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Our guarantee to the subscriber is that the material featured in the e-zine will not be published elsewhere for a period of at least 6 months after a new issue is released.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

(Or: How To Stop Wasting Billions Of Pounds Of Taxpayer Money)

This month, British Prime Minister, David Cameron, announced a new government strategy for dealing with the growing problem of 'problem families' within the nation. Problem families here being those who, for whatever reason, find themselves in need of considerable support from a host of different government social service agencies. According to Mr Cameron's announcement speech, right now, these families can often find themselves – to quote verbatim, 'sorting out – and sometimes fending off – the 28 or more different state services that come calling at the door' (Reference 1).

On the face of things (ah, the wonders of government spin!), this sounds like a good deal for both the problem families and for the British taxpayer. 28 people? What an incredible amount of waste that must involve. And no doubt it does, especially when – we also learned during the speech – many of these agencies fail to share information with each other, so our poor problem families find themselves answering the same answers over and over again to multiple different people. Surely, we were told, it will be far more efficient for each problem family to in effect be provided with a 'single point of contact'. Indeed, we were told during the speech that the initial pilot studies have been 'promising'. Genius.

Or is it.
Spool forward two or three years and think about what we're likely to be reading in the media then regarding the problem family problem. Do you think we'll be reading about the disappearance of problem families? Or the saving of billions of pounds of social service costs due to the predicted efficiency improvements?

Or do you think we'll be reading media stories about incompetence in the social services? Stories of how the single point contact looking after a problem family was 'incompetent' and 'let the family down'. Or offered advice that caused the family to break-up. Or, to take the sort of extreme the media really loves, failed to protect the death of yet another battered and abused child.

Spool forward another year further – most likely after the next election – and very highly likely some new Prime Minister or senior government will be standing up saying how the previous administration's policy hadn't worked, that millions of pounds of taxpayers money had been wasted on re-organising the service (£448million of new money plus £9B a year of re-arranged money to quote again from David Cameron's speech) and not delivering any useful benefit to the – lest we forget the whole point – problem families. And what will this new government be doing to remedy the problem? Almost guaranteed will be a diagnosis that the 'single point contact' strategy didn't work because the single point contacts didn't have the specialist skills needed to deal with the enormous variety of different types of problem family. And the solution to that problem? You guessed it, reformation of the (28) specialist service provider agencies.

If it wasn't such a depressing waste of money and an even more depressing thought that the poor old problem families (the whole point, remember) were still no better off, it would be funny. I can almost feel the tears streaming down my face.

At the root of the tragedy is the fact that each successive administration thinks that this specialist-versus-generalist debate is solved by oscillating back and forth between one extreme and the other. Each time, of course, with the government spin spiraling to a new height of hysteria. And the populace, bless us all, falls for it every time.

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Why is this?

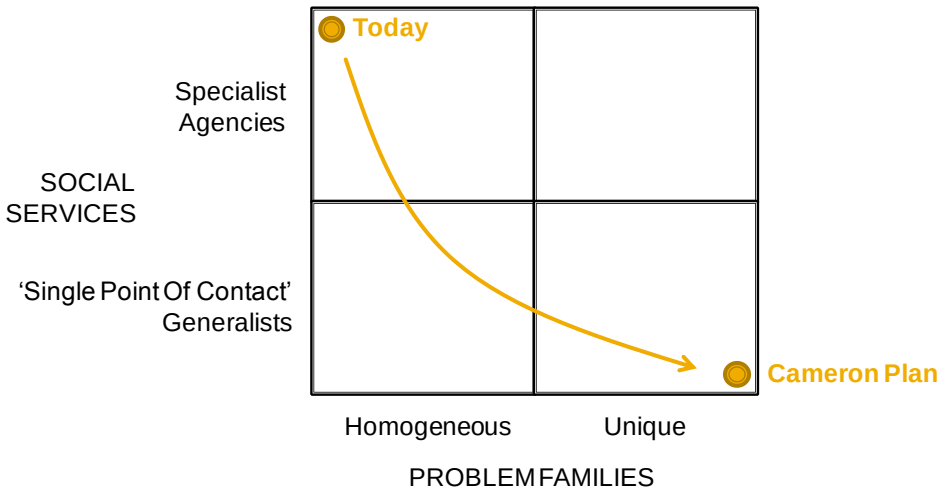
Could it be that we are so conditioned to this kind of either/or argument, we forget to see that there might be an alternative. That it might, for example, be a contradiction, and that the best way to solve a contradiction is *not* to make a trade-off decision (sometimes called 'optimization' to make it sound like a good thing) and to somehow remove it altogether.

