Systematic Innovation

e-zine

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In this month's issue:

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Send them to **darrell.mann@systematic-innovation.com**

'Innovation Culture' As A System

During a recent engagement with one of our clients the seemingly perennial question about innovation culture raised its head. 'How do we create a sustaining innovation culture across our business?' was the specific version of that question posed by the client. To which I responded with my usual answer, 'why do you want an innovation culture?' Not that I'm ever trying to be obtuse or deliberately obstructive, merely that I know most companies haven't really had the opportunity to really think through what they're actually asking for. Too often, alas, the desire to create an 'innovation culture' exists merely because an instruction came down from the C-Suite, or that someone heard that a competitor had such a thing already. Or that 'innovation' was the business imperative of the moment and therefore it was now part of everyone's job to 'be innovative'.

My view tends to be that the need of a company to be innovative depends on the pulse rate of their industry and, in particular, of their customers. If your customers are accepting of step-changes once every decade and you've created a culture in which everyone is looking to be delivering step-changes every ten minutes, the only sure fire result is that you're just about to create a culture of extreme frustration and smart, creative people leaving for pasture's new. Customer pulse rates should be the things that drive the size and pace of innovation activities within a company, and 'innovation culture' is in turn dependent on those factors. That said, there is also the proviso that, should pulse rate accelerate sharply for any reason, an organization needs a population that has enough of a change capability and culture that they don't become paralysed by the sudden impetus to make step-changes.

For this particular client, there was a case that a substantial proportion of at least the technical and marketing communities within the organization should possess some of the traits of what might be seen as an 'innovation culture'. And if this sounds rather vague, you're probably right, it is. And it is that way simply because the organization was pretty close to the beginning of an innovation-anything journey (ICMM Level 2), but savvy enough about the ways of the world to know that changing or creating any type of 'culture' within any business, never mind one like there's with several tens of thousands of employees, is not a task to be taken on lightly. Many, indeed, will claim that it is not possible to change the culture within an organization, that culture is an outcome not a lever that can be moved. Culture, in other words, can only be influenced indirectly – the real challenge, therefore in any kind of culture change initiative is to identify the levers that are somehow correlated to culture. Remuneration, for example, is a direct lever available to managers within an organization. So are things like discretionary time, training curricula, perceived ability of senior leaders and research budgets. Culture is something that emerges – in classic complex systems fashion – through the interplay of all of these factors and no doubt many more.

All very wonderful academically, but ultimately not too much help for a group of managers tasked with delivering some recommendations to their C-Suite by the end of the week. So, in usual 'someone, somewhere already solved your problem' manner, we made a quick search of analogous organizations that carried the sorts of traits that the managers thought were appropriate for their context. A couple emerged:
1) Toyota's extraordinary level of employee engagement in terms of implemented improvement suggestions, and
2) Apple designers passion for creating 'world-changing', 'make-a-difference' products

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Of the two, Toyota seemed to be the closest to what an ICMM Level 2 might hope to achieve. The job now was to get to the 'DNA' of the Toyota success... which seemed to be the realization that Toyota employees keep submitting so many improvement ideas because so many of them get implemented: this is simple human dynamics: if my efforts are recognized and I'm making a positive difference, I keep doing them.

The group agreed that their 'innovation culture' creation challenge was thus actually – right now – a 'sense of progress' challenge. The seeds of a real innovation culture, in other words, were most likely to emerge from a population that could see that whenever they submitted new ideas they were acted upon.

So, the question becomes, 'what does a 'sense of progress' system look like?

Well, the moment we talk about a system to do anything, we know that the Law Of System Completeness ought to come in to the picture at some stage. In our case, we decided that the six-element version was most appropriate to our needs:
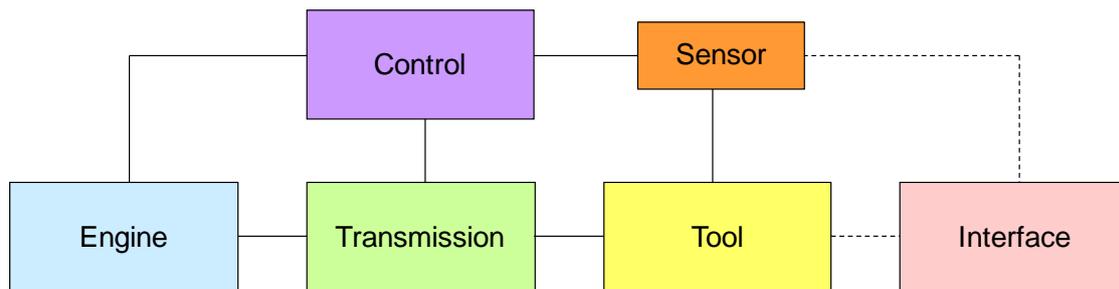
Figure 1: Six-Element Version Of System Completeness Model

Now the job was to interpret what each of these six elements meant in terms of creating the desired 'sense of progress' outcome. This becomes what we could quickly see to be a quite profound but also very context specific set of questions. What is the 'engine' in a sense of progress system?' for example is not an easy question to get your head around. When you do, however, as we found in our exercise, the answer can (and should) be extremely insightful. In our case, trying to relate back to the Toyota improvement system example, the answer was that our engine was the brain of the person or persons tasked with providing timely, meaningful feedback to anyone that submitted an idea.

Here's what we came up with for the other five elements:

Control	A management 'route-map' of overall innovation objectives and 'this is where the organization is trying to get to – i.e. a way of telling people where the ship is heading
Engine	Timely, meaningful management feedback on every submitted idea
Transmission	A means for making sure the 'engine' feedback gets to the right person, in the appropriately transparent fashion. A simple intranet site being the proposed specific solution
Tool	Idea suggestion scheme and series of 'innovation days' – the latter being the 'solution' the team arrived at the session with
Interface	(Being the connection to the outside world) the use of solution and opportunity stimulus from other industries and customers respectively
Sensor	Means by which managers and idea submitters know the status and relevance of ideas

So far so good. The session is being conducted by a group of people with a predominantly engineering/technical background and so the tangibility of these elements was swiftly and coherently easy to visualize and configure.

'Now,' I suggested, 'when we're thinking about soft-skill things like culture, I think we need to consider that there is an equivalent to the Law Of System Completeness for all of the intangible factors that make up the 'real' system'. Tangible systems, in other words, provide people with the good reasons they need to do (or not do) something. Any real system involving people needs to recognize the fact that we all do (or not do) things for both good *and* real reasons. The new question, then, is what might an intangible 'sense of progress' system look like?

What happened next still continues to amaze me in terms of the richness of discussion that emerged merely by injecting what was in effect six words (Control, Engine, Transmission, Tool, Sensor, Interface) into a discussion about the design of the intangible aspects of the 'sense of progress' system the team was looking to build. If there is a single simple 'take-away' from this article, it is that this simple stimulus is something you should try with your teams. Without giving away anything confidential, Figure 2 illustrates some of the key things to emerge from the specific discussion in my client's case:
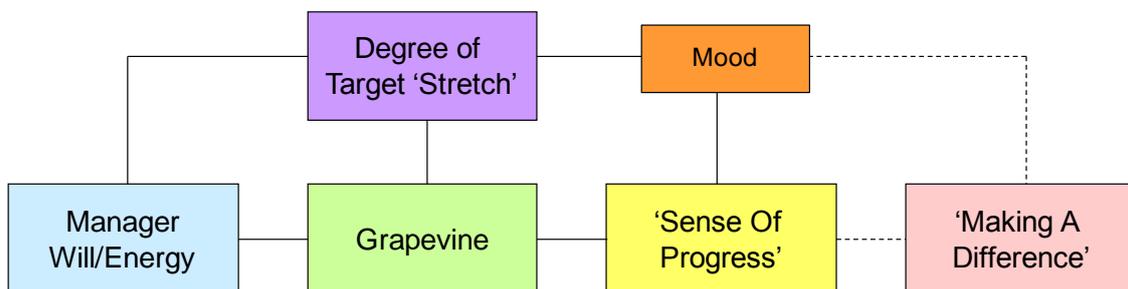
Figure 2: Intangible 'Sense Of Progress' System Model

A significant part of this 'intangibles' discussion was the – universal I think – idea that because, according to J.P.Morgan, 'people do things for two reasons: the good reason and the real reason', that the Law Of System Completeness was telling us that a truly complete system had at least twelve elements to it.

It began to dawn on people that this whole thing was starting to look like hard work. What had in effect started with them thinking was going to be running a couple of 'Innovation Days' was now starting to look like a full-time job. Maybe, I suggested, we might be veering towards some kind of contradiction.

I posed a new question in order to try and tease out and establish whether this might be true:

"if all twelve of these elements need to be present, which is the one likely to be in shortest supply?"

I found myself much encouraged at this point when the group answered that it was their limited will, energy and ability to provide feedback that was going to present the primary constraint on the system.

Very often, knowing what the real problem is sufficient to realize what the most effective solution is going to be. In this case, the realization that what gave people a sense of progress was regular feedback and that the ability or otherwise to provide that feedback was the limiting factor, that in turn should limit the size of innovation culture programme

that was possible to deploy. In other words, launching an 'innovation culture' suggestion scheme across the whole organization was doomed to inevitable failure (as indeed it is in so many companies) because there was no way ever going to be sufficient resource to handle all of the feedback requirements. Far better to let the available feedback capacity drive the number and type of people that should be included in the initial launch of any kind of culture initiative.

