Systematic Innovation

e-zine

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In this month's issue:

The Systematic Innovation e-zine is a monthly, subscription only, publication. Each month will feature articles and features aimed at advancing the state of the art in TRIZ and related problem solving methodologies.

Our guarantee to the subscriber is that the material featured in the e-zine will not be published elsewhere for a period of at least 6 months after a new issue is released.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

Resilience

re·sil·ience n.
1. The ability to recover quickly from illness, change, or misfortune; buoyancy.
2. The property of a material that enables it to resume its original shape or position after being bent, stretched, or compressed; elasticity.

I've always been fascinated by Hong Kong. On the one hand it's one of the most dynamically changing places I've ever visited. On the other, it's always been really difficult to convince any of the companies I visit that they should be innovating. How is it possible to be both changing all the time and immune to the merits of innovating? All the people I've known since I first visited the territory over a decade ago are still there, their organizations still thriving.

Hong Kong's sustained success has been built on its position as a trader in a geo-politically important part of the world. Traders, those that manage to survive beyond the short-term at least, are, by nature, resilient. That is, they will do whatever needs to be done to keep the money flowing and profits coming in. An organization in Hong Kong that sees its margins from manufacturing and trading in, say, plastic flowers, eroding over time is highly likely to get out of the business and switch to manufacturing something else. Tennis racquets or bread-making machines or LEDs, anything, in fact, that will all them to get back to the margins they needed to thrive as a business.

While this kind of ability to rapidly re-focus a business is not innovation in its traditional sense, it is by definition still innovation. Especially when we see what is happening through the lens of our standard 'successful step-change' definition. Hong Kong companies don't tend to be very good at innovating to create a better plastic flower, but they're exceptional good at finding the next something that will allow them to continue trading effectively. This 'traders instinct' is all about sensing to the surrounding environment and, when necessary, making successful step changes.

So how is it different from creating successful new plastic flowers?

A good part of the answer, we think, can be found in Figure 1:

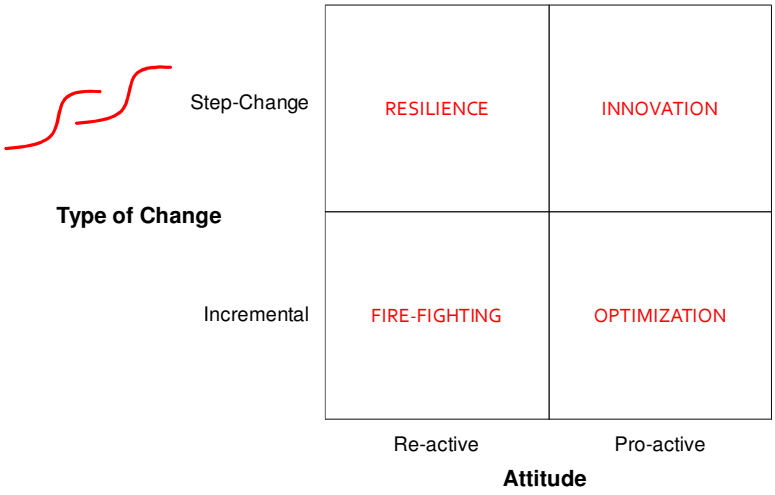

Figure 1: Change-Type Versus Response Attitudes

The figure divides the world into four quadrants: each defined by a pair of attributes: one relating to different types of change, the other relating to the attitude of the organization. 'Change' can essentially be categorized into two types: incremental and step-change. The big difference between the two being, not so much the numerical extent of the change but whether the change involved a discontinuous (s-curve) shift or whether the change was simply an advance borne of doing what is currently done but doing it better.

For the 'attitude' dimension, the world has been divided again into two polar opposites: individuals or organizations either being able to take a reactive or pro-active perspective on the world in which they exist.

We first drew this 2x2 matrix by accident. Once we'd drawn it, though, it seemed to make an awful lot of sense when it came to categorizing the main types of behavior we see in the organizations we have the privilege to visit. Each quadrant represents what we might see as a fundamentally different survival strategy:

The INNOVATORS we work with are the organizations that take a pro-active attitude to, first, looking for, and then executing step-change ideas. Innovation in this sense is an inherently positive, forward looking activity. We increasingly use the terms 'Hero' and 'Hero's Journey' to describe the innovator and the innovation process since these are the essential traits needed to actively seek to shift or disrupt a current situation that might appear to be stable and in no need of change.

The OPTIMIZATION quadrant is also about an individual or organization with a positive, forward thinking attitude to life. In this quadrant, however, the pro-activity is focused on the search for incremental improvements to an existing system. Management philosophies like Lean or SixSigma, and the whole ethos of the modern organization as an 'efficiency engine' are wholly consistent with life in this quadrant. Per our frequent comparison between innovation and optimization, the two activities are polar opposites of one another – one being about getting the most out of the current set of rules; the other being about breaking those rules in order to find better new ones.

The drive for increased efficiency has become a survival necessity for all but the slowest of industries. It is rare indeed these days for organizations to not have some kind of 'efficiency engine' in place within the organization. For those that don't, FIRE-FIGHTING tends to be the general operating model. In the Figure 1 model, it becomes apparent that the only real difference between optimization and fire-fighting are the attitudes of the people involved: optimization and 'continuous improvement' are fundamentally pro-active in nature, while fire-fighting is about waiting until something goes wrong before the system kicks in to action to find and fix whatever it is that's stopped the system from delivering what it was supposed to deliver. There is nothing implicitly wrong with this kind of re-active attitude, provided, of course, that the organization works in such a manner that it is sufficiently agile to react to changes in a timely manner.

Finally, and also in the reactive world is the fourth, RESILIENCE, quadrant in the figure. We think resilience is all about the ability of an individual or organization to survive step-changes that might occur in or around their prevailing environment. Step-changes come in a wide variety and type of forms. A new CEO coming in to an organization is a step-change, as is a merger with another organization. Or the disruption caused by a tsunami or catastrophic emergency. Essentially the difference between 'resilience' and 'fire-fighting' – in exactly the same way as we have mapped the difference between innovation and optimization is that firefighting is all about returning a system to its former state within

the same set of rules of behavior, whereas resilience is the ability to survive through a step-change after which some of the rules no longer apply.

This difference might appear subtle, but is potentially profound in its importance to the survival of a system. Let's take a quick aerospace example to see the difference: Pilots within a civil airliner are increasingly present to ensure the co-pilot doesn't touch anything. And vice-versa. Modern aircraft essentially fly themselves and the job of the crew is largely to make sure the system is operating correctly. This gets done by completing a series of tests so that check-lists can have each item checked.

If, during a flight, the aircraft suffers, say, an engine failure, the pilots need to flip briefly into fire-fighting mode while they make sure the control systems makes the necessary changes to ensure the engine is shut-down safely, to re-schedule the throttle controls to change the power settings of the other engine(s), and to alter the rudder and other control surface settings to compensate appropriately for the asymmetrical thrust profile that now exists. This is classic fire-fighting: the rules of behavior of the aircraft have been characterized for both 'normal' and 'engine-out' situations, and all the pilots in effect have to do is to ensure that the system has re-optimized itself to suit the changed circumstances.

Compare this situation with the one that the crew of United flight 232 (Figure 2) found themselves in when the engine failure they encountered somehow managed to destroy *all* of the hydraulic systems on the aircraft. With no hydraulic power, the pilots now had zero control over the rudder, ailerons or any other control surface on the aircraft. They were now outside the known operating rules of the aircraft. Not only did the 'rules' not apply, there were in effect *no* rules.

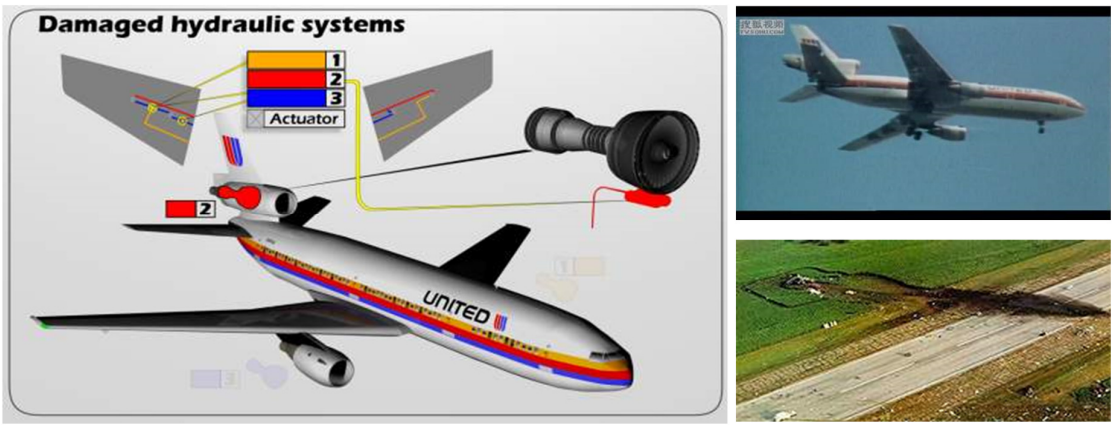

Figure 2: United 232 (http://www.youtube.com/watch?v=W45wMs6jSUg)

To all intents and purposes, the crew and passengers on UA232 were dead. The fact that the pilots managed to get the aircraft on the ground in anything like one piece, and that over half of the passengers' lives were saved is testament to the resilience of the pilots and not their fire-fighting ability. There were no rules any longer, and so the pilots had to quickly find some new ones. And therein lies the 'step-change'. The pilots were no longer in the normal world, they were in the uncomfortable uncertainty inherent to the 'special world' between two s-curves – a set of rules that no longer existed, and a new set of rules they had yet to discover – Figure 3.

