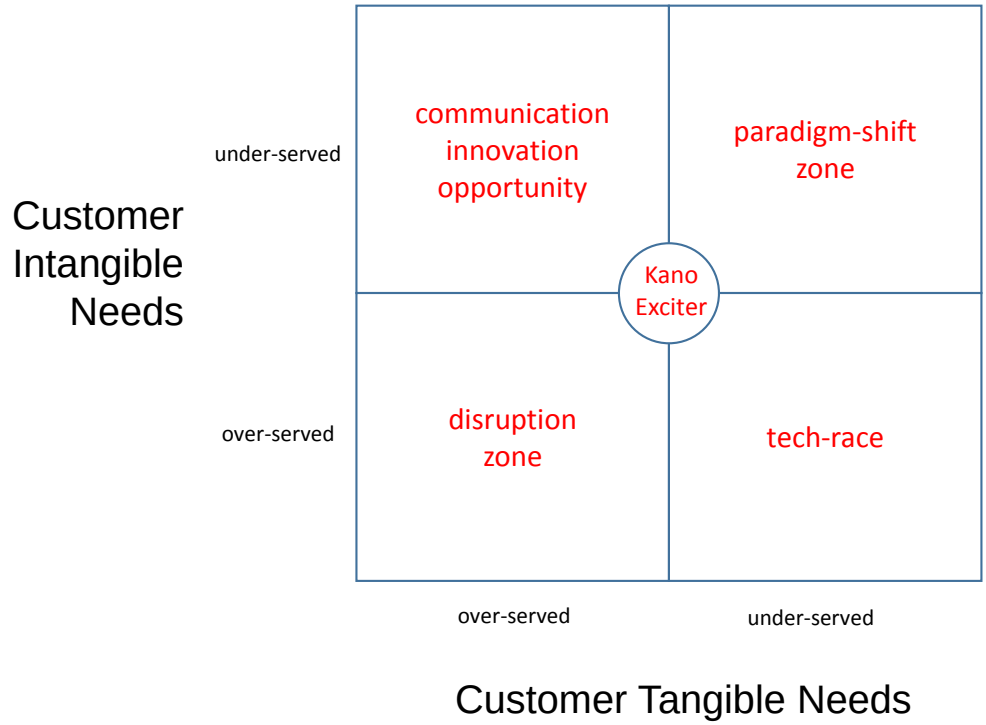


Figure 4: Frustration Grid & Innovation Strategy Suggestions

As promised in March, expect to hear more about this picture in future months. Not least of which being a few case studies showing how the PanSensic suite of tools is allowing companies to map the true frustrations of their customers in an interactive, automatic manner. And then, using the Frustration Grid, to work out how best to translate those frustrations into the right kind of innovation solution.

Reference

1) Elmar Sauerwein, E., Bailom, F., Matzler, K., Hinterhuber, H.H., ‘The Kano Model: How To Delight Your Customers’, Volume I of the IX. International Working Seminar on Production Economics, Innsbruck/Igls/Austria, February 19-23 1996, pp. 313 -327

Not So Funny – Getting Your Competitors To Do Your Hard Work For You

TRIZ Inventive Principle 21, Blessing In Disguise talks about turning harmful things into useful things. In theory, your competitors' marketing and advertising campaigns are harmful things… unless you're able to turn their lemonade into yours. Here are a few of our favourite examples:

Mark that up as one to BMW in a recent US battle between fierce rivals BMW and Audi. Uh, oh, wait a minute:

Make that two up. Or maybe three for taking the campaign battle to a higher altitude.
A bit more subtle, but only slightly… here Burger King manage to recruit a large footed tramp to do some hard work for them:

So how do McDonalds respond?
By taking on an easier target of course….

Fedex, meanwhile, take a cunning swipe at both their main rivals:

And, just in case you thought this kind of Principle 21 strategy was confined to the US, here's a very nice example from India:

And another, this time from Canada:

Not sure where this one is, but I imagine Coca-Cola might like to investigate:

Blimey, even uber-conservative Sweden is having a go. Albeit in New Zealand… which feels like a whole other strategy altogether:

Patent of the Month - Non-Thermal Applications Of Gas Plasma

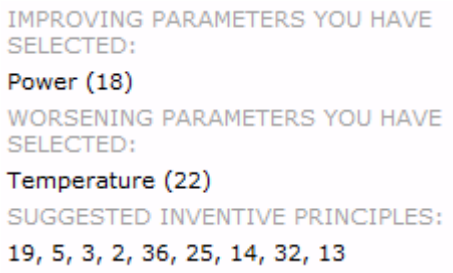
Patent of the month this month features a relatively rare visit into the world of plasmas. As regular readers will know, plasmas represent a distinct evolution stage in the Object Segmentation trend, sitting just after liquids and gases, and just before the (ultimate) 'field' end stage. Our winning patent comes from a team of inventors at the Plasma Institute at Drexel University in the US. US8,725,248 was granted to the team on May 13. Here's what the invention is all about as described in the abstract:

Method for the non-thermal treatment of human or animal tissue with high-voltage electrical discharge plasma is disclosed. The disclosed method employs current through plasma and through tissue not for the purpose of heating the tissue, but instead to maintain the plasma proximate to the tissue being treated. Also disclosed is a method of limiting the current through plasma and through tissue to minimize tissue heating by placement of an insulator or semiconductor between an electrode and tissue resulting in generation of a high-voltage discharge similar to a dielectric barrier discharge. The disclosed non-thermal plasma treatment can be employed to promote coagulation of blood, sterilization, disinfection, re-connection of tissue, and treatment of tissue disorders without causing significant thermal tissue damage.