About a decade ago, still in the UK, a previous administration introduced the idea of 'Third Way' politics. The big thought behind Third Way politics was that rather than choosing between options A or B, the best solution was probably going to be C. In other words it was completely about removing contradictions.

Third Way politics, alas, never really got past the spin stage. Mainly because whenever the media quizzed any of the politicians to find out what it actually meant, it quickly became apparent that not a single one of them had the first idea. Sure, it was a nice theory, but one only had to look at the policy decisions of the day to see that the so-called Third Way solution was still (A+B)/2 type optimization. Bring trade-off thinking to a breakthrough concept and, unfortunately, what you get is trade-off solutions. Like oscillating between specialized and generalized social services.

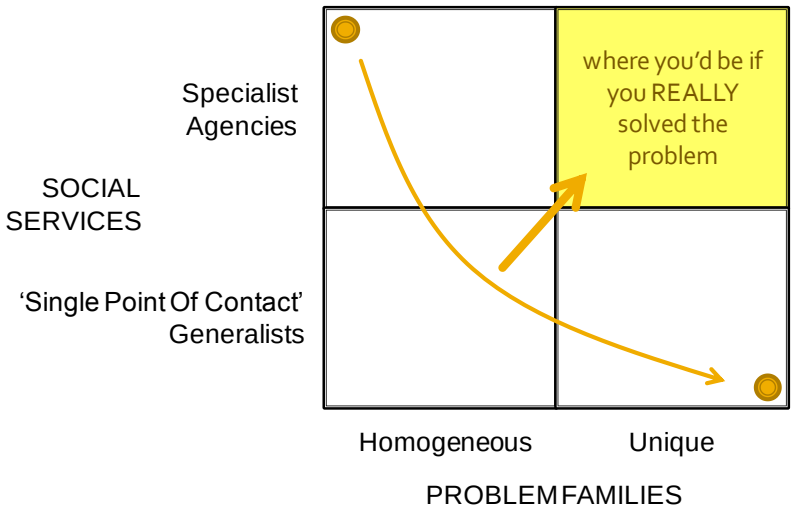
No matter how the politicians' spin tries to disguise these oscillatory shifts from one polarity to its opposite and back again, we'd make an awful lot faster progress as a society (and, indeed, within our organizations – where the exact same polarity shifts keep occurring) if we all started looking past the blather and started looking for the contradiction.

The simplest way to do it is to construct one of the simplest models of the management literature, a 2x2 matrix. Here's what such a matrix might look like when we examine the real issue behind David Cameron's 'fending off 28 agencies' emotive spin:



What any good 2x2 matrix does is make plain the contradiction. No sooner have we drawn this template for the specialist-generalist contradiction than we see all David Cameron's proposal is going to do is shift us from one corner of the picture to its opposite: we either organize the social services, as they are today, into specialist agencies with their assumption that every problem family can be dealt with in the same way (i.e. all 28 people turn up at the door, one after the other), or we say every family is unique and therefore in need of a generalist 'single point of contact' with the social services. Neither extreme is any better or worse than the other. They're merely two different poles answering the wrong question.