As such, the pilots found themselves in the exact same position as the Hong Kong factory owner realizing that he needs to get out of the plastic flower manufacture business. In the

case of the pilots, the 'solution' was discovery (of previously unknown rules) that they could affect at least some control over the aircraft by varying the throttle setting of one of their remaining two engines relative to the setting of the other. In the case of the Hong Kong entrepreneur it is working out that better operating margins would come from switching to the manufacture of something completely different to plastic flowers. Both pilots and entrepreneur need the characteristics of Hero's if they are to get to where they want to be.

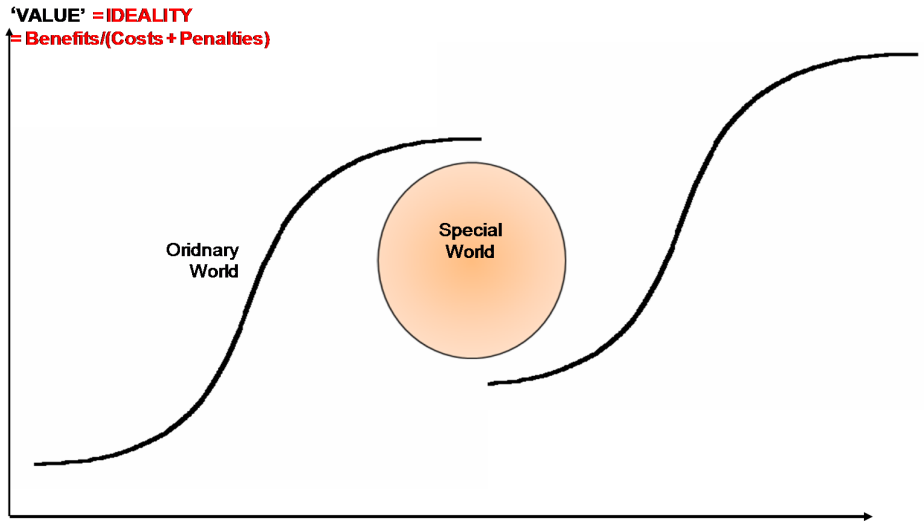

Figure 3: 'Normal' And 'Special' Worlds

Our definition of resilience here is consistent with its use in the world of complex adaptive systems. In a complex adaptive system there are no 'rules' – in the sense that I might adopt a survival strategy successfully for a number of years only to find that it no longer works tomorrow morning. All biological systems have evolved to be resilient: they self-organise and are capable of adapting in circumstances that might change quite starkly from, in extreme cases, one day to another.

This is not to say they are perfectly resilient to any form of change of course. Dodo's had a degree of resilience, but alas not quite enough for them to adapt when their environment rules changed very suddenly to include hungry sailors on their list of predators. As in the world of innovation, what was needed in the Dodo community was some evolutionary Heroism. As is also the case in the world of innovation, most attempts at heroism end in failure.

So What?

You might be thinking to yourself at this stage in the discussion. A very valid thought. And one that we will simply respond with this series of concluding thoughts:

In Hong Kong, like many other parts of the world or different industries, the word 'innovation' tends not to generate a lot of interest.

In these areas, innovation is often seen as an unnecessary provocation of the surrounding environment. Not every manager or employee has a desire to do this: it is hard ('heroic') work, highly likely to end in failure: why take the chance?

On the other hand, almost every manager or employee wants to work in an environment that is resilient – that they will be paid next month in the same way they were paid this month, no matter how much the world around them might change.

Resilience is merely the reactive form of innovation.

Organisations are generally speaking good at optimization and fire-fighting, but terrible at coping with step-changes. They are not, in other words, very resilient.

If you're having difficult convincing a client or other team members to 'innovate', you might have a lot easier task if you convince them they need to be 'resilient'.

All of the 'Systematic Innovation' tools, methods and strategies are equally applicable in both innovation and resilience roles, we just made the mistake sometimes of thinking that our customers are the pro-active Heroes, when in reality, in Hong Kong and beyond, they are much more likely to be the fear-driven, reluctant-Hero's that might resonate far better with a message that you are there to help them to be more resilient. Hands-On Systematic Resilience.

Innovator's rock boats; resilience-builders see the incoming tidal wave and stop them tipping over.

The 'Innovation Capability Maturity Model' might just as well (sometimes better) be called the 'Resilience Capability Maturity Model'.

The Rule Of Three And Do I Need To Innovate?

One of the stories that stuck with us more than most last year was a Western Australia miner who questioned the need to innovate. When the times are good, he said, I earn lots of money; when they're bad, I go fishing.

Deep down, I have kind of a sneaking admiration for this perspective on life: innovating is one of the most difficult, thankless jobs on the planet and I can well see why people would chose *not* to put themselves through the experience. The conversation prompted us to question whether the so-called coming 'innovation tsunami' is real or not. Is it *really* necessary for organizations to innovate?

As in so many things in life, the answer seems to be 'it depends'. My miner friend gets to go fishing because he works in an industry with a very slow pulse rate. And his product stays in the ground until a decision is made to extract it and, short of getting it out relatively efficiently, there is little pressure to change the way it is extracted.

Not everyone, however, gets to work in such conditions. For those in high pulse rate industries, there is no choice: their world is literally an 'innovate or die' world. Often just to maintain parity with other players. The same goes for those in industries where there is an increasing likelihood that an outside player will come along and eat your lunch.

In theory, these two categories should represent the bulk of the working population on the planet. And yet… somehow, it still feels like most people spend their time at work *not* innovating. The aim of this article is to try and bring some clarity why this might be. Why is it that the world is in one of its big innovation periods, and so few people are either doing it, or being allowed to do it. Almost every senior executive, it seems, has to say that they want innovation and an 'innovation culture', but once they realize what they're asking for, they predominantly realize they don't really.

A first set of clues seems to come from one of the business world's enduring classics, Sheth and Sisodia's 'The Rule Of Three' – Reference 1. Figure 1 illustrates one of the key models described in the book:

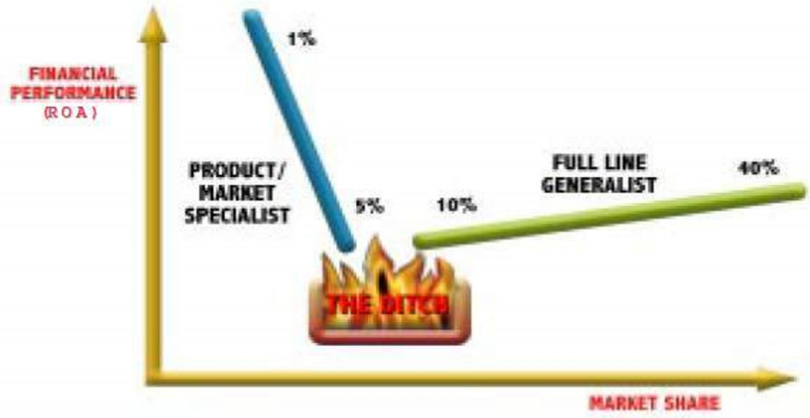

Figure 1: The Rule Of Three: Financial Performance v Size Market Characteristic

What the picture in essence tells businesses is that there are two basic strategies for generating a decent return on investment assets: choice one – be a small niche-playing market specialist, or choice two – be one of what will sooner or later turn out to be Three

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full-line generalist players. The book's authors Jadish Sheth and Rajendra Sisodia, try to elaborate on the most likely characteristics of these big three players:

The **No. 1 company** (The 'Biggest') likely has 40-80% of the total market share. It is usually the least innovative, though it may have the largest R&D budget. Such companies tend to adopt a "fast follower" strategic posture when it comes to innovation. They tend to have the best business innovation and execution strategies of the three, but to a very large extent the majority of innovation-related activities are viewed first and foremost as insurance policies. That's insurance as in protection against the potential threat of innovation from other players. Insurance in this sense should not be taken to imply that innovation activities have any intention at all to result in actual innovation. The number one company is usually best able to protect its leading position by making sure innovation *doesn't* happen. If the R&D function can patent lots of solutions and maybe even purchase any outsiders that come up with something potentially threatening to the status quo in order to ensure those solutions don't come to market, then the senior management team will consider that they have done a good job. Creative scientists and engineers tend to become quite frustrated in the No. 1 player – they're allowed to do some cool stuff, just so long as it doesn't get so far along the development pipeline that it threatens the company's business. Which is making the best possible margins from doing what it currently does.

The **No. 2 company (The 'Best')** typically holds 20-40% of the total market share. This company is usually the one to play the 'best' card, often playing the 'smart underdog' or 'cool' or simply 'we try harder' angle with customers: we might not be as big as the biggest player, but the solutions we offer are 'better' than theirs. Innovation-wise, the No. 2 player tends to best succeed by emphasising 'better' differences to the No. 1 player. In other words, 'me too' doesn't work. If 'effective', 'efficient' and 'resilient' are the big three success drivers – Figure 2 – whichever one the No. 1 player presents as core strength, the No. 2 will best succeed by focusing on one or both of the other two.