Plasmas aren't a new thing in the medical world, but the problem that has prevented them from being used more widely is that plasmas are usually associated with elevated temperatures, and if there's one thing that animal cells don't like its elevated temperatures. Here's the problem from the plasma perspective:

The non-thermal influence of electrical discharge plasma, caused by active plasma particles (electrons, ions, radicals, and other chemically active species) and UV radiation, may be useful in many cases, for example, for living tissue disinfection and sterilization, for skin disease treatment, for blood coagulation, etc. The closer to the living tissue the active plasma is located and the higher is electrical field in the plasma, the higher the intensity and efficacy of the non-thermal plasma treatment. Available methods of non-thermal plasma treatment are relatively weak and are effected usually by plasma jet or afterglow treatment because there are limitations on the power flux to the living tissue (to prevent overheating of the tissue) and on the total current and current density which may flow through the living tissue (to prevent damage of the tissue and nerve channels). Since the power of electrical discharge that creates plasma is a product of the discharge current and voltage, the higher the voltage--the lower the current, when power is fixed.

This is what might be seen as a classical power-versus-temperature conflict: we need the power to create the plasma, but we can't have the temperature that comes with it because that will damage the tissue we're trying to treat. Here's what that conflict pair looks like when mapped on to the Contradiction Matrix:



And here's what the inventors have done to solve the problem:

In a first aspect, the present invention relates to a method of non-thermal treatment of living tissue by electrical discharge plasma wherein the plasma is maintained proximate to the living tissue by a current that passes through the plasma and the living tissue. The current passing through the tissue in the present invention is not used to heat the tissue, but rather is used to maintain the plasma proximate to the living tissue being treated. For this reason, the current employed in the present invention is kept below a value that would cause any significant tissue heating and resulting thermal damage.

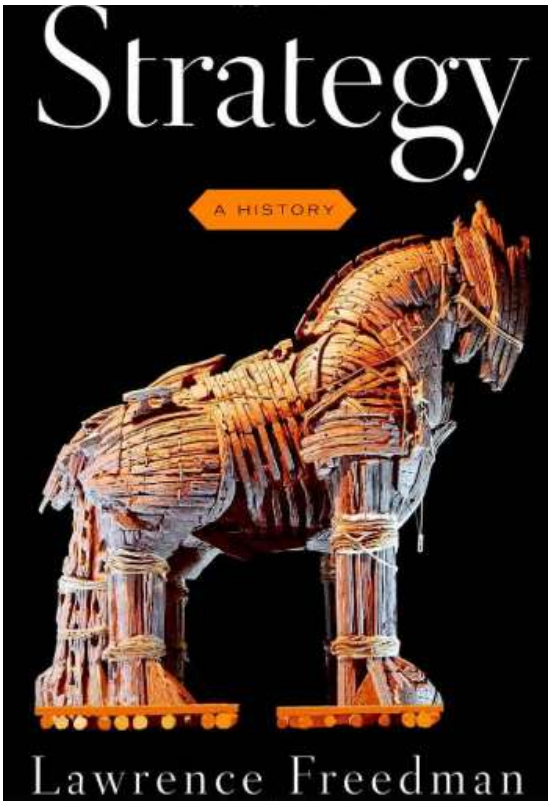
In a second aspect, the present invention relates to a method of creating non-thermal plasma proximate to the living tissue being treated, wherein the current passing through the living tissue and the plasma is limited by the presence of an insulator or semiconductor between an electrode and the living tissue.

While it is clear the invention has 'Taken Out' (Principle 2) the harmful heating effect of the current, it would have required quite some stretch of the imagination to get to the inventors solution just by knowing this Principle. We need to bear in mind the alternative interpretation of Principle 2, 'Separation' to get closer to the heart of the invention. The key inventive step in this invention seems to have been a separation and 're-purposing' of the current used in conventional plasma treatments. Conventionally, the current is present to create and maintain the plasma. In this invention, whilst there is still current used to create the plasma, the only current that makes any kind of contact with the target tissue is the minimal amount needed to keep the plasma proximate to the tissue to be treated. It's still a bit of a jump though, and perhaps a Principle suggestion like 'Another Dimension' would have helped to guide the solution. Better yet, in our 18-Principle version of the TRIZ Inventive Principles, we included 'Change Function' as a meta-Principle. That's the one that would have got us closest to the rather elegant end solution…

…albeit we're still missing the (Principle 24, Intermediary) part of the answer.