This still, several weeks later, seems like quite a big insight to me: totally, thinking about it, in keeping with our oft used Clausewitz quote about bringing a critical mass of effort to the critical point – the size of point you can attack is determined by the critical mass of (management feedback in this case) resources you can bring to bear on the problem.

We could have stopped at this point, but it seemed like everyone was beginning to understand the workings of emergent complex systems at this stage. And so, having found our constraint, we made a quick detour to look at what the Contradiction Matrix might have to say about the subject. Figure 3 illustrates how I mapped the 'if too many ideas are submitted, the amount of time we have to devote to responding is limited' conflict onto the Business Matrix. One of the reasons for doing this, of course, was to begin to demonstrate to the team that whatever the next contradiction is, there will always be someone out there that has already found practical, step-change solutions. Specifically at the very least in this case, Toyota, who purport to implement over a million ideas a year without the need for an army of feedback-delivering managers.

IMPROVING PARAMETERS YOU HAVE SELECTED:

Support Time (18) and Support Interfaces (20)

WORSENING PARAMETERS YOU HAVE SELECTED:

Amount of Information (22)

SUGGESTED INVENTIVE PRINCIPLES:

1, 2, 37, 4, 3, 15, 35, 25, 28, 7

Figure 3: Mapping The 'Idea Quantity versus Evaluation Ability' Conflict

We forced ourselves to spend five minutes exploring each of the Inventive Principle suggestions. I won't delve into any detail here for the simple reason that the clues we derived are both confidential and very context specific. The more important issue as far as this article is concerned is the protocol we followed. And maybe the fact that Inventive Principles 37 ('Relative Change' in its management context) and 25 (Self-Service) were the two that took the team closest to what happens at Toyota. Anyone wanting to explore those avenues in more detail may wish to take a look at Reference 1. For the rest of us, I think the main take away essentially boils down to using very simple constructs like the Law of System Completeness, Good-Reason/Real-Reason and 'find the constraint' thinking to provide simple stimulus to point teams towards the 'right' questions they ought to be working on.

'Innovation Culture' is about as tough as a business question ever gets; creating 'a sense of progress' is, especially for an ICMM Level 2 organisation, a meaningful step along the road; sizing the programme to suit the available resources is what we might think of as one of those blinding flashes of the obvious that tend to make such a big difference in terms of delivering pragmatically implementable solutions; and, finally, making sure everything we are doing is acting in the direction of 'self' anything is always a safe bet compass heading for any kind of system.

So much for the 1% inspiration. Next comes the 99% perspiration associated with actually getting out there and implementing the solutions.

Reference

1) May, M.E., 'The Elegant Solution: Toyota's Formula For Mastering Innovation', Simon & Schuster, 2008.

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From Trend-Map To Trend Conflict (4 Different Kinds)

There's a saying, oft used in TV general knowledge quizzes, that there are no such things as easy or difficult questions, merely ones where you do or don't know the answer. One man's 'obvious', in other words, is another man's completely non-obvious. Looking back at the first TrenDNA book and the processes that we built into it, one of the things we assumed was obvious, but has since been shown to be anything but for a considerable proportion of the readership was how to transition from a trend map to the point where it's possible to make use of the main insight behind the reason we spend so much time drawing the maps in the first place. That big insight comes in two parts: the first is that it is the relationship *between* trends that drives innovation success rather than the trends themselves. The second is the fact that the key to finding the important 'between' relationships is to look for the *contradictions between* pairs of trends. The aim of this article is twofold. Firstly it gives us an opportunity to 'fill in the gaps' in terms of the process for getting from trend map to knowing how to find the important trend conflicts. And secondly, for those lucky few for whom the link is already 'obvious', our job here is to go beyond the obvious and explore some of the subtleties surrounding the types of trend conflict that we should be looking for.

As is often the case, it is easier to describe the theory in the context of a specific example. For the sake of convenience, we'll use a B2B case study we find ourselves using a lot in workshops. The details of the case study shouldn't concern us too much here, but for the completists among us, the contextual background information you might find useful is to know that the case involves an IT services company. The company is based in Europe – hence we examined the European deck of B2B trend cards – and their aim was to 're-invent' themselves in a post-GFC, highly-competitive and busy marketplace in which there are too many providers offering too many similar services to too few, ever-more demanding clients. The basic trend map that began the TrenDNA exercise is reproduced in Figure 1:
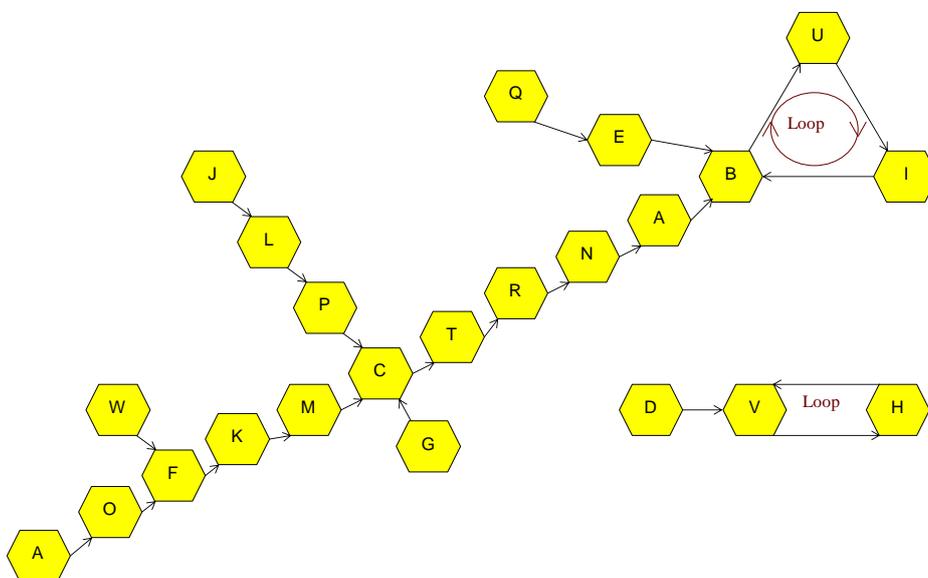

Figure 1: Key Trend Relationships In European IT Service B2B Market

The details of what trends each letter in the map refers to is unimportant. We can say this with confidence since the whole point of the map is to help us to work out what is

important by focusing on the loops and collectors within the picture. Thus, without knowing anything about the IT services industry or the company doing the project, anyone that knows their way around a trend (perception) map, will know that the important trends are B, U, I, V, H, C and, if we were really applying the collector idea to its finest degree, we might also include trend F. Being essentially hard-nosed (i.e. lazy) people, we elected to just focus on the top 6 trends from the map, of which, if we wanted to be really, really hard-nosed (lazier), trends B and V would come out as the top 2. Figure 2 redraws the overall map, taking out all the non-important trends and just leaving us with the top 6. This time, with less detail on the picture, it becomes possible to now begin looking at what each of the important trends actually is:
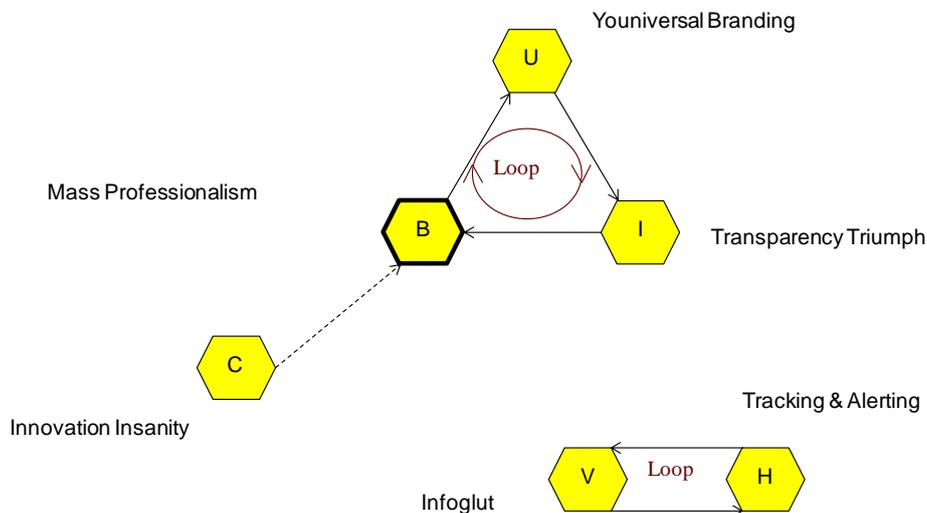
Figure 2: Top 6 Most Important Trends Revealed By The Map

Okay, now we're ready for the 'non-obvious' step in the process. The Figure 2 map has told us what the important trends are, now we need to start looking at the relationships between those trends. Clearly the map itself shows us what some of those 'between' relationships are, but the easiest and usually first thing to do is to simply examine each of the trends in pairs asking the question, 'is there a conflict between these two trends?'