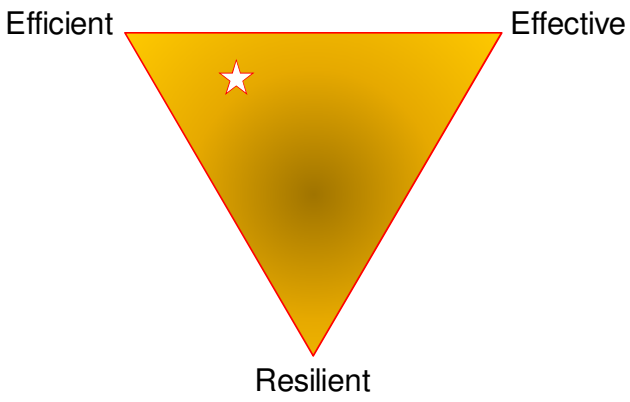


Figure 2: Resilience, Efficient Or Effective?

This player also tends to focus their innovation activities on either executing better or insurance against innovation from smaller players. If they can make a step-change that looks like it might give them a significant advantage over the number one player, it might be allowed to happen, but as with the biggest player, the primary strategy is about protecting the current position of strength rather than rocking too many boats, and potentially capsizing everything.

CEOs operating in both No.1 and No.2 companies are very likely to adopt a defensive strategy. We often describe it as the 'not on my watch' strategy. Which works something

like this: If an incoming CEO sees they might be in position for 2-3 years (the current average tenure for a Fortune 500 company in the US), one of their first questions will be 'is something bad going to happen during my period at the helm?' If the answer to that question is 'no', they are very unlikely to be pressuring the innovators inside the company to do anything other than lie low.

Which brings us to the **No. 3 company** ('The Innovator'). Typically hovering around the 5-10% market share position, the third biggest player generally has to play the role of the most innovative. It needs to create and commercialise new solutions in order, a) try and catch up with the big two, but also, because they can see how difficult life is in the low margin trap that is the 'ditch', and need to do all they can to stay out of it. Sadly, however, its innovations are usually 'stolen' by the No. 1 and 2 companies unless it can protect them in a bulletproof manner (the big 2 tend to be good at finding loop-holes in patents!). The extent to which the third-ranked player is comfortable or precarious depends on how far away that player is from the 'ditch'. Which in turn is often transiently dictated by the state of the economy. Lots of No. 3 players – in the West in particular – presently find themselves in an innovation frenzy simply to generate or recover sufficient margins to stay afloat.

To put some numbers to the story, Reference 2, a solid defence of the small innovator, suggests that over 75% of all innovations come from the collection of third biggest player, ditch-dwellers and myriad small organisations on the planet – Figure 3:

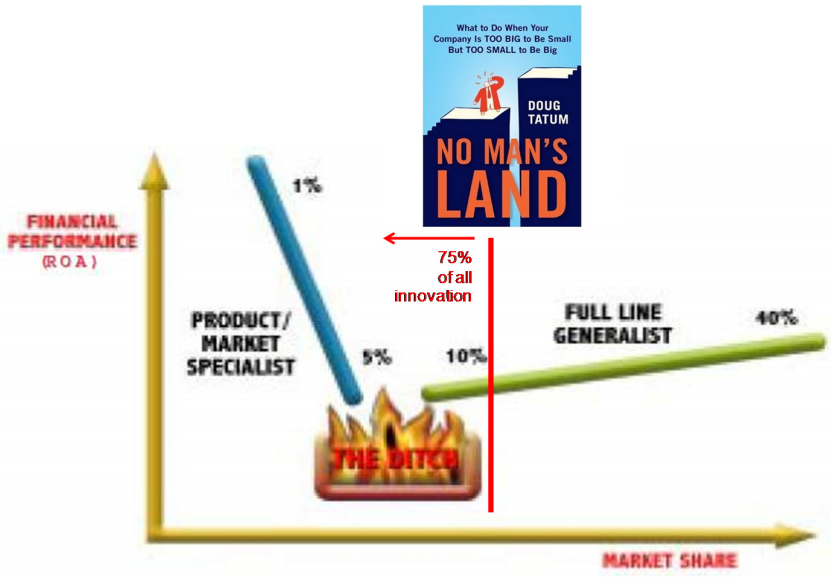


Figure 3: Where Innovation Comes From

All in all, not great news for the inventive people in the Big 2. Unless they are able to convince their employer to let them leave to set up a niche-start-up… ideally with the prospect that the big company comes along in the future and buys them. Which, as it happens, is a strategy that the pharmaceuticals industry often plays to good effect.

For the rest of us working in and around the innovation world, the message of Figure 3 is that 'making a difference' becomes more and more about seeking out the smart small players, fostering good relations with No. 3 palyers, or finding a Big 2 player where the CEO has done the 'not on my watch' assessment and concluded that something bad is indeed going to happen on their watch. Funny how the world can collapse down to some simple heuristics.

Reference

1) Sheth, J., Sisodia, R., 'The Rule Of Three: Surviving And Thriving In Competitive Markets', Free Press, 2002.
2) Tatum, D., 'No Man's Land: What to Do When Your Company Is Too Big to Be Small But Too Small to Be Big', Portfolio, 2007.

Worst Of 2012

And so the moment thousands have held their breaths for finally arrives. With an atonal blast from a slightly damaged bugle, we hereby announce the arrival of our worst of 2012 awards. An old favourite first:

Joint 'It-Can't-Be-KLM-Again Suck'y-Airline Of The Year' and 'All-Conversations-May-Be-Recorded-For-Training-Purposes Customer Service' Awards – one of the best things about 2012 was not having to fly on KLM at all, so that normal sinking feeling when looking at airport Departures boards to see the word 'delayed' next to every KLM flight (hmm, maybe that's actually part of their name? KLM Delayed Airlines announces th departure of….), last year we merely had to nod and smile sympathetically at the poor suckers that didn't know yet how important it was to avoid flying Dutch.

The anticipated chaos at London's airports during the Olympics proved to be almost wholly wrong. I thought I was taking a big chance landing with checked-in luggage at Heathrow a week before the opening ceremony, but found myself amazed that my bags had never arrived faster. I don't think I stopped walking from the jetway all the way to my car, which has to be something of a record. Just goes to prove that us Brits can be organized when we want to be. The problem is that people get bored doing things right all the time. Which is why, a couple of weeks after the closing ceremony, our Airline Award this year found itself awarded to Heathrow Immigration Control. Anyone that has flown in to the EU recently will know that we are starting to automate passport checks.

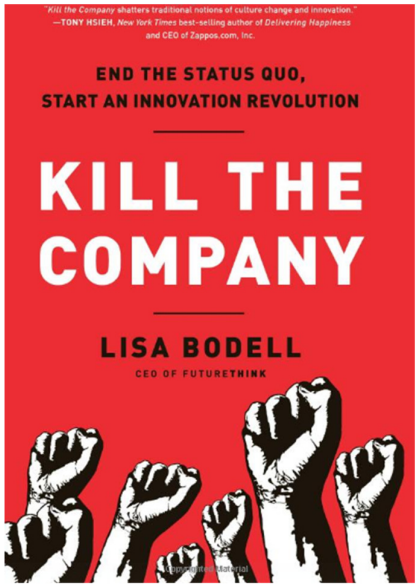
The automated systems – naturally – aren't very reliable and so they typically need a reserve Border Administration official sitting behind them to rectify things when they go wrong. Landing back from a trip I walked into the Border Control area to find a fairly substantial queue for the EU passport holders. Partly because, as it turned out, there were only three Officials in attendance. Unfortunately, two of these officials were acting as reserves behind two automated passport checking machines. Which were out of action so nobody could get into them. I waved at the two thumb-twiddling gentlemen as my turn to step up to the one useful Official finally arrived, 'busy?' I asked. 'Not really,' they replied, before going back to their under-counter Playstation games. They might just have well hung up a sign 'welcome home, stupid. Fooled you with our imitation of competence? Don't worry – see – we're back to usual service'. Rule Britannia!

The Depeche Mode Everything-Counts-In-Large-Amounts Literature Award – Perhaps the most worrying trend of 2012 was the seemingly endless deluge of 'Kindle-only' electronic books. In the old world of the paper book, publishers used to estimate that there were typically 200,000 unpublished manuscripts doing the rounds at any given

moment in time. The truth is that 199,980 of those manuscripts were howlingly awful works produced by nincompoops. We know that now because, thanks to Kindle, it's completely possible for said nincompoops to publish their 'every person has at least one book in them' epic tomes. The world of management literature, which in any event always had a pretty low signal to noise ratio, has now effectively achieved a signal level of effectively zero. All thanks to the enormous sea of Kindle-published noise.

We, in a rare fit of submission, restricted our Award to only those books that managed to find their way through the vetting processes of the management literature world. All in all, it was neither a great nor a bad year. There is a growing sense that the publishers are also getting confused enough that they increasingly don't know the difference between good, bad and indifferent – thanks again to the growing tide of self-published e-books – but at least much of the very worst seems still to be kept out of harms way.

Well, except for this trio of anti-gems:



It's probably not a good idea to give any of these three even the slenderest shred of publicity by saying anything at all about them. Far better to let dying dogs die. But, just in case, any of the titles sounds in any way tempting….

Managing Open Innovation Technologies: the sheen covering the OI concept has begun to disappear during the last couple of years, thanks to the fact that industry has tested the initial academic theory and proved it to be 'shit'. Unfortunately, academia hasn't really picked up on that result yet and so they continue to produce books like this one. Which sucks better than the suckiest sucky Dyson.

Kill The Company: is the sort of thing that frustrated engineers, designers and marketers, especially of the Generation Y persuasion are likely to be attracted to. The raised fists are pure cover-art marketing genius. The content, perhaps not surprisingly, is not going to be helpful to anyone. Basically a dumb idea, badly executed and not thought any further through than the raised fists on the cover. The book seems to be, first and foremost an advertisement for author, Lisa Bodell's company 'Futurethink'. I imagine Futurethink's competitors are rubbing their hands with glee. If I was one of them, I'd be handing out copies of Kill The Company to all of my clients. Which, thinking about it, might just be Ms Bodell's plan all along.