The ‘right’ answer (the real ‘third way’ answer) to any 2x2 matrix problem like this is to move into the top-right box: the box in which the, frankly pointless, specialist-versus-generalist debate gets transformed into a much more meaningful discussion about specialist-AND-generalist. A place, in this case, where every problem family has exactly the right single-point-of-contact specialist turning up at their door when they need help.



Most likely the reason ‘Third Way’ politics fell into inglorious ill-repute so quickly because no-one among the politicians apparently had any idea that it was actually possible to find a genuine third way solution. Never mind that such a breakthrough solution might be achievable in a systematic and repeatable manner.

The reason we all ought to actively look out for these ridiculous either/or polarities (especially from politicians!) is because, someone, somewhere has found breakthrough solutions to all of them. Not everyone, in other words, thinks in either/or ways. Those stubborn rule-breakers see any kind of either/or debate as an opportunity to have their cake and eat it. What TRIZ did for thirty years is codify what those people did in the world of technology. What we’ve done for the last seventeen is do the same thing in the worlds of business and government.

There are quite literally dozens of already proven strategies whereby people have successfully resolved problems like ‘specialist and generalist’. All it requires us to do to find them is allow ourselves the permission to ask the right (both/and) question in the first place.

Governments in most parts of the world are in a mess right now. The reason being that they’re all playing extremely wasteful ‘polarity politic’ games. Ironically, given the extreme dire straits that Greece currently finds itself in, we have the Ancient Greeks (stand up and take a bow, Socrates) to thank for inventing the game. Back in those times, the invention of either/or debating allowed humanity to become the civilization we have today. What we need to start thinking about right now, is that the polarity game has had its day, and that it is time to shift to new and better ways of thinking. Just because the other party is wrong, doesn’t mean you’re right. In the new way of thinking, the job of both of you is to find the higher, ‘third way’ if you must, both/and ground.

Reference

1) http://www.guardian.co.uk/politics/2011/dec/15/david-cameron-plan-problem-families .

‘Strategy’ As A System

(Or: Adding A Sixth Element To The Law Of System Completeness)

“’Strategy’ means a cohesive response.
Unlike a stand-alone decision or a goal, a strategy is a coherent set of analyses, concepts, policies, arguments and actions that respond to a high-stakes challenge.”
Richard Rumelt

By some considerable distance, the best management text we’ve read all year has been Richard Rumelt’s destined-to-become-classic, ‘Good Strategy, Bad Strategy’ (see the review later in this edition of the e-zine). The word ‘strategy’, a lot like the word, ‘innovation’, looks set to go out of fashion before most people got to realize what it *really* meant. With the definition re-printed above, we think Dr Rumelt hits the nail squarely on the head: strategy is not a goal, an exhortation (‘keep going until we win’), a vision, a mission or an ambition. Strategy is about sensing something that needs to be done, and responding until it is done. In other words, strategy, like innovation, is an end-to-end process. Or ‘system’.

The esteemed Dr Rumelt brings a whole career’s worth of expertise to bear on the ‘strategy as end to end process’ thesis. He’s someone who’s literally lived strategy. Spend a lifetime studying something, and more likely than not, you’ll get pretty good at understanding what it is. And, per the title of the book, what the differences between ‘good’ and ‘bad’ strategy are.

Our focus in life is on innovation in particular, and ‘systems’ in general. As soon as we recognize that strategy is a system, we can begin to apply some of the rules (‘laws’ in TRIZ terms) that we know apply universally to all forms of system. Of particular relevance would seem to be the TRIZ ‘Law of System Completeness’.