In some cases, we've seen people constructing a simple matrix with each of the important trends along both axes, or, more efficient still, a 'roof' (Figure 3) a la QFD House of Quality to ensure that each and every pair is forced to be considered during this conflict-pair identification exercise.
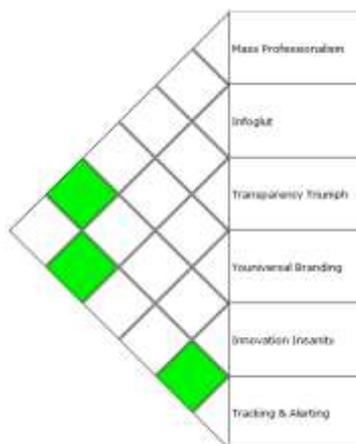
Figure 3: Looking For Trend Conflicts

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This kind of analysis is done to assist us in the search for our first two kinds of trend conflict. The first being a business problem; the second a technical problem. In essence, this split means that we should be looking at each candidate conflict pair through two different lenses – a business one and a technical one. In our specific B2B case, we identified at least one of each. Figure 4 illustrates how, having identified a conflict, we look to either the technical or business versions of the Contradiction Matrix to see how other people have previously resolved similar types of conflict.
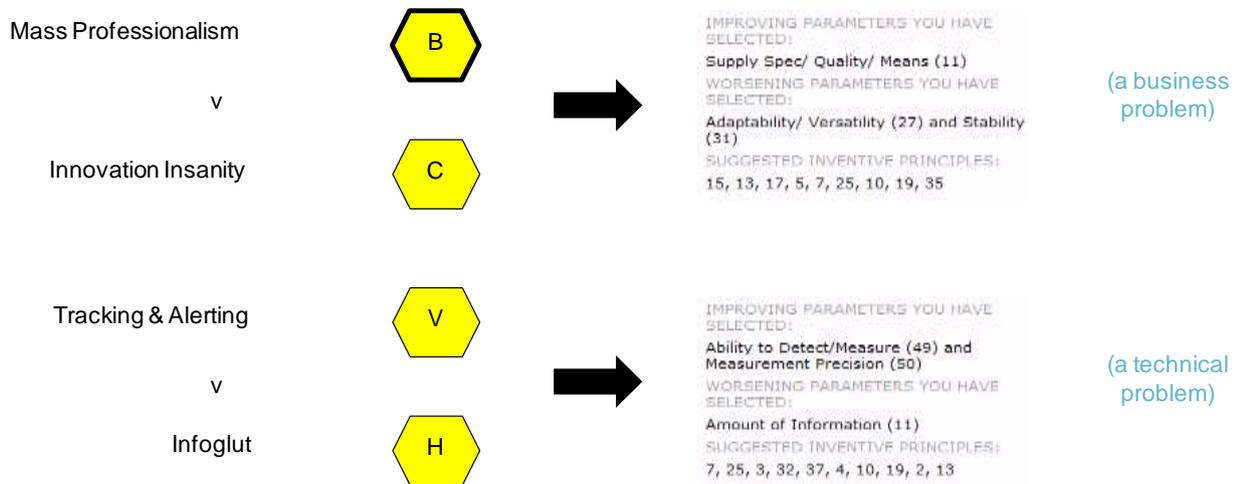
Mass Professionalism — **B**

v

Innovation Insanity — **C**

➤ IMPROVING PARAMETERS YOU HAVE SELECTED:
Supply Spec/ Quality/ Means (11)
WORSENING PARAMETERS YOU HAVE SELECTED:
Adaptability/ Versatility (27) and Stability (31)
SUGGESTED INVENTIVE PRINCIPLES:
15, 13, 17, 5, 7, 25, 10, 19, 35

(a business problem)

Tracking & Alerting — **V**

v

Infoglut — **H**

➤ IMPROVING PARAMETERS YOU HAVE SELECTED:
Ability to Detect/Measure (49) and Measurement Precision (50)
WORSENING PARAMETERS YOU HAVE SELECTED:
Amount of Information (11)
SUGGESTED INVENTIVE PRINCIPLES:
7, 25, 3, 32, 37, 4, 10, 19, 2, 13

(a technical problem)

Figure 4: Mapping Trend Conflicts Onto Technical Or Business Matrix

The third type of trend conflict requires us to do a little more thinking. We find it especially useful for trends where we can't see an immediate conflict with the other ones identified as important by the mapping process. These are conflicts that require us to dig a little deeper to uncover. The basic question we use to reveal the conflicts we're looking for is:

"in my context, what is it that will stop this trend from continuing?"

Figure 5 illustrates an example from our IT services B2B case to show the basic process, up to and including the final step where, having identified a conflict, we again map it onto the relevant Contradiction Matrix in order to obtain insight into how others have previously tackled similar conflicts:

Transparency Triumph — **I**

What stops me?   Trust/ Complexity

➤ IMPROVING PARAMETERS YOU HAVE SELECTED:
Communication Flow (23)
WORSENING PARAMETERS YOU HAVE SELECTED:
Supply Risk (14) and Control Complexity (29)
SUGGESTED INVENTIVE PRINCIPLES:
6, 25, 16, 1, 13, 19, 35, 37, 7, 10, 2

(a look-deeper problem)

**Figure 5: 'Look Deeper' Trend Conflicts Using 'What's Stopping' Question**

(Note: the answer to the 'what's stopping' question is not necessarily one of the other trends in the B2B deck – remember each card in the TrenDNA set has a list of 'trends that conflict with this one' printed on the back – the key thing we're looking for is *something* (not necessarily another trend) that will impede the advance of the trend we're looking at in the context of our situation. That something can either result in a technical or business type conflict pair. In the case of the Figure 5 example, we ended up with a pair that seemed to best suit use of the Business version of the Matrix tool.)

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This leaves us with just one more type of trend conflict to be on the look-out for. This fourth type is rather more subtle than the first three, but can often lead to some of the most important trend conflicts of all. The process of uncovering them requires us to step back a little bit and re-focus on the loops within the trend map we've constructed.

Each loop is, of course, important because it represents either a virtuous or destructive loop. S-curve theory, however, will tell us that no loop, virtuous or otherwise can persist forever. Sooner or later a force will appear that will cause the power of the loop to diminish and eventually disappear. This idea is central to the systems thinking first discussed by Peter Senge in The Fifth Discipline (Reference 1): every system hits a limit. Our job regarding our loops is to try and uncover what will eventually cause them to grind to a halt. We do this with another 'what's stopping' type question:

"in my context, what is it that will stop this loop from continuing?"

Figure 6 illustrates how we used this protocol during our IT services case study for one of our loops, including again, the final part of the conflict modeling process using the – in this case – technical Matrix to get our Inventive Principle solution clues:
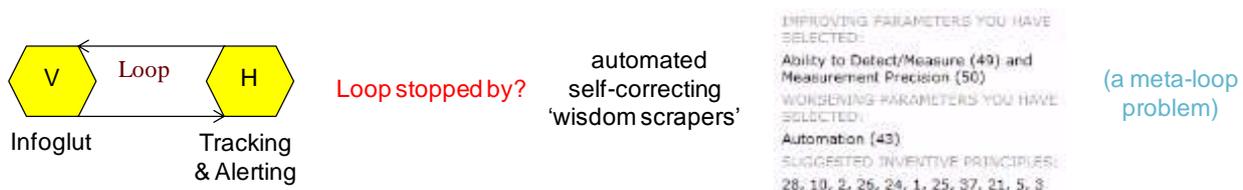
Figure 6: Meta 'Trend Loop' Conflict Mapping

Note also, the mere process of questioning what will cause the loop to stop can, in itself, reveal some quite interesting insights. Indeed, if the loop is a destructive one – as is the case in the Figure 6 example – then identifying the thing(s) that will stop the downward spiral from continuing is potentially very important as an innovation opportunity in its own right. Conversely, if the loop we're looking at is a virtuous one, whatever it is that comes along to cause that loop to stop rotating is something we should be looking to make sure doesn't come to fruition. Or rather that one of our innovation opportunities is to deliver a solution that makes sure the virtuous loop is able to keep turning for as long as possible.

Okay, so there we have it: four different kinds of trend conflict. We still haven't found any specific solutions in the case study we've presented – the job of turning Inventive Principle clues into actual solutions is beyond the scope and relevance of our discussion here. By way of a final point in this article, though, we've spent a significant amount of time working through a multitude of different case studies in order to establish whether there are any emerging patterns that will help us to see which of the four types is more important than the others. As far as we can tell thus far – and please be aware it is still early days – the only consistent finding is that the fourth, meta-loop type conflicts are either the most or least important. Huh?

They are the most important in industries and contexts with a high step-change pulse rate; they are least important in industries and contexts with a low pulse rate. In theory, being 'meta' level conflicts they should be important in all contexts. The story, however, ultimately rests on pulse rate – so that if, for example, we take a slow moving industry like mining or construction, even though we might be able to visualize the thing that will eventually halt a loop, that thing might not actually manifest itself for many years, and so be to all intents and purposes be irrelevant to the job at hand today. We will no doubt talk

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more about industry pulse rates in future articles. In the meantime, we hope this article has provided a few useful insights into how we can get the richest knowledge and wisdom from the TrenDNA trend mapping process. Over to you…
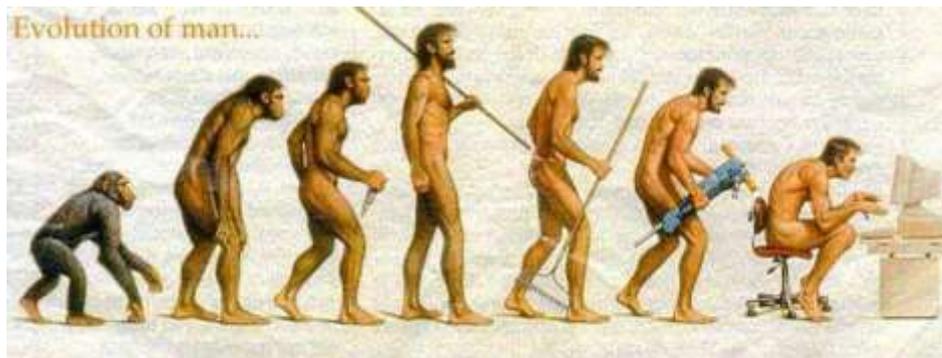
Reference

1) Senge, P.M., 'The Fifth Discipline: The Art & Practice Of The Learning Organization', Random House Business; 2nd Revised edition, April 2006.