Finally, and probably the overall award 'winner' is 'Innovation Generation'. Our hopes with this one were initially sky-high… 'fantastic, a book about Gen Y innovators'. But no. It's another academic-penned tome about how academics don't seem to understand what innovation is. At any level. In theory (pun intended) this book is about applying some 'get out of the box' thinking strategies to the problem of scientific research. In practice it seems to be about a voyage in a time-machine back to 1946 to collect the very best ideas about creativity. New rule: any book in which the author declares their qualifications on the cover is a book that you know will be 70 + years adrift from the real world. Here's what Roberta Ness MD, MPH (miles per hour?) has to say about her time-machine adventure:

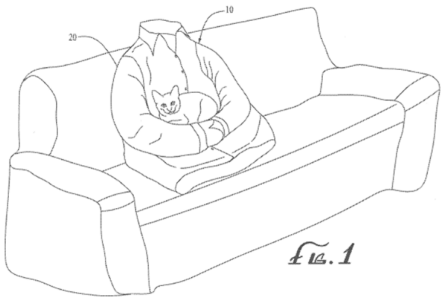
Whether you are a student or an established scientist, researcher, or engineer, you can learn to be more innovative. In Innovation Generation*, internationally renowned physician and scientist Roberta Ness provides all the tools you need to cast aside your habitual ways of navigating the every-day world and to think "outside the box." Based on an extraordinarily successful program at the University of Texas, this book provides proven techniques to expand your ability to generate original ideas. These tools include analogy, expanding assumptions, pulling questions apart, changing your point of view, reversing your thinking, and getting the most out of multidisciplinary groups, to name a few. Woven into the discussion are engaging stories of famous scientists who found fresh paths to innovation, including groundbreaking primate scientist Jane Goodall, father of lead research Herb Needleman, and physician Ignaz Semmelweis, whose discovery of infection control saved millions. Finally, the book shows how to combine your newly acquired skills in innovative thinking with the normal process of scientific thinking, so that your new abilities are more than playthings. Innovation will power your science.*

And, no, in case you were wondering, amongst 'all the tools you need' it doesn't mention TRIZ at all. Most likely because the time machine went back a tad too far.

The Necessity-Is-Not-Always-The-Mother Invention Award – 2012 saw no diminution in the number of did-you-really-spend-money-protecting-that? inventions. There were certainly plenty of candidate award winners to chose from. As ever, the pet-owners of the world show an incredible tenacity in their attempts to cosset and cocoon their precious four-legged (usually) friends. Our favourite two both came from the US. Patent numbers 8,316,409 and 8,181,599 are the ones to go check out. Here's the problem solved by the latter of the two:

Small pets gravitate to the comfort and safety of their owner's lap and being held as the owner watches TV, reads a book, etc. Additionally, when the owner is up and about from the couch, pets often gravitate to the owner's clothing, because the owner's scent found on the clothing is comforting to the pet who has a keen sense of smell. But it looks unsightly to leave piles of clothes laying around for the pet to nest in, to make the pet feel like they are safely in the owner's lap. Pets left alone can become lonely and anxious, misbehaving and damaging articles in the home while the owner is away. And some pet owners become so attached to their small cats and dogs that they suffer guilt when they leave the home. This is a problem as most people today have packed schedules and are unable to spend as much time with their pets as they would like although very attached to their pets.

And here's the solution:



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Claim 1 describes:

An improved pet bed for a small pet comprising: a platform seat cushion sized to receive the small pet; an upright back cushion proximate the platform seat cushion, the platform seat cushion extending contiguously along and transversely from substantially the entire length of a bottom edge of the upright back cushion to define a substantially L-shaped contour therewith; a pair of flaccid arm cushions hanging in a limp manner from shoulder areas defined at opposed upper sides of the upright back cushion offset from the bottom edge; wherein the upright back, platform seat, and arm cushions are configured to cooperatively simulate a pet owner cradling the small pet; the arm cushions being adjustable between an open and a closed position; the pet bed sized to fully receive a yoke and sleeves of a conventional shirt of the pet owner with the arm cushions in the open position drawn away from and not overhanging the platform seat cushion; the arm cushions adjustable to the closed position, configured such that the small pet when placed on the platform seat cushion nests against the upright back cushion and between the pair of arm cushions, the arm cushions in the closed position defining a draped configuration and resting on the platform seat cushion.

Amazing how, by some trick of the light, the lawyer's language almost makes the idea sound sensible. Meanwhile, I'm left with the odd sensation that the (lone, surprise!) inventor is living an intriguing contradiction: they own a cat, but clearly don't understand the psychology of cats… where universal rule number one is: wherever, whatever you want cats to sit on, they are going to sit on something else.

Here's our other pet-related contender, US8,316,469:

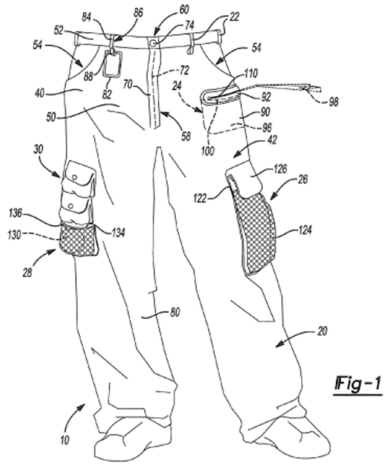


Fig-1

At last. Pet-walking trousers! Amongst a veritable leg full of features, our favourite inventive step involvs item 96, 'storage cavity'. Which, obviously through some kind of black magic, is intended to hold a roll of plastic poop bags (98). In case you're interested, when said plastic bags are filled with said poop, the user can store them in item 26, 'second pocket assembly'.

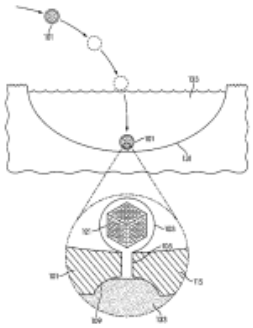
Unless I'm going completely mad, what inventor Renee L. Miller has pulled off here is nothing less than the invention of pockets. With an admiring tear in my eye, I declare US8,316,469 to be a long awaited miracle… finally, somewhere to put my car keys and loose change when I'm walking in the local park shouting at pet owners for not picking up their dog's poop… 'where's your pet walking trousers, you selfish moron.'

Actually, we also offer our special Examiner's Award to this invention. Congratulations to Khoa Huynh ('primary examiner') and Richale Quinn ('assistant Examiner') for your

diligent and generally wonderful contribution to the credibility of the US patent system. 21st Century: the century of the 'pocket'.

If pet-care is looney-central when it comes to bad invention, sport isn't often too far behind. The massively strange 'sport' of golf, especially, seems to attract an astonishingly high number of patents every year, frequently from desperate individuals intent on finding ever more convoluted ways of hitting their stupid ball five yards further. The strangest golf invention of the year, however, this year goes to sporting giants, Nike. US8,251,837 was granted to the company on August 28. Here's the abstract for their 'floating golf-ball' idea:

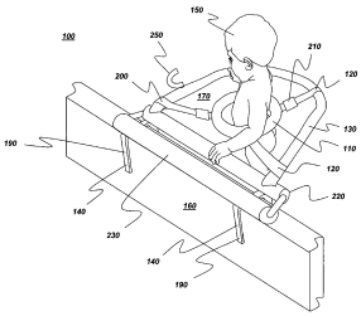
A golf ball includes an inner layer, a cover layer, and a cavity. The cavity includes a conduit connecting the cavity with an exterior of the golf ball. The cavity contains a matrix comprising particles of a first material bound together by a second material. The first material has a density greater than water and the second material is water soluble. Upon prolonged submersion in water, the matrix dissolves allowing the first material particles to exit the cavity. The removal of the mass of the first material particles lowers the density of the golf ball, allowing the golf ball to float to the surface of the water.



If I understand the problem the invention tries to solve correctly, when golfers lose their ball in a lake, the ball gradually dissolves and the released chemicals contaminate the lake. Obvious solution: make part of the golf-ball dissolve faster so that after this part has dissolved, the ball floats to the surface so the rest can be retrieved easier.

There is so much wrong with this invention, and on so many levels, it is difficult to know where to begin. Suffice to say, Nike takes our 'Wrong Problem, Dummy' first prize. If I had to make a bet, I'd say that the management team at Nike introduced a departmental patent target a couple of years ago. This invention is an excellent example of why KPIs measuring the number of patents quickly turns sour. 'Quick, it's two days til Christmas and we're still four applications short of our target. What shall we do?' Invent the floating golf ball seems to be the depressing answer.