As originally formulated, the Law said that any system must contain four different elements: a tool, an engine, a transmission and a control. Way back in the 1990s, following our integration of TRIZ-thinking with the systems work of others – most notably Stafford Beer and his work on cybernetics – we extended the Law to include a fifth essential element, an ‘interface’. Figure 1 illustrates the manner in which we usually present this five-element view of the world:

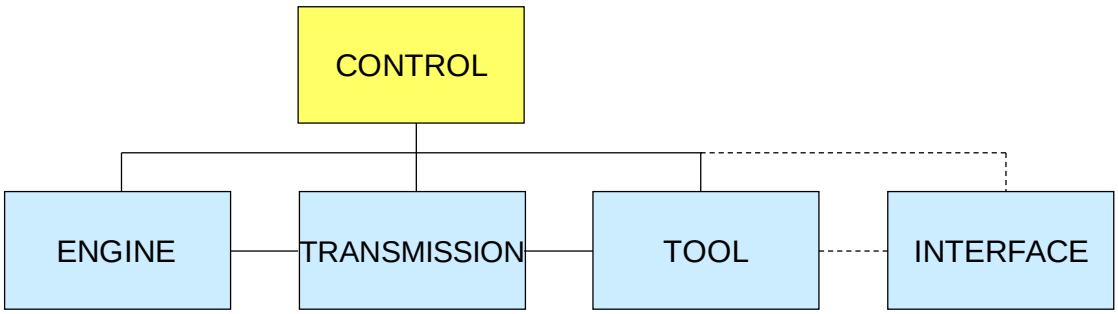


Figure 1: Five-Element ‘Law Of System Completeness’

One of the difficulties pertaining to this view of the world is that it still (we’ve always felt) misses out some of the more intricate attributes of, for example, Beer’s Viable System

Model. More worryingly, when we speak to biologists about their definitions of a (life) system, they have some very clear definitions that, at surface level, don't appear to tally with the TRIZ Law, or our initial extension of it. Biologists often talk about 'systems' simply in terms of 'sense' and 'respond' mechanisms. One way to resolve the apparent contradiction between this view of the world and the Engine/Transmission/Tool/Control view is to say that the 'Tool' corresponds to the 'respond' element, and 'Control' applies to the 'sense' element. Not an ideal match since 'control' is about rather more than sensing, and just saying 'control' doesn't immediately suggest a need for a sensor. In most situations, we can get away with our five element view of the systems world. Occasionally, however – for example, we've been doing a big project for the last couple of years on 'industrial automation' – where it has been important to explicitly add 'sensor' as a sixth essential element in the Law of System Completeness – as shown in Figure 2:

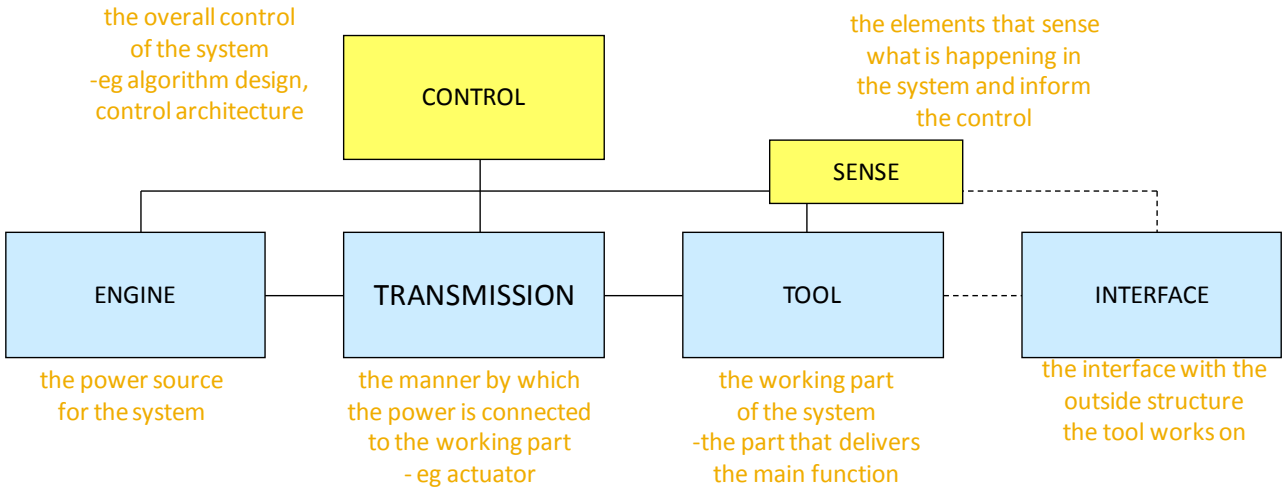


Figure 2: Six-Element 'Law Of System Completeness'