Humour – The Ascent Of Man And Beyond

One of the most important tasks undertaken by our research team concerns the identification of societal trend patterns – whether they be step-change 'TRIZ-like' trends or the more traditional directional signposts beloved of the marketing, sociology and anthropology professions. This month sees us venturing closer to the territory of step-change, albeit we're on the look-out for step changes as they relate to humans and particularly human evolution. Many people will be familiar with versions of the 'ascent of man' cartoons oft-used by evolutionary biologists:
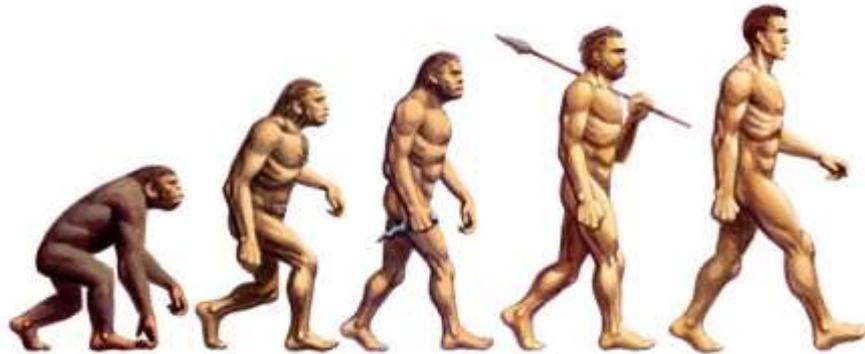

During the course of our never-ending quest to unearth new patterns and new stages beyond the ends of current trends, it seems that quite a few others have already done some hard work for us. Here's one that, if Google Trends has any relevance, is the most popular map of our future:
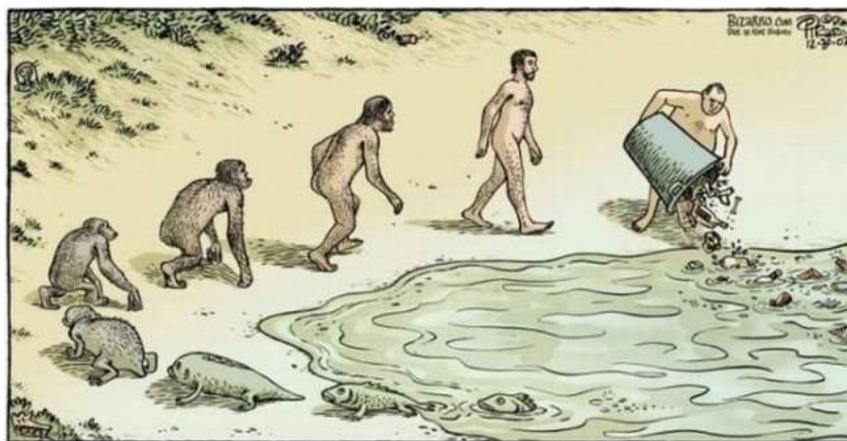

I've also got something of a soft-spot (literally these days thanks to too many conference dinners) for this alternative view:
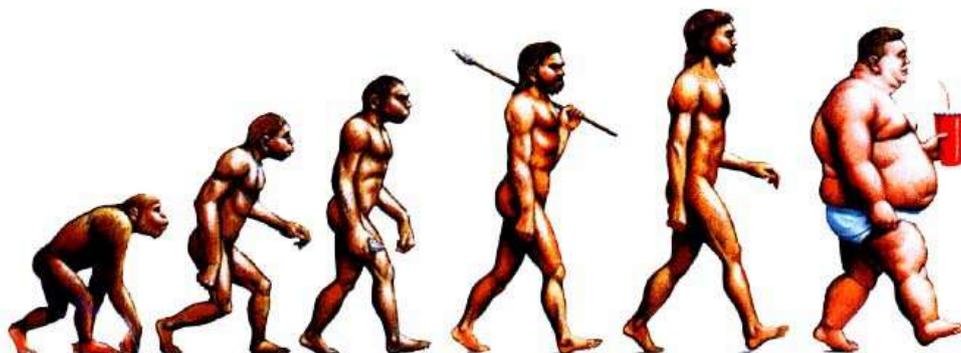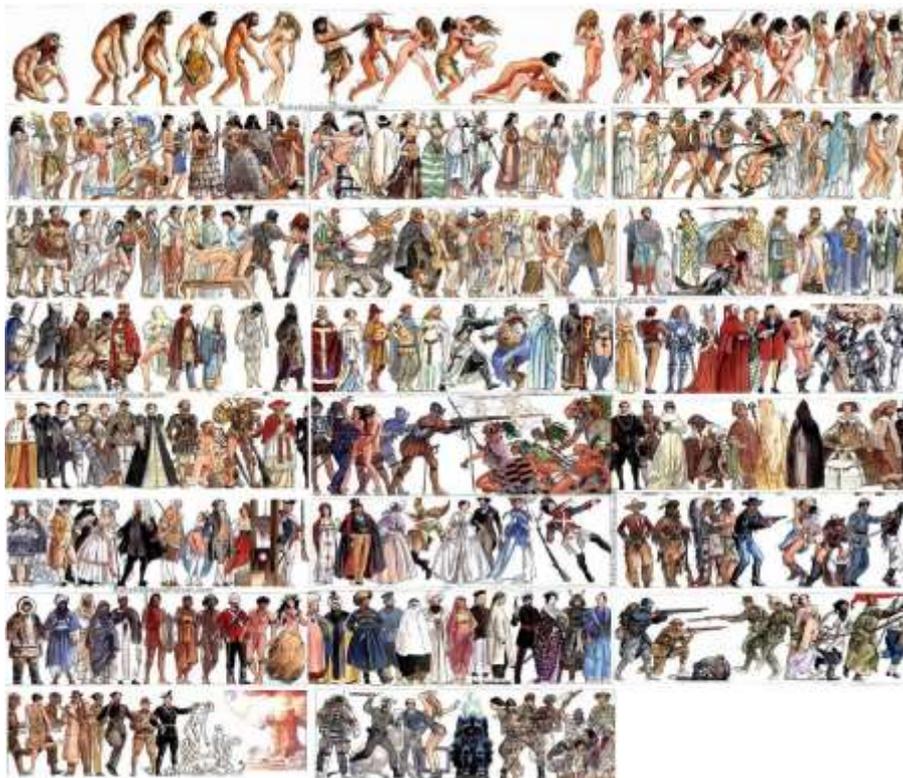
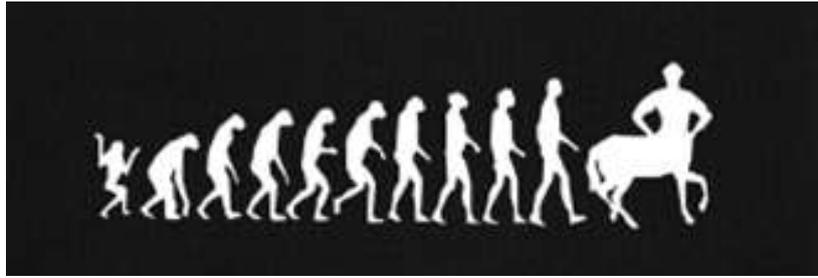Then there's the pessimist's view:
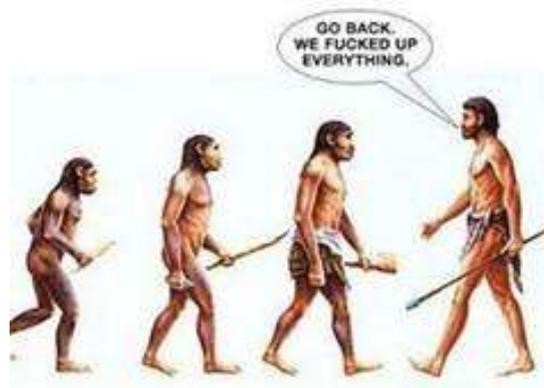
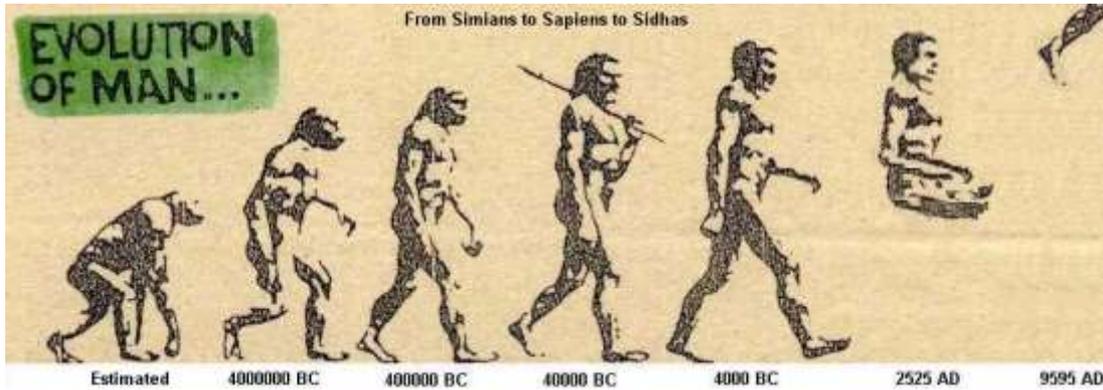