All in all though, as can be seen from the photograph at the head of this article (the plasma being applied to sterilization of chicken breast meat), this is first and foremost an elegant solution that is already making a difference in the real world. Something that already discriminates it from 97% of patent applications.

Best of the Month - Strategy: A History



At a whopping 752 pages, I don't recommend this book lightly. But then, when one of the world's leading authorities on war and international politics, decides to bring everything he knows about the vast history of strategic thinking, and then does it in such an engaging and insightful manner, who could ultimately say no? Not to mention the fact that, whether we like it or not, 'strategy' has come to pervade every aspect of our lives.

The range of Freedman's narrative is extraordinary, moving from the surprisingly advanced strategy practiced in primate groups, to the opposing strategies of Achilles and Odysseus in The Iliad, the strategic advice of Sun Tzu and Machiavelli, the great military innovations of Baron Henri de Jomini and Carl von Clausewitz, the grounding of revolutionary strategy in class struggles by Marx, the insights into corporate strategy found in Peter Drucker and Alfred Sloan, and, in a final section of the book, contributions of the leading social scientists working on strategy today. The core issue at the heart of strategy, the author notes, is whether it is possible to manipulate and shape our environment rather than simply become the victim of forces beyond one's control. Time and again, Freedman demonstrates that the inherent unpredictability of this environment-subject to chance events, the efforts of opponents, the missteps of friends-provides strategy with its challenge and its drama. Armies or corporations or nations rarely move from one predictable state of affairs to another, but instead feel their way through a series of states, each one not quite what was anticipated, requiring a reappraisal of the original strategy, including its ultimate objective. Thus the picture of strategy that emerges in this book is one that is fluid and flexible, governed by the starting point, not the end point.

Methinks this is a book that will not only come to be known as something of a bible on the strategy subject, it also makes for a terrific collection of contradiction-solving case studies. Genius.

SYSTEM·ATIC INNOVAT·ION

Investments – Electroceuticals

A wireless system developed by Stanford Assistant Professor Ada Poon uses the same power as a cell phone to safely transmit energy to chips the size of a grain of rice. The technology paves the way for new "electroceutical" devices to treat illness or alleviate pain. The technology allows wireless power transfer deep inside the body and then use this power to run tiny electronic medical gadgets such as pacemakers, nerve stimulators or new sensors and devices yet to be developed.

The discoveries reported May 19 in the *Proceedings of the National Academy of Sciences* culminate years of efforts by Ada Poon, assistant professor of electrical engineering, to eliminate the bulky batteries and clumsy recharging systems that prevent medical devices from being more widely used.

The technology could provide a path toward a new type of medicine that allows physicians to treat diseases with electronics rather than drugs.

"We need to make these devices as small as possible to more easily implant them deep in the body and create new ways to treat illness and alleviate pain," said Poon. Poon's team built an electronic device smaller than a grain of rice that acts as a pacemaker. It can be powered or recharged wirelessly by holding a power source about the size of a credit card above the device, outside the body.

New generation of sensors

The central discovery is an engineering breakthrough that creates a new type of wireless power transfer -- using roughly the same power as a cell phone -- that can safely penetrate deep inside the body. As Poon writes, an independent laboratory that tests cell phones found that her system fell well below the danger exposure levels for human safety. Her lab has tested this wireless charging system in a pig and used it to power a tiny pacemaker in a rabbit. She is currently preparing the system for testing in humans. Should such tests be approved and prove successful, it would still take several years to satisfy the safety and efficacy requirements for using this wireless charging system in commercial medical devices.

Poon believes this discovery will spawn a new generation of programmable micro-implants - sensors to monitor vital functions deep inside the body; electro-stimulators to change neural signals in the brain; and drug delivery systems to apply medicines directly to affected areas.

Drug therapy alternatives
William Newsome, director of the Stanford Neurosciences Institute, said Poon's work created the potential to develop "electroceutical" treatments as alternatives to drug therapies.

Newsome, who was not involved in Poon's experiments but is familiar with her work, said such treatments could be more effective than drugs for some disorders because electroceutical approaches would use implantable devices to directly modulate activity in specific brain circuits. Drugs, by comparison, act globally throughout the brain.

"To make electroceuticals practical, devices must be miniaturized, and ways must be found to power them wirelessly, deep in the brain, many centimeters from the surface," said Newsome, the Harman Family Provostial Professor and professor of neurobiology at Stanford.

He added, "The Poon lab has solved a significant piece of the puzzle for safely powering implantable microdevices, paving the way for new innovation in this field."

How it works
The article describes the work of Poon's interdisciplinary research team, which included John Ho and Alexander Yeh, electrical engineering graduate students in Poon's lab; Yuji Tanabe, a visiting scholar; and Ramin Beygui, associate professor of cardiothoracic surgery at Stanford University Medical Center. The crux of the discovery involves a new way to control electromagnetic waves inside the body.