If that was bad, though, spare a thought for Connecticut resident, Evelyn Tristao and her Method and apparatus for stabilizing a standing infant patent, granted as US8,109,478 on 7 February:

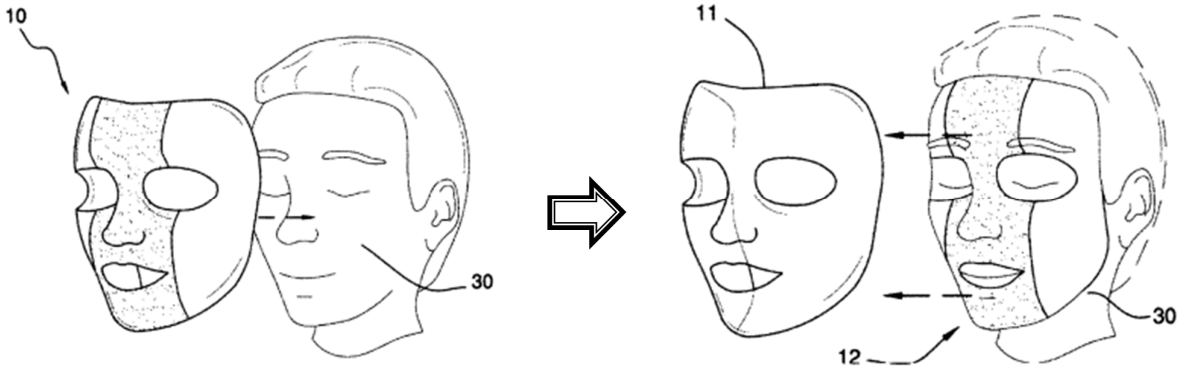


Any regular readers of our Generations feature will know that the world is currently in a phase of over-protective parenting. If you're not sure what that means, allow Ms Tristao to enlighten you:

In a variety of situations, once some infants begin to develop an ability to stand, these infants also develop a preference for standing over either sitting or lying down. Despite the inability to stand unaided, or the inability to stand aided for an extended time, these infants will exhibit a behavior wherein continued expression of this preference results in eventually falling to the ground. This behavior is particularly worrisome to caregivers attempting, for example, to bathe such infants in a bathtub or shower, to dress such infants, or simply to prevent such infants from walking or crawling away when caregiver attention is directed elsewhere. Opportunities exist, therefore, to develop an apparatus which: provides a handhold, stably coupled to a grounded surface, to aid in standing; allows the infant to be largely self-supporting to help develop strength and balance; prevents the infant from striking the ground if attempts at standing should fail; and allows access to the infant by caregivers.

What I like best about this invention is how it will take the parent 25 times longer to attach the stabilizer device to a firm surface than it would to, hmm, let's think about this for a second, 'hold' the child? Or maybe let the poor little mite fall once in a while? (You can tell I'm not a parent, right? Or maybe I'm just bitter that my parents didn't have one of these when I was growing up… this invention would've saved me a lot of trouble when I was 17.)

Finally, before that thought has too long to dwell inside your brain, we head over to New Jersey and another lone inventor. This time Nicholas Burnett, who had US8,262,303 granted on September 11. His invention 'pre-designed face painting system' *('a pre-designed face painting system that simply stick onto the surface of the face without the requirement of an artist' hand to manually draw said design on the face.')* is a cunning work of self-explanatory deluded genius:



Item 30 in the picture, by the way, is 'mentally retarded person'.

The Slow-Fast-Moving-Consumer-Goods Design Excellence Award – 2012 marked the year that Apple managed to plant the first seeds that its two-decade long unblemishable track record for hits was finally very, very blemishable indeed. Not that I actually own any Apple products (whenever anyone says to me that their Apple Whatever is 'the best thing they ever did, watch this...', invariably something seems to go wrong), but even the most ardent Apple fan would have to admit that Apple Maps was one of the most amateur attempts at a smartphone app ever allowed into the Apple Store.

Joint runner up is Ticketmaster in the UK. Thanks to them convincing all my favourite UK concert venues that they can handle ticket sales more efficiently than even the best box office, they have successfully taken over handling all just about all of them. Which now means I pay more for the privilege of attending concerts, I'm expected to pay for special 'make sure the tickets arrive in the mail' insurance, and the tickets never seem to arrive until the day before the gig. A curse on you, Ticketmaster. Come the revolution, y'all will be the first against the wall.

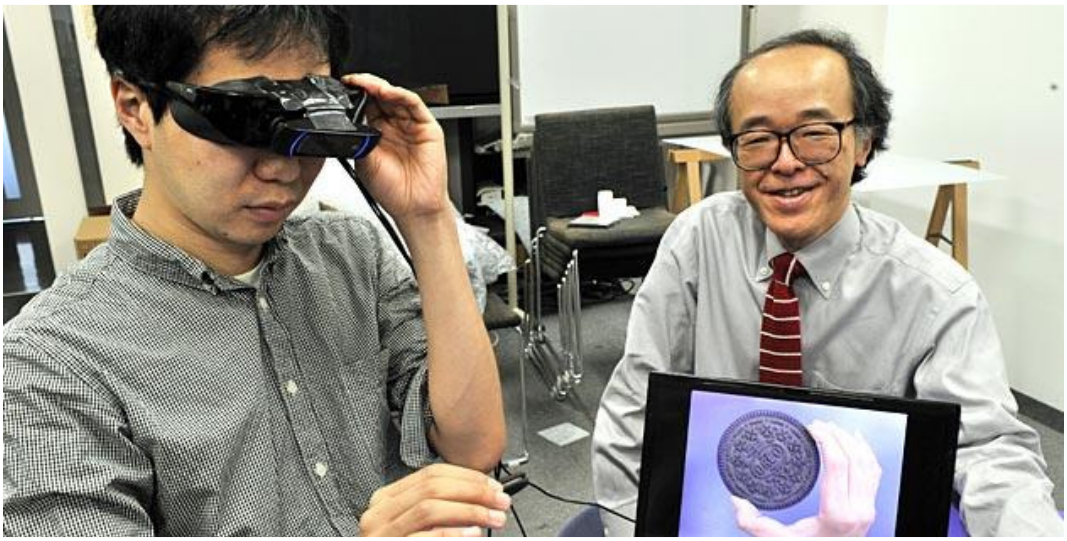
Meanwhile, calming down before I blow a gasket, winner of the 'Take A Bad Idea And Make It Worse' Award had to be the aptly named Solowheel. Meaning that's likely how many have been sold.

In theory, simplifying the Segway concept was a good idea. In classic TRIZ Principle 2, Taking Out, fashion, I know, let's remove one of the wheels: two wheels good; one wheel better. Especially if you're in love with the nurses in your local Accident & Emergency department. Seriously though, this has to be the most inconvenient convenience solution ever. Unless you count the baby stabilizer patent.

Staying with the same convenience theme, here's our next winner, the also very self-explanatory (Australian) Joeybra.

I suppose if the intention is to stop people wanting to borrow your phone is what you're after, this is the solution for you. Or if you're in the habit of forgetting to put your blouse on before you leave the house.

Finally (fanfare!), here's our overall winner. This one's so good, we initially thought it was announcing the publication of a new Chindogu book. Sadly, no, it's intended as an actual, put-your-money-in-your-pocket-and-buy-one product:



'Weight Less Goggles' is the product; Japan is the country; making your food look bigger ('aagh, I'm about to be squashed by a giant Oreo') is the big idea; "Reality is in your mind," said 'lead researcher', Professor Michitaka Hirose. He's the guy smiling in the photo. The actual reality in his mind is his real research project, which is titled, 'is there really a sucker born every minute?' Wait, I think I know this one.

Let's All Jump Off A Cliff Advertising Suicide Award: Last up, a new award for 2012. Generally speaking, unless you happen to live in the US or Australia which have some of the consistently most mediocre advertisements on the planet, it is very rare these days for marketers and advertising professionals to get their job completely wrong. If only because the brand manager in any good efficiency-engine organization, who's neck is on the line, is very unlikely to let anything too risqué through the system. That trait creates a series of other problems of course, but, our task here is to bring attention to a pair that somehow made it through the net.

Here's the latest advertising for Alibi bourbon:

Now, I know this advert isn't intended for me. But I'll be willing to bet my last floating golf ball, that this was conceived by a typical Generation X sceptic. Most likely one that hated the client and took it upon themselves to see just how far they could push that client in the direction of 'wrong'.

Probably not too dissimilar to this even more ill-conceived idea for uber-chic, uber-sophisticated UK retailer Harvey Nichols:

There are simply no words.

SYSTEM ATIC INNOVAT ION

Patent of the Month – Multi-Domain Acoustic Wave Devices

The highest scoring ApolloSigma patent and our Patent of the month this month is US8,344,588, granted to a pair of (Russian?) inventors based at the University of Mississippi. Their 'multi-domain acoustic wave device solution takes us deep into the realms of nano-engineering. Surface acoustic wave (SAW) filters are used in mobile telephones, where they provide significant advantages in performance, cost, and size over other filter technologies such as quartz crystals. The key problem solved by the 8,344,588 solution, as described in the invention disclosure:

Previous state of the art transducers must have the metal electrodes more thinly than an acoustic half-wavelength. This requirement yields a technological restriction on upper limiting frequency since photolithographic technology can not make a very thin and still reliable electrodes needed for very high frequencies in the gigahertz frequency range. A problem is the metal interdigital electrodes must be too narrow (about 210 nm) for lithographic process and, in addition, these narrow metal electrodes are not stable over time. Another limiting issue is the nature of the surface acoustic waves propagating along crystal surface. In the case of very high frequencies of the gigahertz frequency range, a quality of mechanical polishing of a crystal surface becomes unsatisfactory, and high SAW attenuation does not permit one to fabricate a delay line. Industrial-scale SAW-device production based on optical lithography is feasible up to 2.5 GHz (2.5.times.10.sup.9 Hz), which is consistent with present global UMTS standard for 2 GHz communication in S-band of Super High Frequency (SHF). Due to commercial and security applications, it is anticipated that there will be an increase in operation frequency and subsequent shift to the range of 2 to 10 GHz range. Unfortunately, there is no current technology for very high frequency acousto-electric devices.