Now, on one level, this five-versus-six discussion is a poor attempt on our part to justify how and why we think Richard Rumelt's strategy definition is a truly valid definition of strategy as a system. Hopefully, too, having made the admission, it is an opportunity to formally introduce an expanded Law Of System Completeness model that may be of general interest irrespective of whether you have any desire to learn more about strategy. And perhaps even better, get people familiar with and using the five-element model to go back to things they have done with it and to see whether the addition of a 'sense' element offers any new insights into the functioning of the systems they are responsible for.

That aside, Figure 3 illustrates the six-element view of the world as it applies to strategy as detailed in Rumelt's definition:

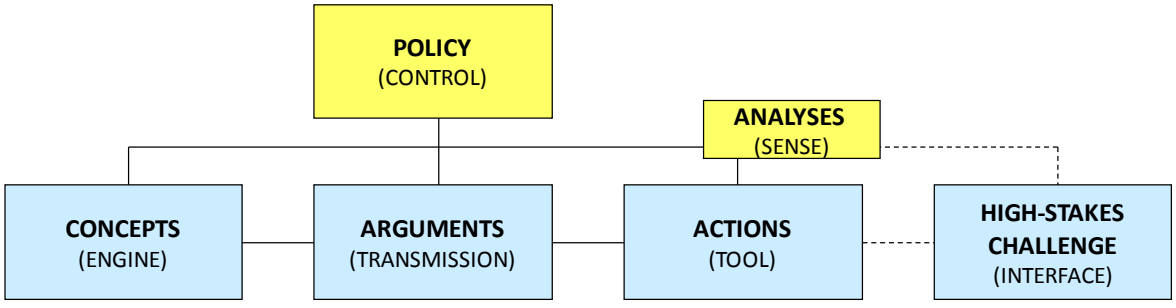


Figure 3: Rumelt's Strategy Definition As A System

Let's examine the correlation between each of the six elements to see if they are, first, consistent, and then whether the two different world-views offer anything to complement the other and thus deliver new insights into what we actually mean when we in the TRIZ/SI world talk about 'systems':

Interface
We typically connect this part of the system to the other parts using dashed lines because, strictly speaking, this is the part of the system that is external to the system. In order for the 'tool' element to usefully deliver a function (i.e. the only reason the system exists in the first place), in other words, it must act on something. Looking at the six elements in Rumelt's definition, and we see that 'high-stakes challenge' is the only one of his six that is also 'outside' the system. Put yourself in the position of the strategy owner within a company, and the things they have control over are the analyses, policy, concepts, arguments and actions; the 'high-stakes challenge' is what they're going to connect those five things together to achieve. Or, put another way, the tool ('actions' in Rumelt's world) is going to act on the high-stakes challenge.

Tool
In the classical TRIZ definition, the Tool is the thing that does the work of delivering the function. Rumelt goes to great lengths in his book to emphasise the end-to-end aspect of his strategy definition. A strategy is only a strategy if it includes execution. And in the 'tool' and 'actions' match, we have a clear correlation between the two different worldviews.

Engine
The 'tool' in the TRIZ Law of System Completeness, can only do its job if it has a source of energy. This is what the 'engine' element of a system fundamentally provides. In the Rumelt worldview, the 'engine' of strategy seems to most clearly correlate with his description of 'concepts'. Concepts in his case being the solutions that need to exist before any of the actions can be conducted. The 'engine' of strategy, in other words, is all about having solid, actionable ideas and solutions that are capable of addressing the high stakes challenge.