Electromagnetic waves pervade the universe. We use them every day when we broadcast signals from giant radio towers, cook in microwave ovens or use an electric toothbrush that recharges wirelessly in a special cradle next to the bathroom sink. Before Poon's discovery, there was a clear divide between the two main types of electromagnetic waves in everyday use, called far-field and near-field waves. Far-field waves, such as those broadcast from radio towers, can travel over long distances. But when they encounter biological tissue, they either reflect off the body harmlessly or get absorbed by the skin as heat. Either way, far-field electromagnetic waves have been ignored as a potential wireless power source for medical devices.

Near-field waves can be safely used in wireless power systems. Some current medical devices such as hearing implants use near-field technology. But their limitation is implied by the name: They can transfer power only over short distances, limiting their usefulness deep inside the body. What Poon did was to blend the safety of near-field waves with the reach of far-field waves. She accomplished this by taking advantage of a simple fact -- waves travel differently when they come into contact with different materials such as air, water or biological tissue.

For instance, when you put your ear on a railroad track, you can hear the vibration of the wheels long before the train itself because sound waves travel faster and farther through metal than they do through air.

With this principle in mind, Poon designed a power source that generated a special type of near-field wave. When this special wave moved from air to skin, it changed its

characteristics in a way that enabled it to propagate -- just like the sound waves through the train track. She called this new method mid-field wireless transfer.

In the experiment, Poon used her mid-field transfer system to send power directly to tiny medical implants. But it is possible to build tiny batteries into micro-implants, then recharge these batteries wirelessly using the mid-field system. This is not possible with today's technologies.

More details:
Video: http://www.youtube.com/watch?v=7WURJ9rgwjs

First of what we imaging will be a cluster of patent applications: US20130215979.

Full reference: John S. Ho, Alexander J. Yeh, Evgenios Neofytou, Sanghoek Kim, Yuji Tanabe, Bhagat Patlolla, Ramin E. Beygui, and Ada S. Y. Poon. **Wireless power transfer to deep-tissue microimplants**. *PNAS*, May 19, 2014 DOI: 10.1073/pnas.1403002111

(this month we begin a new regular feature from Marcelo Gimenes and the work he's conducting in our post-doc music project at the University of Plymouth)

Bolero: compositional skill and 'wow' music

Listening to Ravel's Bolero, probably the most famous creation by one of the most influential composers of the 20th century is an amazing experience. Hypnotic, mysterious, fun, contagious, and mad are just some of the adjectives that could easily describe it. What is remarkable about this masterpiece is that it displays, at the same time, the power to captivate the listener's attention and, on the other hand, the simplicity of the material on which it is based: a repetitive rhythm and melody.

It was Ravel himself who once said that Bolero was an exercise, an experiment: "I am particularly desirous that there should be no misunderstanding about this work. It constitutes an experiment in a very special and limited direction, and should not be suspected of aiming at achieving" (Lanford, 2011). Despite this apparent contradiction, Ravel was able to prove his compositional skills by knowing exactly how to guide the listener in a journey from potential boredom to ultimate wow. As a result, Bolero became an instant hit.

Originally composed as a ballet but usually performed as a purely orchestral piece, Bolero lasts for approximately 16 minutes during which an imaginary and magical account is told. Initially the rhythmic ostinato is introduced by the snare drum. Next, the melody is played by the flute, which is then followed by other instruments in various combinations of timbre and textures. In each iteration, the overall volume escalates, starting from pianissimo and gently rising to 'as loud as possible'. From the beginning, an atmosphere of mystery is created and little by little tension rises as the listener follows the unravelling of a conundrum of unexpected results. Gradually the listener gets used to the rhythmic and melodic mantras and, hypnotised, is offered a feast of different combinations of timbres.

When the orchestra reaches the highest plateau in terms of volume, the listener arrives at the utmost Spanish fiesta, full of colour and joy and, in the 'wow moment', the climax, a modulation (Inventive Principle 17) happens, the orchestra goes into a completely different direction that, all of a sudden, terminates ('disintegrates') in a downwards movement.

Bolero seems to be a perfect example of a piece that was designed for wow, the product of Ravel's craftsmanship towards "contradiction elimination". Mann and Bradshaw raised the hypothesis that a "wow design solution" in music occurs "when something happens that the listener was not expecting to happen" (Mann and Bradshaw, 2005). In Bolero, this is achieved when the listener realizes, repetition after repetition towards one direction, the pathway he was following finally leads to an unexpected destination. I am content to say that every time I listen to this piece and follow the track, I get caught in the end. Let the music lead you and the same will happen to you.