This is a pretty easy one to map onto the Contradiction Matrix: we're trying to increase operational frequency (speed), and what's stopping us is the inability to get the electrodes thinner (length) and maintain their stability over time (stability). Here's what that pair of problems looks like when we map it:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Speed (14)

WORSENING PARAMETERS YOU HAVE SELECTED:

Length/Angle of Stationary Object (4) and Stability (21)

SUGGESTED INVENTIVE PRINCIPLES:

2, 17, 28, 15, 30, 3, 5, 14, 33, 1, 18

One of our recurring concerns when we see problems being tackled at the nano-scale is whether the recommendations made by the Matrix are relevant or not. We thus love it when we see inventions like this one that provide us an opportunity to test the robustness of the Matrix. Here's how the inventors claim to have solved the contradiction:

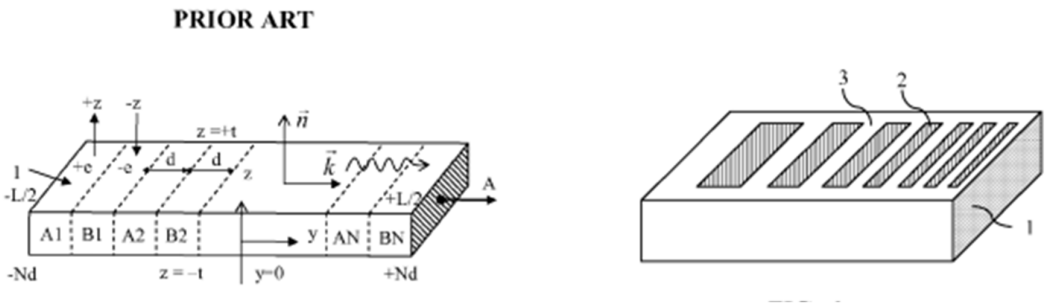
A principal object of the present invention is to provide a multidomain acoustic and ultrasonic device, such as an acoustic ultrasonic transducer, an ultrasonic delay line, and an rf filter, employing a set of inversely poled ferroelectric domains that are fabricated within a single block of piezoelectric material*. Such multidomain ultrasonic devices are achievable through the provision of specifically designed inversely poled ferroelectric domains fabricated and embedded within one crystal body, in which a transformation from electrical energy to acoustic wave/vibrational energy takes place. For example, A/C current can be applied to the set of inversely poled ferroelectric*

domains, and the domains will vibrate with matching phase providing an acousto-electric resonance at the frequencies that depend on the domain dimensions. In such a device, acoustic contact between the ferroelectric domains is essential to provide a desired acoustic wave.

And here's their main Claim (one of the main reasons they scored highly on ApolloSigma):

A multidomain plate acoustic wave device, said device comprising: one or more single plate acoustic wave propagating piezoelectric plates with differently polarized ferroelectric domains, said domains having diverse directions of their axes of polarization.

The accompanying figures also provide a clue or two:



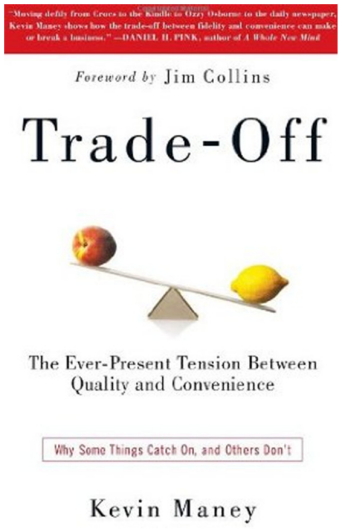
Plenty of evidence here of the following Inventive Principles:

13 – 'inversely poled' ferroelectric domains…
17 – …said domains having diverse directions of their axes of polarization
5 – fabricated within the same, single, block…
3 – …with different sizes of domains in different places (note: we only pick up the presence of this feature by examining the actual design of the component – the words don't get us to this Principle – a reminder of the potential dangers of just relying on text searches in the patent literature).

All in all, though, the overall comparison result gives us a re-assuringly high level of correspondence with what the Matrix is trying to tell us.

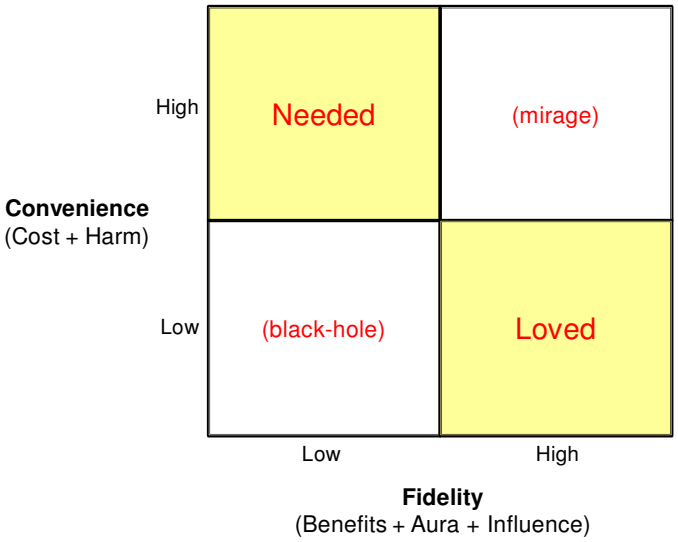
Not to mention, the fact that, assuming the inventors' claims are correct, what we have here is a design offering an order of magnitude improvement in performance… which doesn't happen that often. Especially in the SAW business.

Best of the Month – Trade-Off



At first blush, Kevin Maney's 2009 book, 'Trade-Off', doesn't sound like a promising match with the world of TRIZ and Systematic Innovation. Surely, both these methods will rightly say, whenever we make trade-offs, we just threw away some of our best innovation opportunities. There is little or no evidence in his book to suggest that Maney understands this concept, but, on the other hand, he does manage to make a pretty convincing argument that some contradictions are more important than others.

In essence, all of the 202 pages in this book are about one particular contradiction: the one, as hinted in the books sub-title, between quality and convenience. Or rather, once we get past what feels like the publisher's weak attempt to frame Maney's hypothesis in everyday language rather than what he meant, between 'fidelity' (benefits + 'aura' + influence) and a broad definition of convenience that also encompasses cost. The distinction is important since Maney contends that rarely if ever do customers want providers to solve the conflict between these two parameters. Somewhat strangely (publisher influence again?), he pointedly refuses to draw a 2x2 matrix to put across his argument. We think that was a mistake, so here's what the book's main argument boils down to:



In so many words, the two axes of this matrix represent the top and bottom halves of the Ideality equation. The 'aura' and 'influence' elements of fidelity correspond to the 'perceived' word in our usual definition:

Ideality = (Perceived) Benefits / (Cost + Harm)

And 'convenience' effectively describes the sum of cost and anything the customer views to be harmful (or 'inconvenient').

Having defined the world in this way, Maney makes a compelling case that products and services have the highest chance of being successful if they position themselves in *either* the 'loved' or 'needed' quadrants on the Matrix, and specifically not in the top-right hand box – the 'mirage' as he describes it.

In theory, of course, this runs counter to the whole idea of solving contradictions: surely the ideal solution would be one in which the customer receives the highest fidelity *and* the maximum convenience? Sounds logical. Except it is extremely difficult to identify any organization that has successfully made money from such a positioning strategy. Give it some thought yourself for a few minutes. Can you think of any? (We managed one possible one – flickr.com – after about 30 minutes trying to break Maney's rule.)

Sure, there are many organizations that have tried. Maney describes several of them during the course of his arguments for a company operating philosophy that involves being 'loved OR needed'. It doesn't work: If a prospective customer is looking for fidelity (going to a U2 gig for example – the 'real experience'), they not only expect some inconvenience, but actually demand that it is part of that experience. In order to really enjoy something, it seems there *needs* to be a degree of suffering. Something that becomes a part of the retelling of the experience when we talk through our experiences with friends and family.

On the other side of the equation, say when we download the latest U2 track onto an MP3 player, this is a massively convenient, easy to do and low cost way to listen to the band. If we need a new U2 fix, downloading is the predominant manner in which people will do it these days. We might tell our friends to go and take a listen themselves by downloading their own version, but there is no way that when something becomes ubiquitous like this does it become the subject of legend or story-telling.

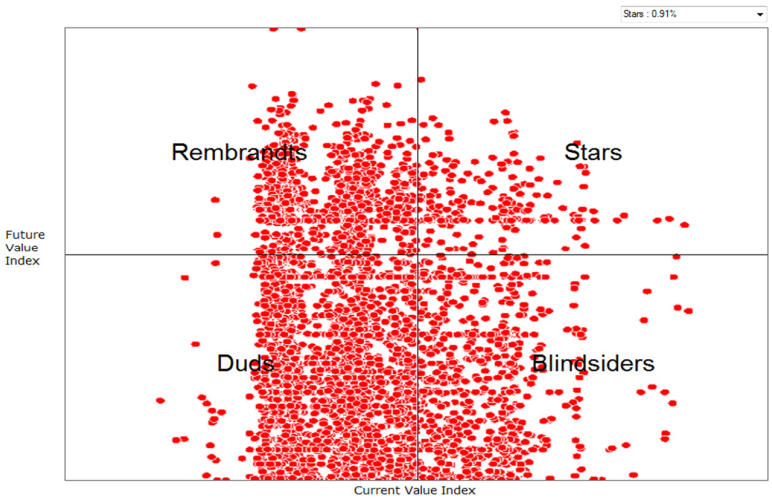
What I liked best about this book, over and above the apparent challenge it makes to the TRIZ mindset, is that Maney is brave enough to apply his hypothesis to future scenarios rather than merely reverse-engineering previous '20-20 hindsight' ones. In so doing, he identifies a series of significant innovation opportunities that have opened up as a result of some industries all competing in the same portion of the fidelity-convenience landscape. Education being a classic one – with every institution playing in the fidelity quadrant, and almost no-one in the convenience space, thus leaving a potentially enormous opportunity for highly convenient, 'just-good-enough' education. Healthcare isn't far behind. And things don't look too good for Apple either in the coming years. It will be interesting to see how Maney's projections pan out in the coming years – indeed, some of them already look prescient in just the 3 years that have passed since the book first appeared. Whether they come true or not, there is still much in this easy to read book to commend it to readers. If only, given the high proportion of TRIZ-people amongst readers of the e-zine, to encourage consideration of different perspectives than those that come to condition our 'all contradictions are bad' thinking. 'Thank heavens we've found a contradiction' said Niels Bohr, 'for now we might begin to make some progress'. Amen to that one.