Or the tad-more-pessimistic view:

A detail-oriented perspective:

A surrealist perspective:

An optimist's:

A sub-system view:
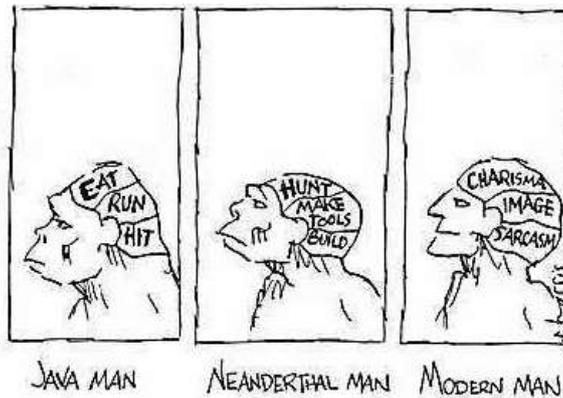
Or how about another perspective on the evolution of our thinking. More over the course of a lifetime rather than over evolutionary time:

I'm a little bit scared about that one. Probably more so about this one though:
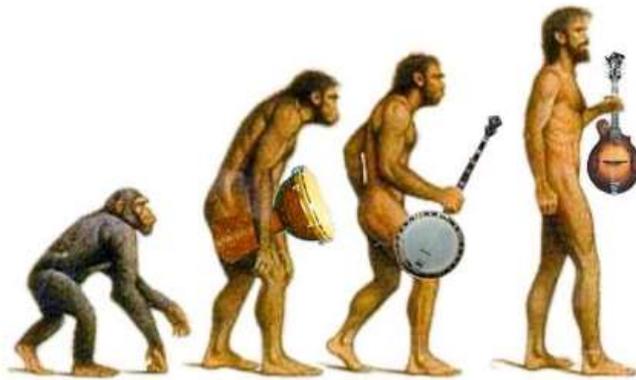
Which in turn is nothing compared to this one:
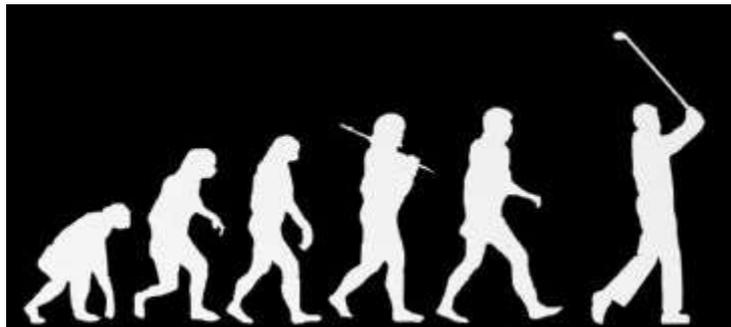
Ultimately, of course, like the TRIZ/SI trends, it's all about working out where the system you're analyzing is, so that you can work out where to look for future innovation opportunities…

…or not.

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Patent of the Month – Highly Nonlinear Pulsing

First up, an admission. I'm not a physicist, so I don't understand too much of how our Patent of the month choice this month works. That said, I think I understand it well enough to know that there is something important happening; that the inventor at the California Institute of Technology have uncovered what, at the very least, feels like a very intriguing cluster of previously untapped resources. Part of the clue-set telling us that something important is in front of us is, first of all, the Rhythm Coordination trend clue word 'pulsing'. Stuff that pulses is inherently more evolved than stuff that is not. Second up, and a tad more subtle, is the presence of a non-linearity. Non-linearities are another great clue word when it comes to thinking about making best use of available resources. A non-linear system, assuming we make it work for us rather than against us, allows us to, as if by magic, turn a small input into a massively magnified output.

In the case of US8,191,401, granted to CIT inventor, Chiara Daraio, on June the 5th the invention disclosure reveals very little about the likely benefits of highly non-linear pulsing – in itself probably a very useful strategy from a commercialization perspective! – so what we've had to glean from elsewhere is that strongly nonlinear wave dynamics is a new area of interest, the behavior of strongly nonlinear uncompressed granular chains exhibit qualitatively new features, from which novel applications such as sound focusing devices (tunable acoustic lenses and delay lines), sound and shock absorption layers and sound scramblers might arise as the most promising engineering applications.

With that application context in mind, here's what the invention disclosure does choose to share with us:

This disclosure relates to a method and system for the formation and propagation of highly nonlinear pulses with selectable pulse properties. More particularly, the present disclosure describes the generation and propagation of pulses through the use of granular chains consisting of particles with desirable geometries.

The existence of the highly nonlinear regime of wave propagation in solids was discovered while studying the shock absorption properties of granular matter. The model typically used to represent the simplest form of granular systems consisted of a one dimensional (1-D) chain of spherical beads regulated by Hertzian contact interaction potentials. However, a new, general wave dynamic theory, supporting compact solitary waves, was derived for all structured homogeneous materials showing a highly nonlinear force (F)-displacement (.delta.) response dictated by the intrinsically nonlinear potential of interaction between its fundamental components.

Within the present disclosure, "granular matter" is defined as an aggregate of "particles" in elastic contact with each other, preferably in linear or network shaped arrangements. In addition to the nonlinear contact interaction present in such systems, and related purely to the particle's geometry, another unusual feature of the granular state is provided by the zero tensile strength, which introduces an additional nonlinearity (asymmetric potential) to the overall response. In the absence of static precompression acting on the systems, these properties result in a negligible linear range of the interaction forces between neighboring particles leading to a material with a characteristic sound speed equal to zero in its uncompressed state ($c_0=0$): this has led to the introduction of the concept of "sonic vacuum". This makes the linear and weakly nonlinear continuum approaches based on Korteveg-de Vries (KdV) equation invalid and places granular materials in a special class according to their wave dynamics. This highly nonlinear wave theory supports, in particular, a new type of compact highly tunable solitary waves that have been experimentally and numerically observed in several works for the case of 1-D Hertzian granular systems.

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Do you see what I mean about not understanding what's happening, but at the same time 'knowing' that whatever it is is imporant? Who wouldn't be interested in a 'sonic vacuum' or 'zero speed of sound'? And, now knowing that such a thing is possible, start thinking about how to make use of such a phenomena?

Likewise, who would've thought that what is essentially a pile of particles (cheap!) that are energized in a particular non-linear, pulsed, asymmetric (another good clue word!) manner could achieve such interesting outcomes. It's probably too soon to say for sure whether this is a Level 5 invention, but our instincts right now suggest that it is. In which case, there lies ahead the opportunity for hundreds of Level 4, 3 and, eventually, 2 inventions making use of the newly uncovered resources.

You heard it here first.

The invention disclosure is not massively more enlightening, so, if we've intrigued you enough to want to dig deeper, here's where we suggest you try next:
http://arxiv.org/ftp/cond-mat/papers/0503/0503299.pdf

FIG. 7A   FIG. 7B

FIG. 1

FIG. 2B
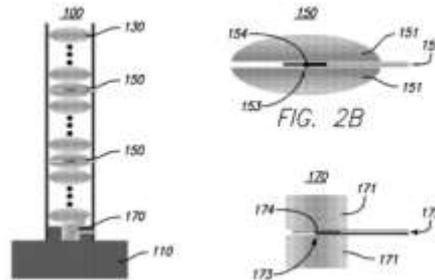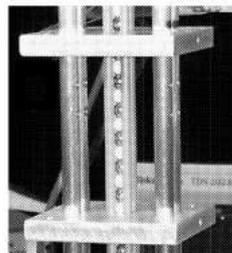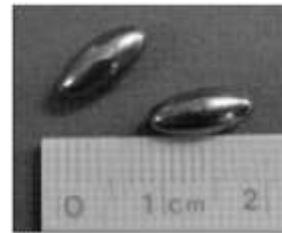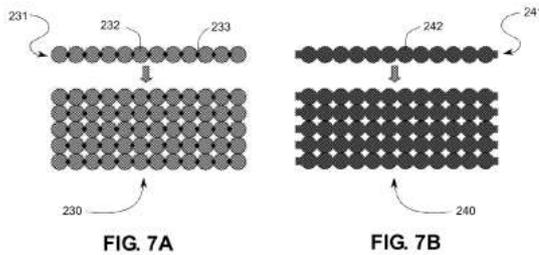
Final thought:
It's very often difficult to connect a Level 5 invention to a contradiction than other, lower Level, inventions, since they are much more attuned to discovery of new resources. That said, if we were to map the problem as a contradiction, here's the one we think fits pretty well:

IMPROVING PARAMETERS YOU HAVE SELECTED:
Noise (29)
WORSENING PARAMETERS YOU HAVE SELECTED:
Energy used by Moving Object (16)
SUGGESTED INVENTIVE PRINCIPLES:
28, 19, 4, 35, 14, 24, 23, 9, 3

As much as anything, we know this is a pretty good fit by in effect using the Matrix in reverse: we know the invention involves Principles 19 (pulsing), 4 (asymmetry) and 9 (a good analogue for non-linearities), so go find boxes in the matrix that feature those Principles and see what problem they relate to. Just a thought.

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Best of the Month – Zen Guitar

This might sound like a very strange choice for our book of the month feature, but, trust me (don't you hate it when consultants say that to you?), this is just about the best book I've ever read on the subject of the innovator's mindset. Replace the word 'guitar' with 'innovate' and the word 'audience' with 'customer' and my bet is that we'd all be calling this an innovation classic, for beginners and career-spanning masters alike. Quite a feat given that the book contains less than 200 pages and is readable in, say, a flight from London to Nuremberg.