Transmission
The 'transmission' in any system is the thing that connects the tool with the source of energy. Of the six elements within Rumelt's definition, this is probably the most difficult one to connect to the TRIZ or extended-TRIZ System Completeness models. In the final analysis, we believe that his 'arguments' element best performs the function of connecting 'concepts' to 'actions'. It is all very well to have a number of potential solutions, but these solutions will not be actionable until such times as the people responsible for making things happen are convinced that the solutions being proposed are the 'right' things to do to address the need. And how do we convince these people? Answer: we solicit their opinions and construct valid and tenable arguments to show that we are about to do the right thing.

Control
In the TRIZ definition, and specifically in the hierarchical fashion by which we always draw our five-element Law Of System Completeness models, 'Control' sits at a higher level than the other elements. It is essentially the thing that sits above, looking at all of the other things in order to make sure that they are all connected and that the right things are being done at the right time and for the right reasons. Of the six elements contained within the Rumelt model, it is the 'Policy' element that seems to offer the clearest connection to this 'higher-level' view of the world. No strategy owner, in other words, can meaningful implement their strategic actions without the existence of some high-level policy guidelines

relating to ‘this is how we do things around here’. Policy is what connects a particular strategy to the rest of the business. No business lives in a world in which there is one single ‘high-stakes challenge’. If there is one strategy for each high-stakes challenge, and there are multiple such challenges, it is ‘policy’ that determines how different strategies operate and interact with one another.

Sensor

Here is the ‘new’ sixth element in the Law Of System Completeness view of the world. It is the thing that exists to measure how well the tool is acting on the interface. As such, it tallies very well with Rumelt’s ‘analyses’ element in his strategy definition. No action to address the stated high-stakes challenge can meaningfully know it is the ‘right’ action without there being some means of establishing that it is successfully addressing the needs of the challenge. Put more simply, every strategy system needs to acquire feedback in order that the management team is able to know that what it is doing is the most appropriate thing to be doing at any given moment in time.

Hopefully, for those of us more familiar with TRIZ and Systematic Innovation than the world of ‘strategy’, Rumelt’s work offers a number of useful new insights into the ways in which we think about systems. Before we leave the story, it is worth adding one more aspect of the Rumelt story in order to plant another – we think – important seed that we hope can grow into a valuable new perspective on systems thinking.

That seed (excuse the upcoming pun) relates to a concept Rumelt describes as the ‘kernel’ of a strategy (Figure 3): “The kernel of a strategy contains three elements: a diagnosis, a guiding policy and coherent action. The guiding policy specifies the approach to dealing with the obstacles called out in the diagnosis. It is like a signpost, marking the direction forward but not defining the details of the trip. Coherent actions are feasible coordinated policies, resource commitments, and actions designed to carry out the guiding policy”.

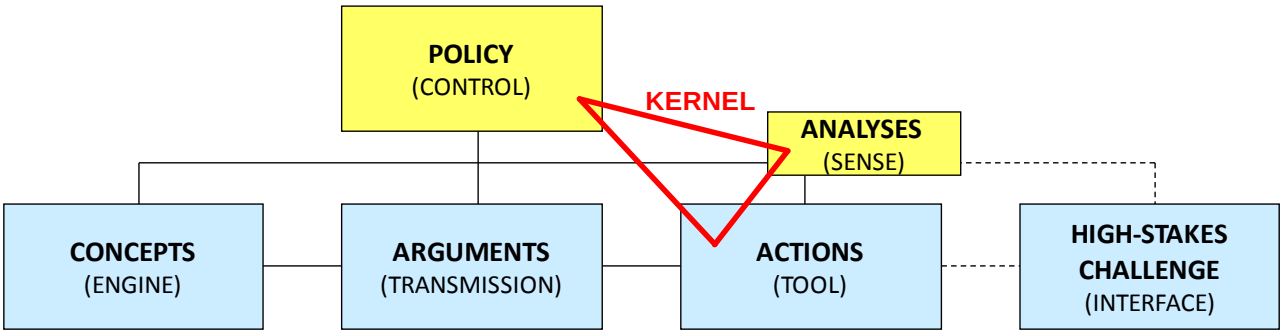


Figure 4: Rumelt’s Strategy ‘Kernel’