References

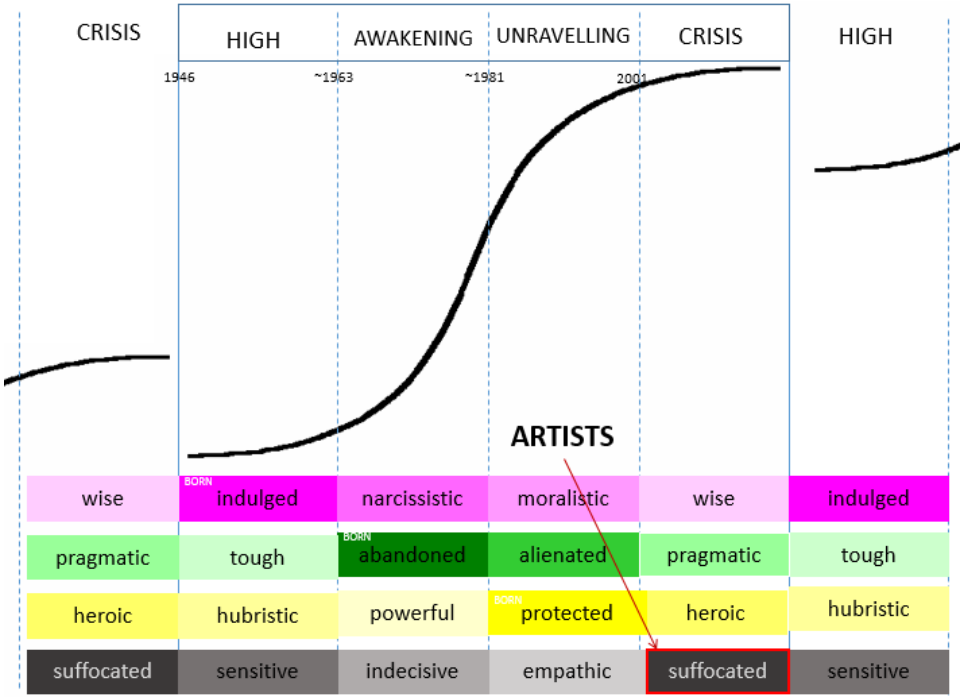
Lanford, Michael (2011) Ravel and 'The Raven': The Realisation of an Inherited Aesthetic in Boléro. The Cambridge Quarterly, v. 40, n. 3.
Mann, Darrell and Bradshaw, Chris (2005) Design for Wow 2 – Music. TRIZ Journal.

Generational Cycles – Suffocated Artists

This article continues our series of sixteen Generation-related articles, each taking a closer look at each of the four main phases of the four different generational archetypes identified in the Strauss & Howe research. This month is the turn of the Suffocated Artist. Too young for the cohort to have been given a name yet – other than, perhaps, the rather lazy 'Generation Z' term, these are the children born into the world since 2001. What makes this Generation an interesting one to look at right now, is that, at the time of writing, the oldest of them enters their teenage years later this year, and as such they begin to start making some of their own decisions in life, over and above the decisions made for them by their predominantly Heroic Generation Y parents. In this article we take a closer look at their childhood, and what we might expect to see from them in the coming decade:

		0-20	21-41	42-62	63-83
(Generation Y)	HERO	protected	heroic	hubristic	powerful
(Silent)	ARTIST	suffocated	sensitive	indecisive	empathic
(Boomer)	PROPHET	indulged	narcissistic	moralistic	wise
(Generation X)	NOMAD	abandoned	alienated	pragmatic	tough

The Suffocated Artist spends their growing-up years during the 'Crisis' period in (Western) world history. The 'post 9/11' world into which they have been born is full of many tensions that their parents and the generation before them never really saw. Life 'before' was reasonably good, but now none of us is really so sure anymore. Very similar, in fact, to the previous Artist generation, the so-called 'Silent Generation' that were born into the post-Wall-Street-Crash triggered Depression of the 1930s.



The whole Strauss & Howe generation cycle model is predicated on the transfer of influence from parents to children, and the changes that occur from one generation of parents to the next. The (GenX) Nomads were abandoned by their (Boomer) Prophet

parents… their abandonment meant that when they themselves became parents, they tended to do the opposite of what happened to them. They were thus highly protective of their (Generation Y) Hero children. These Heroes have now started to become parents themselves – the oldest of the cohort is now in their mid-30s – and, when they look back at their benign, protected childhood, they tend to think, 'yes, that was pretty good, I need to do even more of that'. And so 'protection turns into 'suffocation'. In no small part because of media-fuelled messages that the world is a dangerous place for children and that, as a parent, it is therefore your duty to keep your eyes on your offspring at all times. From the disappearance of Madeline McCann to the recent round of child-abuse-by-celebrities scandals from the 1970s in the UK (Jimmy Saville, Rolf Harris, et al) to the current tragedy of the kidnapped Nigerian schoolgirls, no parent is left in any doubt that there is danger lurking at every corner. Or the perception of danger… which is probably worse. Either way, Hero parents are vigilant parents. Ask any Hero parent, 'where are your kids right now?' and they're practically guaranteed to have the answer. And if they don't, they're very likely to feel guilty about the fact.