In effect, the book is able to cross such a broad span of relevance because it takes the reader from a journey in which – per the martial arts – the reader starts with a 'white belt', advances to 'black' and then (genius) back to white again. i.e. in-line with Zen philosophy, the master of anything possesses the magical combination of unconscious competence and the instinct to know when and how to come at a challenge with a 'beginners mind'. The true master of anything, in other words, knows that there is no end-of-the-road, and that the getting-better journey is a never ending one.

To quote from the introduction: 'You should know from the beginning Zen Guitar is not a conventional how-to programme of instruction. It is alternative, meaning it requires a do-it-yourself spirit. There are no chords or tunings or music theory in this dojo; you won't find lessons on how to read music, play the blues, fingerpick or copy 'Stairway To Heaven'. All of that is information. Information is something you can get from a gamut of sources… the world is swimming in information. Any student with enough dedication knows how to acquire information. But information alone cannot teach you what you need to know to play your song. At the Zen Guitar Dojo, our aim is not to acquire information but wisdom. The idea here is to train and to experience; it is only through the experience of our senses that we truly gain wisdom. One cannot learn Zen Guitar simply by reading. Just as no words can teach us how to ride a bicycle, the only way we can learn to play our song is through the direct experience of our bodies… There is a Zen saying, 'paths cannot be taught, they can only be taken'. So it is with Zen Guitar'.

Full of great quotes and sayings ('don't ask, practice'; 'seven times down, eight times up'; 'the only opponent is within'; 'perfect practice makes perfect'), a great metaphor for just about every aspect of life irrespective of whether you're interested in guitars or innovation – if you want to get better at something – anything – let Philip Toshio Sudo be your guide. Plus, I got hold of my copy from Amazon for a couple of quid. What more could you want?

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Conference Report – LERC 2012, Cardiff

If ever the expression 'bittersweet' was an appropriate label for a conference, the Cardiff University Business School Lean Enterprise Research Centre annual 2-day event fit the bill better than any I've ever had occasion to present at. All is not happy on the good ship LERC it seems. And running a conference is never going to be all happiness and light when half the academic team is either leaving for pastures new or in the midst of a root and branch re-organisation. That said, ignoring the undercurrents, the event ran like clockwork, with as fine a roster of presenters and presentations as I've ever seen in one place at one time. The 'sweet' side of the conference undoubtedly came from some of the presentations. When a member of staff is simultaneously leaving and asked to provide a review of their time in the Lean subject, it provides a recipe for no-holds-barred insight: no longer any need to be politically correct; no longer any need to present everything through rose-coloured spectacles. Consequently, John Bicheno's review of the whole Lean journey – from Toyoda's adoption of the 'create thinking people' philosophy to the best of today – and John Darlington's blistering (yet beautifully subtle) attack on some of the weak adoptions and corruptions of Lean principles were both an absolute joy.

Anyone wishing to explore any of the presentations will find them on the LERC website in the coming weeks. If your time is limited, and you want to get right to the heart of what Lean is really all about through one single presentation, my suggestion is that you check out the Portsmouth City Council paper from Owen Buckwell. Not only is it a wonderful story of *really* understanding what is waste and what is not, but, in keeping with my bittersweet adjective, it also eloquently conveyed the fact that the success was only able to happen because a single brave person stood up to be counted, refused to do the job they'd been asked to do, and instead set about designing and implementing the job that needed to be done. Portsmouth, for any readers that don't know, is a small city on the south coast of the UK. In the various government league tables for council performance it consistently comes out as one of the best run (unlike, ironically, the Portsmouth football team!). Owen Buckwell's instructions for the repair and maintenance part of the council services was essentially 'keep us at the top of the league tables'. What he noticed when exploring what this meant was that there was a significant mismatch between what needed to be done to get good government scores and what actually made the population of Portsmouth happy. Fixing a leaking tap, for example, by replacing a washer scored positively on the official rule set. If the tap started leaking again a month later, then going to fix that also counted as another tick in the box – a request for repair came in; it was dealt with on time. Likewise, if the plumber saw a problem elsewhere in a resident's home while fixing the washer, there was no incentive to fix it while he was already there on site. Far better – according to the government rules – to come away and wait for the problem to become a bigger problem necessitating emergency rectification. Especially if that emergency was fixed within the target timescale. The government standards essentially measured things like was the repair done on time, not 'was it needed'. Far better to turn up at a job with a long-term perspective, replace the tap and fix anything else that was about to go wrong and thus ensure a happy customer that doesn't have to spend half their life phoning up the council. All in all, Mr Buckwell's re-invention of the system to focus on doing the right long-term customer-focused thing in preference to the short-term biased government league table climbing thing, had now, five years downstream created an organization that was still top of the league table, received real praise from the populace and – there had to be a Lean element – achieved the success with a massively reduced budget and around 40% less people (none of the leavers, by the way, were forced out of work – all the reductions being achieved by voluntary processes).

If that wasn't enough, one of my favourite parts of the story was how Mr Buckwell had noticed customers didn't want to have to wait in their homes all day waiting for a contractor to arrive to conduct a repair. Why can't we give people a precise time he asked? Why can't we say we're coming at 9.30am, and actually arrive at 9.30am? 'Waste' in these terms means that the customer's wasted time is also part of the system. My friends in the Royal Mail, or any of the utilities or shipping companies take note: in Portsmouth, they have achieved exactly this precision of 'delivery' of their services. People don't have to wait home all day or (thanks UPS, Fedex UK!) half a day. What they need is to find people like Owen Buckwell and get their services provided through his kind of organization.

If you get a chance to listen to Mr Buckwell present, you should take it. He is probably the best example of the mindset required to make the kinds of bloody-minded, no-compromise shifts Portsmouth have now achieved. You'll also learn that he's someone that is very prepared to take on the system and fight for what is right. It would have been all too easy to follow the government guidelines and keep on collecting the league table topping accolades. But instead he chose to fight the system (note: performance of his function, as is the case in just about every kind of step change, got 'worse' for 2 years before the long term benefits started kicking in), and refused to sacrifice the long term for short term political expedience. I suspect, in the tough economic times in which we should expect to find ourselves in the coming years, his sort is exactly the sort we need to get us out of the mess. I suspect also, he's exactly the sort we'll find it more difficult to find: in tough times, it is far safer for a manager to hide behind the rules than it is to systematically set about breaking them. Overall, I'm pessimistic. My main glimmer of optimism comes from listening to Owen Buckwell, and hoping that some of the politicians listen to what he has to say and are then themselves brave enough to do what's he's shown can be done.

Here's what the rest of the tip-top programme looked like. Interesting to note, I think, the continuing dominance of manufacturers in the field. There might have been lots of attempts to bludgeon Lean thinking into services, but, on this evidence at least, there still seems to be a significant mis-match between the way services operate and the manner in which Lean thinking is being applied. No surprise, leaning-out every-one-unique service transactions (think 'people' and 'intangibles') is somewhat different from leaning out a manufacturing operation producing millions of identical artifacts. Perhaps, if there was a hint of an answer from Owen Buckwell and others, it is about true end-to-end measurement of what waste actually is. As we've mentioned in previous articles, the waste of a lost customer is a crucial part of the waste equation: it doesn't matter how efficient your internal waste-elimination processes are if the customer decides they'd rather shop elsewhere. Hey ho and c'est la vie. If anyone's interested in our relatively minor keynote on the Innovation Capability Maturity Model, you'll find it on either the LERC website, or in our Free Downloads page.

Monday 25th June, 2012	
Noel Hennessey, Lake Region Medical **'A Sucessful Lean Transformation'**	Denis Becker, Gemalto **'Generating Fast Paced Improvement With Shop Floor Teams'**
Gary Steele **'De-Stressing the Distress Purchase'**	George Koenigsaecker **'Lessons Learned'**
Paul Whyte, DePuy	Ann Esain & Jackie Thomas, Oxford Health NHS

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'Exploring the Use of System Thinking to Understand and Plan Change'	Foundation Trust and Cardiff University **'Productive Ward - Is it really a Lean Intervention?'**
Andy Brophy, Lean 2 Innovative Thinking **'The Compounding Power of Employee Driven Incremental Innovation'**	Glynis Caulfield, Unipart Rail **'Lean in Transactional Procurement Operations'**
Robin Howlett, Britvic Soft Drinks Limited **'Leader Standard Work Driving Continuous Improvement'**	James Sandfield & Jacob Austad, Nestle **'Two Sides of the Leadership Coin:** **Transactional Lean - A Case Study of a Business Turnaround (Jacob) &** **The Lack of Real Progress in Lean in the last/next 25 years (James)'**
Chris Cooper, Simpler Consulting **'The Simpler Design System – How we Developed a True End-to-End Lean Product Development System'**	
Tuesday 26th June, 2012	
Kate Mackle & David Bowles, Thinkflow & The Royal Mint **'Cash Flow: Transforming the UK's Oldest Manufacturing Company'**	John Darlington, Lean Enterprise Research Centre **'Lean: Time and Money'**
John Bicheno, Lean Enterprise Research Centre **'Reflections on the Absolutes of Lean'**	Owen Buckwell, Portsmouth City Council **'Customers Not Accolades – A Different Way of Delivering Customer Services'**
Darrell Mann, Systematic Innovation Network **'The Global Innovation Capability Maturity Model'**	Garry Hencher, DS Smith Packaging **'Lead Time Reduction: A Case Study'**
Nick Downham, NHS Institute for Innovation and Improvement **'Shaping the Future of General Practice'**	Shane Maher, Depuy **'Integration: The Way Forward for the Supply Chain'**
Sarah Powell, Royal Surrey County Hospital **'Show me the Evidence – Engaging Doctors in Service Improvement'**	Dr Matthias Holweg, Judge Business School **'Lean, Six Sigma or Lean Six Sigma?'**