Conference Report – 3rd Taiwan Systematic Innovation Conference

This will be short one. This year's Taiwan SI conference was held on January 5 at the x Christian University in Chung-Lu county on the outskirts of Taipei. Close to 100 delegates were in attendance to listen to a pair of keynote addresses and around 30, parallel-session, papers. I was there to deliver one of the keynotes – 'Strategic IP: The Next Business Imperative' – which, if anyone is interested, can be downloaded from the Free Downloads page on the SI website. It was the only presentation given in English. More pity me. In fact, aside from two students from Paraguay (!), I was the only non-Taiwanese person present at the event. And I only managed to be present for my presentation.

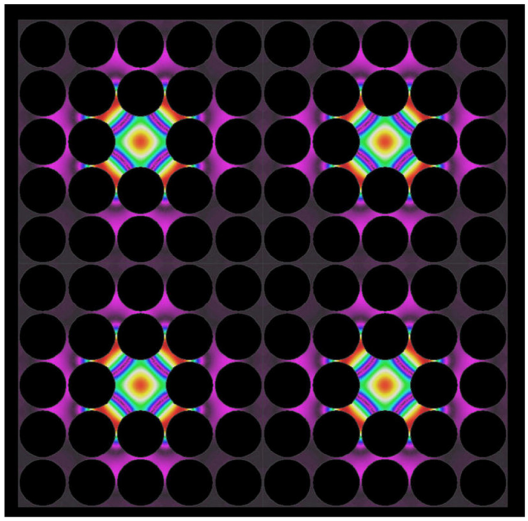
As to the content of everything else, it was difficult to gauge either the quality or focus of most of the papers due to my ongoing lack of language skills. Examination of the poster presentations suggested a continuation of the blend of student projects and (artificial) case studies found in previous years. Informal discussions during and after the event seemed to suggest that there wasn't anything on offer that deserved any special attention. Again, much the same as previous conferences.

What was perhaps interesting this time around was what appeared to be a relatively higher number of industry-based participants. Not that any of them was necessarily there to present papers, but at least they were there to listen. One of the organizations represented was the Industry Technology Research Institute (ITRI) – essentially Taiwan's research powerhouse (as in similar to Fraunhofer in Germany), generator of several thousand patents and spark behind some quite important technology advances being made in Taiwan. As a part of our presentation, we did an analysis of the patents held by the Institute, which is worth mentioning here since the results probably represent the most impressive set of ApolloSigma scores we've ever recorded:



Taiwan generates the highest number of patents per capita of any nation on the planet. It now turns out they also turn out some of the most impressive patents on the planet. Pity neither TRIZ nor Systematic Innovation can seem to get a foothold in the story. Getting 100 attendees at the conference is a good start, but unless the event starts to reveal some method generated success stories, I imagine organizations like ITRI will shrug their shoulders and keep asking, 'why did we need *you*?'

Investments – Focusing Heat



An interesting headline recently caught our attention: ‘How to Treat Heat Like Light: New Approach Using Nanoparticle Alloys Allows Heat to Be Focused or Reflected Just Like Electromagnetic Waves’. This sounded a bit like a solution to one of the world’s holy grail problems: the ability to conduct heat independently of electricity. We needed to find out more. Here’s the story:

“An MIT researcher has developed a technique that provides a new way of manipulating heat, allowing it to be controlled much as light waves can be manipulated by lenses and mirrors.

“The approach relies on engineered materials consisting of nanostructured semiconductor alloy crystals. Heat is a vibration of matter - technically, a vibration of the atomic lattice of a material - just as sound is. Such vibrations can also be thought of as a stream of phonons - a kind of "virtual particle" that is analogous to the photons that carry light. The new approach is similar to recently developed photonic crystals that can control the passage of light, and phononic crystals that can do the same for sound.

“The spacing of tiny gaps in these materials is tuned to match the wavelength of the heat phonons, explains Martin Maldovan, a research scientist in MIT's Department of Materials Science and Engineering, "it's a completely new way to manipulate heat." Heat differs from sound, he explains, in the frequency of its vibrations: Sound waves consist of lower frequencies (up to the kilohertz range, or thousands of vibrations per second), while heat arises from higher frequencies (in the terahertz range, or trillions of vibrations per second). In order to apply the techniques already developed to manipulate sound, Maldovan's first step was to reduce the frequency of the heat phonons, bringing it closer to the sound range. He describes this as "hypersonic heat."

"Phonons for sound can travel for kilometers," Maldovan says - which is why it's possible to hear noises from very far away. "But phonons of heat only travel for nanometers. That's why you couldn't hear heat even with ears responding to terahertz frequencies."

Heat also spans a wide range of frequencies, he says, while sound spans a single frequency. So, to address that, Maldovan says, "the first thing we did is reduce the number of frequencies of heat, and we made them lower," bringing these frequencies

down into the boundary zone between heat and sound. Making alloys of silicon that incorporate nanoparticles of germanium in a particular size range accomplished this lowering of frequency, he says. Reducing the range of frequencies was also accomplished by making a series of thin films of the material, so that scattering of phonons would take place at the boundaries. This ends up concentrating most of the heat phonons within a relatively narrow "window" of frequencies.

Following the application of these techniques, more than 40 percent of the total heat flow is concentrated within a hypersonic range of 100 to 300 gigahertz, and most of the phonons align in a narrow beam, instead of moving in every direction. As a result, this beam of narrow-frequency phonons can be manipulated using phononic crystals similar to those developed to control sound phonons. Because these crystals are now being used to control heat instead, Maldovan refers to them as "thermocrystals," a new category of materials.

These thermocrystals might have a wide range of applications, he suggests, including in improved thermoelectric devices, which convert differences of temperature into electricity. Such devices transmit electricity freely while strictly controlling the flow of heat - tasks that the thermocrystals could accomplish very effectively, Maldovan says.

Most conventional materials allow heat to travel in all directions, like ripples expanding outward from a pebble dropped in a pond; thermocrystals could instead produce the equivalent of those ripples only moving out in a single direction, Maldovan says. The crystals could also be used to create thermal diodes: materials in which heat can pass in one direction, but not in the reverse direction. Such a one-way heat flow could be useful in energy-efficient buildings in hot and cold climates.

Other variations of the material could be used to focus heat - much like focusing light with a lens - to concentrate it in a small area. Another intriguing possibility is thermal cloaking, Maldovan says: materials that prevent detection of heat, just as recently developed metamaterials can create "invisibility cloaks" to shield objects from detection by visible light or microwaves.

Possibly too soon to be strictly called an ‘investment’ opportunity, but a new discovery that potentially opens up a mass of downstream opportunities across a range of domains.

Read more here:

Martin Maldovan. Narrow Low-Frequency Spectrum and Heat Management by Thermocrystals. *Physical Review Letters*, 2013; 110 (2) DOI: 10.1103/PhysRevLett.110.025902

Generational Cycles – Freedom & Coming Of Age

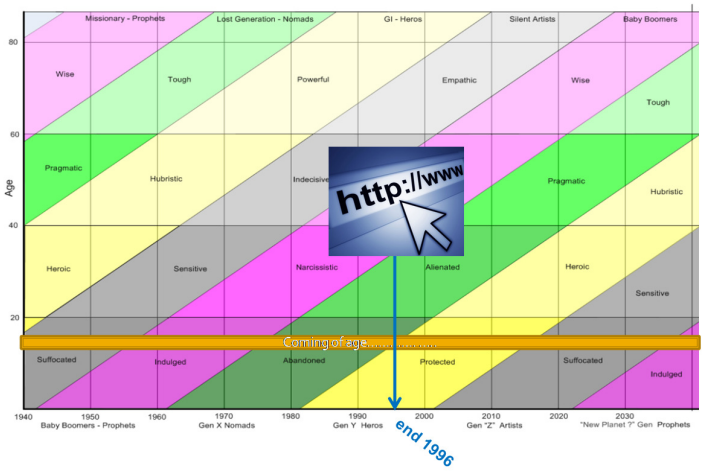
There are a number of universal, key periods in our lives – starting school, puberty, leaving home, etc – that come to play a significant role in defining who we are as individuals. Or, potentially if the environment we live in is the same as many others, as a generational cohort. One of those key periods is 'coming of age', a period in which escape from parental influence becomes a primary behavior motivator. It is frequently uncomfortable for both parent and offspring – the surly, mono-syllabic teenager on the one hand; the desperately un-hip, embarrassing mother or father on the other. This coming of age period, in nearly all cultures around the world, is about freedom. Freedom to make up your own mind about things, and to live the life that you want to live. The things that happen to us during this critical independence-seeking period in our lives tend to stick with us for the remainder of our lives. Especially the things that facilitated the achievement of our desired freedom and escape.