Part of the 'suffocation' of this new cohort of Artists comes from some significant changes in direction that Generation Y parents have made when they look back at their own upbringing. While that upbringing was generally remembered as being pretty good (e.g. many Generation Y 'failed to launch' when they hit their 20s, realizing instead that life was much easier if they stayed home with their very amenable parents), there is a feeling that the alienated nature of their Gen X parents meant that they were pretty much allowed to do anything that was edgy or 'against the norm', and that they were given too much leeway. GenX parents had an almost peer-like relationship with their kids, and now those kids have grown up they're increasingly looking back and thinking 'I really shouldn't have been allowed to do that'. So whereas the GenX parent almost had a sneaking admiration for their falling-down-drunk kids, with their armfuls of tattoos, the new GenY parent seems to be saying, 'it was okay for me, but it's not okay for my kids'. The GenY parent is much more likely to put their foot down and say no. It's happening in the energy drinks category already for example. Beverages like Red Bull hit their stride with Generation Y teens. GenY adults might still sneak a can when they need a kick, but they also 'know' it's not good for them, and anything that's not good for you, shouldn't be given to vulnerable kids. In some countries, energy drinks are already banned for under-16s.

Any teenager – of course – is required to rebel against their parents. That's part of what being a teenager is all about. That rebellion will undoubtedly happen too with a cohort of kids that have grown-up not playing out, being supervised every moment of the day, and having been isolated from anything that might potentially be harmful. One might legitimately say that they have accumulated a lot of pent-up rebellion potential over the course of their short lives. But the problem is this. They generally speaking don't have the life-skills to cope with a sudden exposure to the 'real world' and, worse, society is increasingly likely to ensure they cease and desist when any kind of rebellion does begin to appear. Hence the reason we discussed James Dean – an iconic member of the previous Artist generation – in last month's Generations article: the literal and figurative 'rebel without a cause', all Dean's character, Jim Stark, ultimately wanted to do was fit in and live normally in a world they didn't really understand. Rebellion to Jim Stark, meant going nuts and being knocked back into conformance pretty darn quickly.

All of which is still to come for this new round of Artists. Meanwhile, here is a list of the general characteristics generally found across the Suffocated Artist cohort as may be observed so far either from what we can see today or what we can read across from the previous Artists at the comparable period in their lives. As per our usual convention, if

you're a Heroic Hero or Pragmatic Nomad (e.g. parent) reading this, these statements don't necessarily apply to your post-9/11 kids personally, rather they are what may be observed when we step back and look at the cohort as a whole. Again, per convention, we're deliberately exaggerating some of the characteristics to help make the important innovation sparking insights and contradictions more visible than they might otherwise be:

- very insular (average of 6hours per day looking at screens)
- ask and ye shall receive… so long as it's good for you (you *could* do that, *or*…)
- …most things are 'not allowed'
- timid, frightened, lost, bewildered when in 'the real world'
- cautious, always looking to parents for validation
- 'learned helplessness'
- strongly isolated from anything negative or potentially harmful
- labelled and categorised (almost half have some form of 'condition' – ADHD, GAD, etc)
- confused (never been taught things from first principles, and able to see an opposite version of everything they see on the Internet – over here it says Black; over here it says White – which is correct?)
- social media dominates life… although less happy to reveal personal details than previous generation, partly due to parental monitoring
- clear understanding of 'boundaries' – what's acceptable and what isn't
- highly scheduled lives (especially extra-curricula education/hobby activities)
- self-oriented (social media is main exposure means to peers, rather than face-to-face)
- taught that 'wholesome and healthy' is good; fast-food is bad

In other articles in this series, we've tried to include a number of iconic examples of the generation cohort to help crystallise the generation. That has proved to be much, much harder to do for this cohort. Partly because they're all still pre-teens, but also – and we think this is quite significant in its own right – because one of the generational reversals we can see between Generation Y and this new cohort of Artists is that, while it was okay for GenY kids to be fame-hungry, GenY parents are very reluctant to allow their kids the same direction in life. This is perhaps due to the general 'dangerous world' threat, but more likely is due to the widespread media reporting of the damage that has been done in the past to kids who achieved celebrity at an early age. Very significantly, if you take a look at the Wikipedia list of top 100 'child actors' at the moment, they're nearly all (Generation Y straggler) kids between the ages of 14 and 17. There are in fact just four that were born after 2001, none of whose names I recognized, and only one of them had a face a recognized from a movie.

Quite tellingly, the predominant Artist Generation icon of the day is the aforementioned Madeline McCann. It's almost as if Madeline's face is the only pre-teen face the media feels it is appropriate to show pictures of these days.