Although Rumelt never mentions another favourite strategist of ours, USAF pilot’s pilot, John Boyd, there is a lot of similarity here between the kernel concept and Boyd’s OODA model (Reference 2). The winner in any combat situation, according to Boyd, was the player with the shortest duration OODA (Observe-Orient-Decide-Act) cycle. Boyd’s cycle starts with Observe, which equates to Rumelt’s ‘diagnosis’ or ‘sense’ stage. The clear implication in starting with this stage is that, as in a combat situation, strategy too ought to start from a ‘sense’ activity: don’t do anything, don’t formulate anything until you’ve surveyed and diagnosed the lay of the land.

Once, we've observed, in Boyd terms, we then need to Orient and Decide. In Rumelt's model, we need to formulate the appropriate Guiding Policy. Then, finally (although, of course, recognizing this is going to be an ongoing and repeating cycle of activities in any real world scenario), we are able to Act.

There is a lot here, too, that matches up to the biologists view of the world: if life-forms are fundamentally sense-respond mechanisms, their world begins with a 'sense' activity. Sense informs brain informs the muscles and other response mechanisms.

More generally still, there is a clear implication in all of these models that it is the Sense element of a complete system that sits up front and triggers the other elements to do their thing. You might like to think about that, as you try and connect what is being described here with your previous use and interpretations of the Law Of System Completeness.

There is another, we think, intriguing aspect to Rumelt's kernel definition: "The guiding policy specifies the approach to dealing with *the obstacles* called out in the diagnosis." The clear implication here is that the primary job of the Diagnosis or Sense element of the complete system is to identify 'obstacles'. Or should that be 'contradictions'?

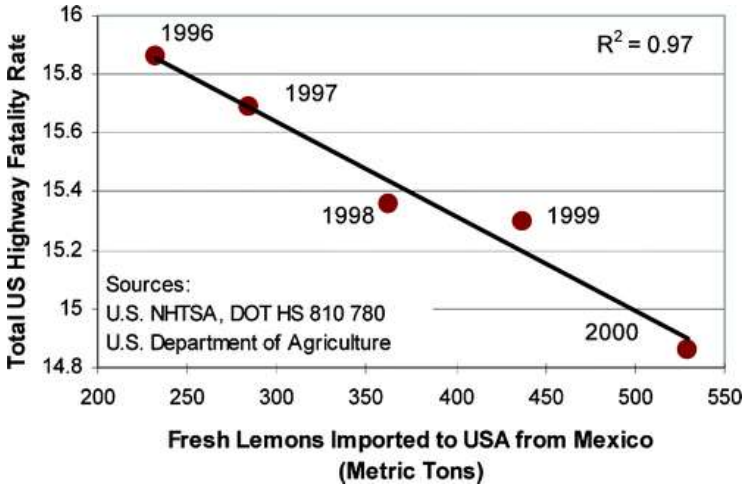
So does this mean strategy starts by finding contradictions? Is that what we mean when we go looking for a 'high-stakes challenge'?

Perhaps you might like to think about that next time you're sat in on a strategy session inside your organization: 'strategy is a system for contradiction solving'.

Not So Funny – Correlation Or Causation?