For the Baby Boomer generation – the first generation in which 'teenagers' were allowed to rear their unpleasant heads – freedom for the 16+ year old meant a bicycle, motorcycle or car. In other words, 'freedom' and 'escape' very much meant physically removing oneself from your parents' gaze.

Back in the 1960s and 1970s, those teenagers fortunate enough to acquire a car quickly discovered that they could only afford an old, beat-up thing and that it required a lot of care and attention to keep it on the road. For my generation in the UK, 'coming of age' usually meant time spent underneath a Mini, either changing the engine, repairing the radiator, or re-welding the (I still have nightmares!) rear subframes. Anyone that went through this kind of rite of passage was very likely to grow up viewing cars as an essential part of their life. A significant proportion became 'petrolheads'. A significant proportion of them aspired to work in the automotive industry…

…which has now become the generation that tends not to understand why the current crop of Generation Y teenagers don't seem to be nearly so interested in cars as they were. Indeed, here is a generation that to a growing extent doesn't see the point of owning a car at all, never mind being interested enough in them to get their hands dirty and try and do anything as menial as filling the windscreen washer bottle ('dad, the windscreen doesn't clean any more').

A look at one of our usual generation time-chart maps perhaps begins to offer a quick clue as to what is going on:



SYSTEM ATIC INNOVAT ION

What the picture tries to illustrate is the coming together of a perfect storm, somewhere around the end of 1996. One of the most significant things about this period is it marked the time at which Internet usage became ‘common’ as opposed to something that just geeks did. It was also a time when the very first Generation Y teenagers were hitting their ‘coming of age’ phase of life…

…and consequently looking for their own version of freedom and escape. Not quite old enough for a car, and probably not allowed one anyway thanks to helicopter parenting, the Internet became the perfect point of access into a world parents didn’t understand.

Freedom no longer had to mean physical separation. The tech-savvy GenY teen could suddenly access all the freedom they wanted from the comfort of their own bedroom.

Car companies of the world beware, the connection might appear subtle, but to anyone that went through their coming of age years on the Internet rather than under a Mini, they just don’t understand why what you do is of anything but passing relevance to their life. And, unless someone switches the internet off, no freedom-seeking adolescent ever will again.

Biology – Woodpecker Beak & Skull

Eagle-eyed followers of the CREAX newsletter will have seen the ‘Kranium’ bicycle helmet featured recently. We thought we’d take the opportunity this month to dig a little deeper and see exactly how the biomimetic features of the design correspond to nature’s solution to the impact problem. For those that didn’t see the CREAX feature, the Kranium is the work of helmet-designer Anirudha Rao, who has developed a helmet that not only fits better, but also protects better than a normal polystyrene helmet. The most interesting part of Rao’s design is the material it’s made out of: cardboard.

Hearing that a cardboard helmet is safer than a plastic helmet may sound crazy, but Rao said, when tested against the British Standards (EN 1078) at the Imperial College, Kranium actually absorbed four times the amount of impact energy when compared to the regular cycling helmets.

Though polystyrene has been used in helmets for decades, it doesn’t do a very good job at absorbing impact energy. It also distributes the impact energy all over your head. Kranium, on the other hand, is built to accommodate movement in some places and stay completely inflexible in others. So, if there is a crash, the force peak of the impact is absorbed by the helmet’s ribs which “flex and de-flex.” Rao said the remaining energy is then “absorbed by the crumpling nature of the corrugated ribs.”

The lightweight helmets also last longer. Most helmets are kaput after just one impact, whereas the Kranium can actually last up to five impacts.

Another problem with polystyrene helmets is that they rarely fit the user perfectly, which could be very detrimental during a crash. The custom-made Kranium is manufactured by scanning the user’s head. The customer’s information stays in the company’s system and can be used again if the customer ever needs another one (we hope because they lost it, not because they crashed more than five times). Rao says a replacement would cost “a

fraction of the new price," which encourages the customer to change their helmet when it needs to be changed without spending a lot of money. The customer can choose the shape, color, and fit.

The Kranium helmet uses cheap, eco-friendly, easily-available materials. Rao even suggested that the helmet be used as an inexpensive way to stay safe while renting a bike. He said it could be possible to get the helmet through a vending machine. And don't worry about the cardboard getting soggy if you go on a sweat-inducing bike ride or if it happens to rain; the cardboard is treated with a "waterproof acrylic compound."
Rao's design has been licensed by a few major manufacturers, so we're hoping to see it in stores sometime in the near future.

Surabhi, who goes by Ani for short, essentially designed the helmet from scratch: "the revolutionary Kranium liner is based on the corrugated structure found in the woodpecker and it is this structure, which provides the right amount of crumple zone to absorb impact energy."

Upon closer inspection, I found that it is the only bird in the planet where the beak and skull are not attached to each other: it has a corrugated cartilage structure to absorb the impact, which is why it doesn't have a massive headache after a good days' work. So I set about creating the perfect material to mimic the qualities of the woodpeckers' natural shock absorber.

If 'corrugated cartilage' is the solution, the basic problem that the woodpecker has had to solve involves the need to minimize the transmission of high stresses and pressures to the head (and, one imagines, particularly the brain), when the beak impacts against the solid surface of the target tree trunk. The thing preventing the minimization of stress is the fact that the trunk is hard and therefore high forces are necessary. And, looking at the problem from the other direction, what's stopping the high stresses from being acceptable is that the woodpecker would potentially suffer from repetitive strain injuries. Here's how we might map that pair of problems onto the Contradiction Matrix:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Stress/Pressure (19)

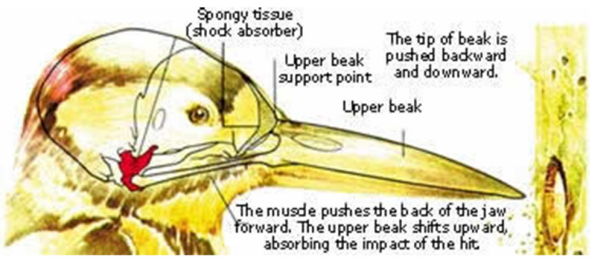
WORSENING PARAMETERS YOU HAVE SELECTED:

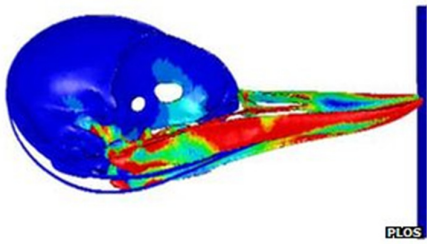
Force/Torque (15) and
Safety/Vulnerability (38)

SUGGESTED INVENTIVE PRINCIPLES:

35, 4, 31, 17, 40, 14, 9, 12, 24, 37, 36

Good to see that the 'corrugated' solution is present as a recommendation (in the form of Inventive Principle 17), but also to see that Principles 31 ('Holes' – 'spongy tissue') and 37 ('Relative Change') can be seen when we examine both the Kranium and the woodpecker beak-to-skull-join solution, including, on the right, a computer stress analysis:





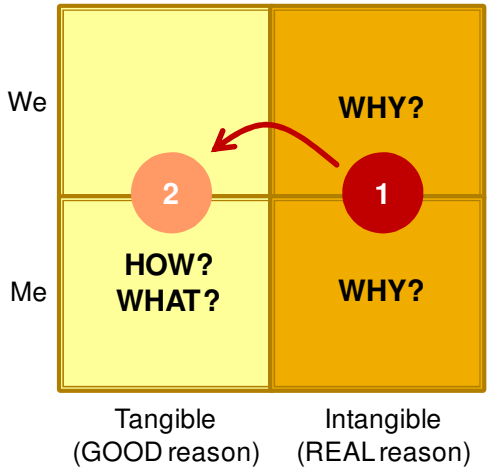
SYSTEMATIC INNOVATION

Short Thort

Apparent Contradiction:

"A man makes a decision for two reasons: a GOOD reason and a REAL reason"
J.P.Morgan

(D = 1 AND 2)



"People don't buy WHAT you do or HOW you do it, they buy WHY you do it"
Simon Sinek

(D = 1 NOT 2)

Resolution:
Decisions (D) are made at 1 (in the limbic brain, first)
2 rationalises the decision (in the prefrontal cortex, second):
If 2 doesn't exist, no purchase will be made.

News

Websites

In our frequently deluded state of mind sits a piece of logic that correlates the quality of a company's website to the lack of client work they have. It's our way of excusing the enduringly poor state of the SI website. Recently we've remembered to remember the difference between correlation and causation. Which is to say that by the time you read this, there should be the bones of at least one and probably two or three new SI related sites. It's time to divide and conquer: a new SI site featuring all the usual solution-related stuff (hopefully in an easier to follow structure), then one specific to TrenDNA (www.trenDNA.com), and still another, www.meta-innovation.net, intended to ultimately become the high level navigation site that connects all our others. Comments on the new structures and content welcome. Ditto for the next two in the plan – ICMM and Innalytics – coming soon to a WorldWide Web close to you.

Graves Future Conference
We now have a complete set of papers and a new official date for our Graves conference. Be sure to put 'Clevedon' into your diaries for 30 April and 1 May.

Hong Kong
Following the success of this month's ICMM workshop in Hong Kong, we will be running a repeat session. Definitely in March. Specific date to be announced on the website Diary page, hopefully, by the time you're reading this.

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

Government – IP strategy
Construction – Asset sweat project
FMCG – Generation archetypes brand study
Semi-conductor – ApolloSigma benchmarking study
Transport Infrastructure – ICMM assessment
SME – business plan 'prescient diligence' study
FMCG – Closed-Open Innovation – solution finding project