As far as the parents of Suffocated Artists are concerned, there has been a noticeable decline in adult-audience movies featuring small children in prominent roles in the last decade. Nearly all of the ones that have, can be seen to have played a significant role in shaping the attitudes of Generation Y parents:

- Life Is Beautiful (1997) - A Jewish man has a wonderful romance with the help of his humour, but must use that same quality to protect his son in a Nazi death camp, the whole premise being that the son should never discover the horrors that are taking place.
- The Pursuit Of Happyness (2006) - A struggling salesman takes custody of his son as he's poised to begin a life-changing professional endeavour. Key parental message: children should not be exposed to difficult situations.
- The Boy In The Striped Pyjamas (2008) - a story seen through the innocent eyes of Bruno, the eight-year-old son of the commandant at a concentration camp, whose forbidden friendship with a Jewish boy on the other side of the camp fence has startling and unexpected consequences. Key parental message: keep your eyes on your kids at **all** times.
- The Lovely Bones (2009) - Centers on a young girl who has been murdered and watches over her family - and her killer - from purgatory. She must weigh her desire for vengeance against her desire for her family to heal. Key parental message: keep your eyes on your kids at all times.
- The Book Thief (2013) - While subjected to the horrors of World War II Germany, young Liesel finds solace by stealing books and sharing them with others. In the basement of her home, a Jewish refugee is being sheltered by her adoptive parents. Key messages: in crisis times, children should be seen and not heard.

Key Contradictions:

1) rebellion years approaching, but likely to be met by strong societal resistance (what was acceptable for the previous generation is increasingly not acceptable any more… what was okay for you, isn't okay for me hypocrisy)
2) 'upbeat', optimistic parents, but not sure what there is to be particularly upbeat and pessimistic about
3) isolated from real world, but about to be exposed to it with few, if any, coping skills
4) …which, if the Strauss & Howe model continues to hold over the course of the next decade, will increasingly have to be developed without parental assistance

Relationships With Others:

The following table shows how the Suffocated Artists see others around them. As per the convention determined in earlier articles, the relationship story has been divided into two main dimensions: 1) how the Suffocated Artists see the four different Prophet, Nomad, Hero, Artist types, and 2) how they view the people inside their friends and family network versus how they view those outside.

	Prophets	Nomads	Heroes	Artists
Outside Friends/ Family Group	'source of the societal problems we're having' (as told by parents) Aloof Slightly sinister Rich or resentful of still having to work. Sharing Mentors if engaged Authoritative/Bossy	Distant/reserved/aliens? Slightly odd/don't fit Quirks Sarcastic/Cynical Loners/'free time is me time' = no time for me Cold… but soft beneath the hard shell 'don't really want me around'	Confident Heroic 'world changers' Loud 'dangerous..' but approachable Open/sharing Comfortable with fame	(peers) Wary 'also confused' Kept away from me by my/their parents Life enters through a social media lens/screen Bookish

Inside Friends/ Family Group	(grandparents/great-grandparents) Put self first – time for me, but on their terms Wise… …yet still somehow out-of-touch (despite their presence in my social media world) Sympathetic (let me do more things than my parents do) Impatient	(late-parents/ grandparents) Loving 'there for me' Harassed – not enough time to do everything to the standard the wish Pragmatic – trying to do the right thing, but often compromising Lacking in confidence – never quite sure they're doing the right thing 'us against the world' 'society going mad' (both older and younger generations) Doubting	(parents)* Enthusiastic Upbeat 24/7, 'always there' 'on my side' Mum and dad 'a team'/'a proper family' Large extended family of their peers (semi-covert competition between them… 'are my kids doing better than theirs?') Policemen/controlling 'All-knowing'/awe Keen to do 'fun stuff' together.. not so good at the mundane stuff Few practical skills	(siblings/friends) Quiet Unassuming Unsure Serious Philosophical Reflective Family-comes-first

* Worth noting here is that Generation Y experiences a so-called 'Quarter-Life Crisis' to a far great extent than other generational cohorts – they've been promised a lot in life ('you can be whatever you want to be'), but in their late 20s/early30s, when the Crisis hits, comes a realization that no-one can be everything, and that they have to 'knuckle-down' and focus on what's important. Becoming a parent is often at the heart of the Crisis. The parent category here is dominated by people who have 'been through their Quarter-Life Crisis')

Biology – Red Crossbill

Red crossbills feed exclusively on conifer seeds. Populations, or call types, may have specialized bill morphologies that make them most efficient at extracting the seeds from cones of particular conifer species. A bird's biting muscles are stronger than the muscles used to open the bill, so the Red Crossbill places the tips of its slightly open bill under a cone scale and bites down. The crossed tips of the bill push the scale up, exposing the seed inside. A bird's biting muscles are stronger than the muscles used to open the bill, so the Red Crossbill places the tips of its slightly open bill under a cone scale and bites down. The crossed tips of the bill push the scale up, exposing the seed inside.

Red crossbills feed mainly on conifer cones still attached to trees, although they will also hold unattached cones in their feet. They use their peculiar mandibles to bite between cone scales so that, as they bite, the lower mandible opens the scale and exposes the conifer seed. In particularly tough cones they may have to bite several times or twist with their head before they can reach the conifer seed with their tongue. Their "crossed" mandibles are essential for this task and allow them to exploit a niche not otherwise exploited among seed-eating birds. Once they expose a conifer seed, they remove the seed coat with their tongue and mandible and either swallow small seeds whole or crush larger seeds. The Red Crossbill is so dependent upon conifer seeds it even feeds them to its young. Consequently, it can breed any time it finds a sufficiently large cone crop, even in the depths of winter.