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Investments – Nano-Immunoassays
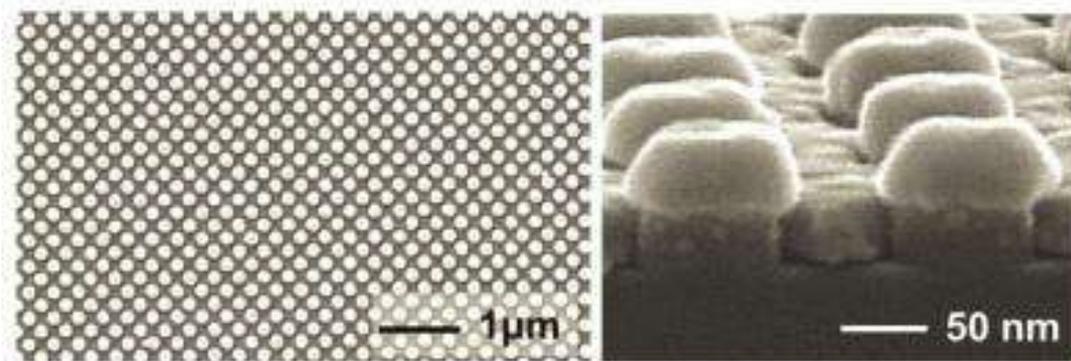
Princeton researchers dramatically improved the sensitivity of immunoassays, a common medical test, using the nanomaterial shown here. The material consists of a series of glass pillars in a layer of gold. Each pillar is speckled on its sides with gold dots and capped with a gold disk. Each pillar is just 60nm in diameter, 1/1,000th the width of a human hair.

A laboratory test used to detect disease and perform biological research could be made more than 3 million times more sensitive, according to researchers who combined standard biological tools with a breakthrough in nanotechnology.

The increased performance could greatly improve the early detection of cancer, Alzheimer's disease and other disorders by allowing doctors to detect far lower concentrations of telltale markers than was previously practical.

The breakthrough involves a common biological test called an immunoassay, which mimics the action of the immune system to detect the presence of biomarkers -- the chemicals associated with diseases. When biomarkers are present in samples, such as those taken from humans, the immunoassay test produces a fluorescent glow (light) that can be measured in a laboratory. The greater the glow, the more of the biomarker is present. However, if the amount of biomarker is too small, the fluorescent light is too faint to be detected, setting the limit of detection. A major goal in immunoassay research is to improve the detection limit.

The Princeton researchers tackled this limitation by using nanotechnology to greatly amplify the faint fluorescence from a sample. By fashioning glass and gold structures so small they could only be seen with a powerful electron microscope, the scientists were able to drastically increase the fluorescence signal compared to conventional immunoassays, leading to a 3-million-fold improvement in the limit of detection. That is, the enhanced immunoassay would require 3 million times fewer biomarkers to be present compared to a conventional immunoassay. (In technical terms, the researchers measured an improvement in the detection limit from 0.9 nanomolars to 300 attomolars.)

"This advance opens many new and exciting opportunities for immunoassays and other detectors, as well as in disease early detection and treatment," said Stephen Chou, the Joseph C. Elgin Professor of Engineering, who led the research team. "Furthermore, the new assay is very easy to use, since for the person conducting the test, there will be no difference from the old one- they do the procedure in exactly the same way."

The researchers published their results in two recent journal articles. One, published May 10 in *Nanotechnology*, describes the physics and engineering of the fluorescence-

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enhancing material. The other, published April 20 in *Analytical Chemistry*, demonstrates the effect in immunoassays.

The key to the breakthrough lies in a new artificial nanomaterial called D2PA, which has been under development in lead researcher, Chou's lab for several years. D2PA is a thin layer of gold nanostructures surrounded glass pillars just 60 nanometers in diameter. (A nanometer is one billionth of a meter; that means about 1,000 of the pillars laid side by side would be as wide as a human hair.) The pillars are spaced 200 nanometers apart and capped with a disk of gold on each pillar. The sides of each pillar are speckled with even tinier gold dots about 10 to 15 nanometers in diameter. In previous work, Chou has shown that this unique structure boosts the collection and transmission of light in unusual ways -- in particular, a 1 billion-fold increase in an effect called surface Raman scattering. The current work now demonstrates a giant signal enhancement with fluorescence.

In a typical immunoassay, a sample such as blood, saliva or urine is taken from a patient and added to small glass vials containing antibodies that are designed to "capture" or bind to biomarkers of interest in the sample. Another set of antibodies that have been labeled with a fluorescent molecule are then added to the mix. If the biomarkers are not present in the vials, the fluorescent detection antibodies do not attach to anything and are washed away. The new technology developed at Princeton allows the fluorescence to be seen when very few antibodies find their mark.

In addition to diagnostic uses, immunoassays are commonly used in drug discovery and other biological research. More generally, fluorescence plays a significant role in other areas of chemistry and engineering, from light-emitting displays to solar energy harvesting, and the D2PA material could find uses in those fields, Chou said.

As next steps in his research, Chou said he is conducting tests to compare the sensitivity of the D2PA-enhanced immunoassay to a conventional immunoassay in detecting breast and prostate cancers. In addition he is collaborating with researchers at Memorial Sloan-Kettering Cancer Center in New York to develop tests to detect proteins associated with Alzheimer's disease at a very early stage.

"You can have very early detection with our approach," he said.

More details at:

Liangcheng Zhou, Fei Ding, Hao Chen, Wei Ding, Weihua Zhang, Stephen Y. Chou. Enhancement of Immunoassay's Fluorescence and Detection Sensitivity Using Three-Dimensional Plasmonic Nano-Antenna-Dots Array**. *Analytical Chemistry*, 2012; 84 (10): 4489 DOI: 10.1021/ac3003215**

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Generational Cycles – 2-Generation Parent-Child Gaps

One of the most frequently asked 'yes, but' questions whenever we introduce the Strauss/Howe generational cycles research findings to workshop delegates (especially from typically skeptical Gen X'ers) is the one that goes something like , 'I had children late and so my kids are two generation jumps away from me, how can the model still apply?' The situation, as shown in one of our usual generation maps below, is not untypical – at certain periods in history, late parents will find themselves raising children that reside within a cohort that jumps over the usual generational boundaries twice:
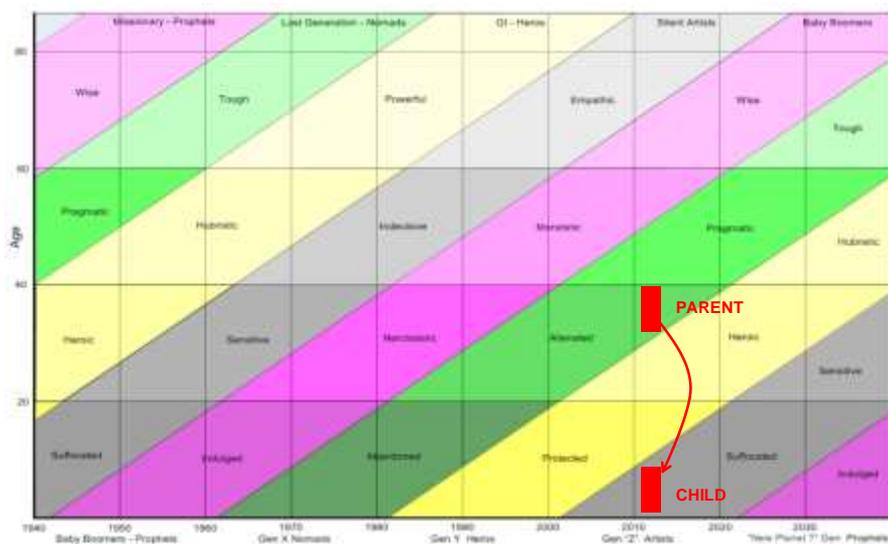
Late Nomad parents (i.e. our skeptical Gen X'er) are currently raising 'Suffocated Artist' primary school children. Surely, the logic goes, if I have the typical characteristics of a Nomad parent, my children should be 'Heroes'?

Let's try and unravel what goes on in these kinds of situation to see whether the reality matches the pattern.

First and foremost, the GenerationDNA rule is very clear: 'the manner in which you were raised by your parents will in turn influence the manner in which you raise your children'. The key word here being 'you': ultimately what happens in your household is determined by your individual views about child-rearing. This is why we always try and preface any discussion about generation cycles by saying 'this pattern may not apply to you personally, but when we step back and look at the bigger picture, we think it does'.

It's inevitably a fuzzy pattern, subject to all the variations associated with continuous variables,Normal or Gaussian curves and emergent complexity.

That said, the reason we're so interested in the pattern is that we can see clear (step-change) distinctions between one generation and the next. So how can this be?