Red crossbills travel in feeding flocks that help individuals take best advantage of locally variable conifer seed crops. Flocking is thought to help these crossbills avoid predation while also assessing the best areas for foraging. Red crossbill calls and calling rates transmit information on the availability of food. Flying birds join foraging flocks when the foraging birds are calling. However, call rate increases among foraging birds as they spend more time feeding and, perhaps, begin to have less success in finding food. As the call rate reaches a crescendo, the flock departs to look for another foraging opportunity. The calls of foraging birds do not attract flying groups of another call type, however, which is consistent with their specialization on different conifer species.

The Crossbill story illustrates an elegant example of evolution taking the easiest path to solving a contradiction. The basic contradiction here being the desire to open up conifer seeds that require a prising-open action rather than a crushing action. One way to solve this problem, in theory at least, would have been to develop stronger beak-opening muscles. The problem with this is that a Crossbill with a *slightly* stronger set of opening muscles has no advantage over one with normal muscles. It's only when the available opening force reaches a useful – seed-opening – threshold that any kind of evolutionary advantage occurs. Whereas… as soon as a Crossbill mutated even a slightly crossed beak, it is immediately more able to prise open its target seeds. And hey presto evolutionary advantage sets in train an advantage to greater degrees of beak crossing.

Here's what the problem looks like when mapped on to the Contradiction Matrix:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Stress/Pressure (19)

WORSENING PARAMETERS YOU HAVE SELECTED:

Length/Angle of Moving Object (3)

SUGGESTED INVENTIVE PRINCIPLES:

35, 9, 40, 17, 3, 14, 4, 13

Good to see that human engineers have also worked out that Asymmetry, Another Dimension and The Other Way Around are good ways to solve this type of 'I want to exert pressure, but at a different angle' problem.

SYSTEM·ATIC INNOVAT·ION

Short Thort

“Consider that we trust military and homeland security personnel with our lives, yet we don’t give them lavish bonuses. They get promotions and the honor of a job well done if they succeed, and the severe disincentive of shame if they fail. For bankers [and many modern-day business leaders], it is the opposite: a bonus if they make short-term profits and a bailout if they go bust. The question of talent is a red herring.

“The ancients were fully aware of this upside-without-downside asymmetry, and they built simple rules in response. Nearly 4,000 years ago, Hammurabi’s code specified this:

“If a builder builds a house for a man and does not make its construction firm, and the house which he has built collapses and causes the death of the owner of the house, that builder shall be put to death. If it causes the death of the son of the owner of the house, a son of that builder shall be put to death.”

“The Babylonians understood that the builder will always know more about the risks than the client, and can hide fragilities and improve his profitability by cutting corners — in, say, the foundation. The builder can also fool the inspector; the person hiding risk has a large informational advantage over the one who has to find it.

“Banning bonuses addresses the principal-agent problem in economics: the separation between an agent’s interests and those of the client, or principal, he is supposed to represent. The potency of the solution lies in the idea that people do not consciously wish to harm themselves; we feel much safer on a plane because the pilot, and not a drone, is at the controls. Similarly, cooks should taste their own cooking; engineers should stand under the bridges they have designed when the bridges are tested; the captain should be the last to leave the ship.”

Nassim Nicholas Taleb

News

Website

Eagel-eyed and very patient readers will maybe have observed that the new SI website went live this month. One day we’ll write a book on why it has taken close to two years to create a vaguely competent new site. In the meantime, for anyone that has wanted to point others in our direction and been too embarrassed to send them to the website, hopefully at least that embarrassment problem has now been resolved.

Prague
This year's MATRIZ conference takes place in Prague from the 4th to 6th of September. We've been invited to run a number of seminars in the Czech Republic at around the same time, so it looks like we'll be doing something along the lines of 'Why the World's Most Potent Problem Solving Method Is Still A Struggling Cult, And What To Do About It'. More details from Darrell (and the website!) if you're interested.

eBooks
First a new website, then we start building momentum in the world of ebooks. We always vowed that we'd head down that road when we received the 100th customer request. That's happened now, so expect to see TRIZ Companion ebook in the SI-Shop shortly, with the two HOSI books not far behind.

Rail Industry Association
We will be presenting a session on Evolution Potential & Predicting the future of the railway industry at the UK's industry coordination forum. The session will take place on 10 July in the Midlands.

Business Leader Innovation Awards
Darrell will be speaker and one of the judges at the UK Business Leader Innovation awards event being held in Taunton on 25 September.

New Projects
This month's new projects from around the Network:

FMCG – Bulletproof invention disclosure preparation
Medical Devices – patent strategy study
Healthcare – Leadership workshop series
Transport – Innovation strategy workshop
Financial Services – TrenDNA workshop
IT Services – Systematic Innovation & TrenDNA workshops
Process – Problem-Solving Workshop
FMCG – PanSensic study
Transport – PanSensic dashboard
Government – PanSensic dashboard
O&G – Business Innovation Culture programme