We'll look at three contributing answers here:
1) The late parent is not the average parent
2) Your behavior as a parent is influenced by the broader society you belong to
3) Your child's behavior beyond the age of 4 is as influenced by peers and teachers as it is parents
4)

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The Late Parent Is Not The Average Parent

If you look at the average age at which mothers give birth to their first child, at least in the Western world where the Strauss/Howe research was first conducted, it currently shows that new mothers have an average age, in 2006, of around 28:
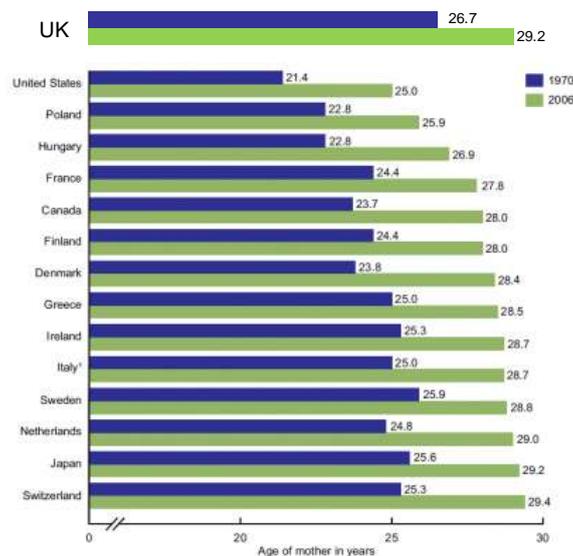
Also shown in this figure is the fact that the average age has increased quite significantly since 1970 (a pattern highly consistent with the expected cyclic patterns found within the overall Generation Cycle – we are now – per prediction – seeing it start to fall again).

The average 28 year old mother by definition gives birth to babies that will reside within the adjacent generation. Gen Y, 'Hero' parents are thus giving rise, per prediction, to Suffocated Artist babies. The fact that these are the parent that are in the majority means they get to dominate the collective behavior of both peer parents and peer offspring at school.

Slightly more controversially, it might also be speculated that there is some kind of correlation between the age of a parent and their worldly knowledge. Older parents tend to be smarter than the pregnant teen that tends to forego graduating college. But, crucially again, because the older, smarter parents are in the minority, they don't get to be the ones that define the Generational pattern. A lot of the people that we tend to find attending our workshops tend to be in this minority group. But ask them if they consider themselves 'average' and they will usually nod in agreement. When they do, I tend to suggest they take a morning off work one day to stay at home watching some of the people who find themselves as guests on the Jeremy Kyle Show, and then re-evaluate whether they think they are average or not. Sadly (for all of us), the Generational Cycle is more strongly influenced by the 'average' Jeremy Kyle guest than it is by the PhD-toting 40-something parent.

Typical Jeremy Kyle Guests – Now Where Do You Think The 'Average' Parent Is?

Your Behavior As A Parent Is Influenced By The Broader Society You Belong To
Much as every (especially GenX) parent likes to think that they are individual and not bound by the conventions of society, I suspect I only have to mention the words 'Madeleine McCann' to get them to reflect and change their minds.

When three-year-old Madeleine disappeared on 3 May 2007, a media furor was ignited, that now, some five years later, continues to make global news: 'we still haven't found Madeleine'. Parents Kate and Gerry McCann – classic late-parent GenXers – found themselves under incredible levels of scrutiny, which in turn has left every parent thinking to themselves, 'that could be me; that could be my child'. Take your eyes off your child for a few seconds and they could be abducted is the now constant media message. Constant in the sense that barely a day goes by without a picture of Madeleine somewhere on our TV screens or on the front page of a newspaper.

But that's not all. Even the most strongly skeptical, no-sell-out, anti-establishment GenX parent will not only find it difficult to escape the feeling that other mothers will be shaking their heads and 'tutt'ing at the school gates if they should commit even the most minor infraction concerning 'doing the best' for their precious protected/suffocated offspring, they are increasingly finding themselves on the wrong side of the law. Following the case of a (church-going no less) mother arrested for leaving her thirteen year old babysitting her four-year old for half an hour, several US states and European countries have instituted laws that make it feasible that a mother can be jailed for such irresponsible acts. (Note: just about every Baby Boomer parent would be liable for prosecution if such laws were enforced retrospectively.)

Your child's behavior beyond the age of 4 is influenced by peers and teachers
The moment your child skips off to kindergarten, your influence as a parent takes a sharp dip (which probably explains why, in the US especially, protective GenX parents have increasingly chosen to home-school their children (thus creating a whole series of – predictable – pattern-re-enforcing outcomes)). Any parent finding themselves listening to their sobbing eight-year old's story that they can't go to their friend Jenny's birthday party because she's only sending out invitations by SMS and I don't have a mobile phone (as happened to my sister-in-law recently) will know how incredible the peer pressure problem can be. No matter how sensible the rationale for not giving expensive phones to eight year old children, it's a brave parent indeed that will hold out and say, perhaps Jenny is not the sort of friend you need to be hanging around with. Either way, the point remains the same; you're not as individual as you think. The Generational pattern exists because, as in any complex system, anything that goes against the prevailing forces tends to be dissipated. Or, put another way: 'sorry, 2-generation-gap parents, no matter what you do, you're fight to swim against the tide will most likely be lost'.

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Biology – Emperor Moth (Saturnia pavonia)

Not only can moths hear, they can smell scents too. Female moths produce scents called pheromones to attract males, and the males use their antennae to pick up this scent as it wafts on the air. The world-record holder when it comes to being able to sniff out the proximity of a potential mate belongs to the male Emperor moth, who manages to locate females up to five miles away. Taking in to account the fact that the amount of scent a female is able to produce is fundamentally small and the enormous amount of dilution that occurs when diffusing over a five mile radius, the male's sensing capability is nothing short of phenomenal.

Here's what the problem looks like when expressed as a contradiction:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Ability to Detect/Measure (49)

WORSENING PARAMETERS YOU HAVE SELECTED:

Amount of Substance (10)

SUGGESTED INVENTIVE PRINCIPLES:

3, 18, 28, 24, 13, 27, 29, 4, 32

As hinted at in the above photograph of said Emperor, the solution comes in the form of a pair of feathered antennae. Or rather, 'fractal' might be a better description, since, when we zoom in to focus on the fine details, they seem to be never ending in terms of detail:

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Feathering represents a pretty good illustration of Inventive Principle 3, Local Quality, right up at the top of the list of strategies used by human engineers to design similar problems. The fractal concept of feathers-on-feathers is more redolent of a hierarchical structure and as such, Principle 7, Nested Doll, would have given us a more complete map of the Emperor solution. In order to have the Matrix get us to that particular solution, we'd have had to dig a level deeper into the problem and recognize that the detection problem is solved by having the highest possible antennae area, and that in turn necessitates the provision – under typical trade-off design scenarios – of a big volume of structure. Here's what the Matrix has to say about that problem:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Area of Moving Object (5)

WORSENING PARAMETERS YOU HAVE SELECTED:

Volume of Moving Object (7)

SUGGESTED INVENTIVE PRINCIPLES:

14, 17, 7, 4, 13, 1, 31, 3, 18

Mothtastic!

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Short Thort

<p style="color:red">"95% of business problems come from the system not the individual."</p>
W.E.Deming

<p style="color:blue">"95% of a business system is intangible."</p>

The system is configured by individuals.

<p style="color:red">99.8% of problems originate from the system designers who paid inadequate attention to the intangibles.</p>

News

Road To True Professionalism
Don't faint! Our long-absent publishing company has finally promised us that copies of the lost Edward Matchett classic will be available from the early part of July. I'm not sure I can believe it, but when I checked, we approved the proofs back in September 2011. So much for instant gratification…. Good job the wait is worth it. Copies available for order from the online shop.

Korea TRIZ Conference
For a while it looked like we were going. Then we weren't. Now we are again. Keynoting and giving a 'Business TRIZ' tutorial on July 11. Details on the calendar page of the website.

Lean MSc
We are pleased to say that we will be continuing our involvement in the Cardiff University Business School 'Lean Enterprise' Masters programme. The next intake round comes together in September. Following changes at the University, it also looks like a period of divergence has created a new-generation Lean MSc at the University of Buckingham.

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With a following wind, we'll also be participating in the design and delivery of this exciting new re-invention of this important topic area.

University of Warwick
Following confirmation of Darrell's appointment as a Visiting Professorship at the University, it has been agreed that he will give a pair of inaugural lectures within the Engineering and Business faculties on October 2. In theory, at least one of the pair will be open to the wider public…anyone interested in attending should contact Darrell in the first instance.

13 August – UK Innovation Future
Following the interest expressed during the May UK TRIZ Forum, we will be running a one-day 'Does TRIZ/SI have a role in the UK innovation space? How do we make it happen?' session at our HQ in Clevedon. A maximum of 12 participants will be invited to, first, work through a TrenDNA analysis of the subject and to then start thinking about what we could/should be doing as a community to make a difference. Anyone interested in being one of the twelve should contact Hannah.

2012 Business Matrix
We're in the middle of a project to update and re-structure the (2004!) Business Contradiction Matrix. There is currently a window of opportunity for us to introduce new Parameters above and beyond the 31 found in the current version of the tool. Anyone wishing there were parameters in the matrix that aren't in the matrix; now is your chance to be heard. In the first instance, let Darrell know what you're desires and wishes are.

New Projects
This month's new projects from around the Network:
  FMCG – Innovation Culture Mindsets Study
  FMCG – ApolloSigma IP study
  Industrial – Technology foresighting project
  O&G – Eyes on the World Project
  Aerospace – Service Transformation Design
  Industrial – Subversion Analysis project
  Government – IP licensing project
  Financial Services – New product development project
  SMCG – TrenDNA study
  IT – software innovation research design