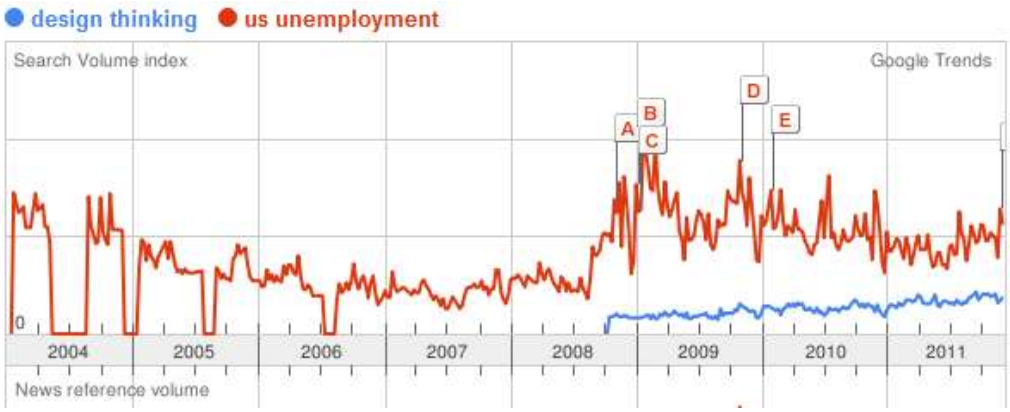
Our burning desire to be good global citizens has lead us to conduct an extensive programme of research into what needs to be done to get the US back on track and the problem of global warming sorted. Several years and several PhDs later, here's our seven-point plan for solving all of our ills:

1) Save American lives by ceasing imports of Mexican lemons:



2) Solve the house price problem by renaming everyone 'Ava':

3) Solve the unemployment problem by banning 'Design Thinking':



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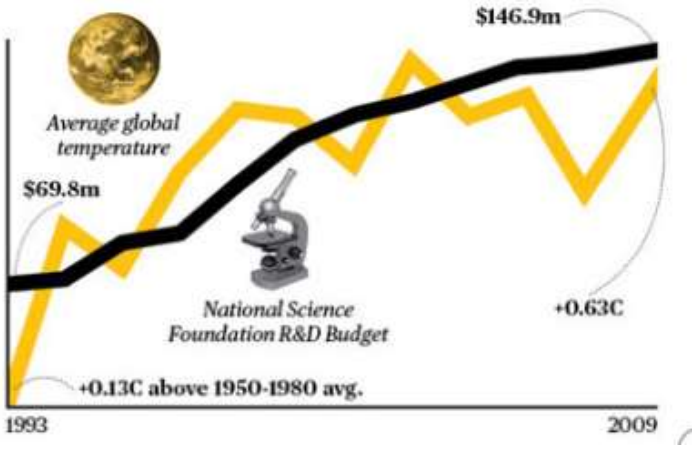
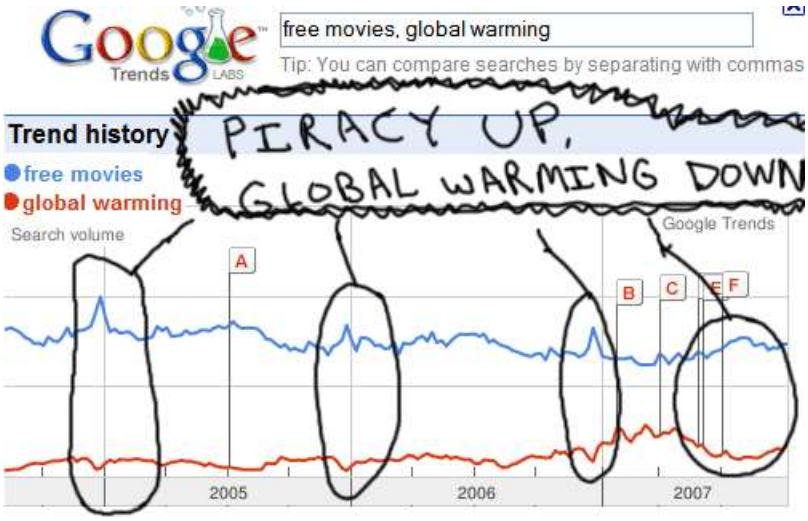
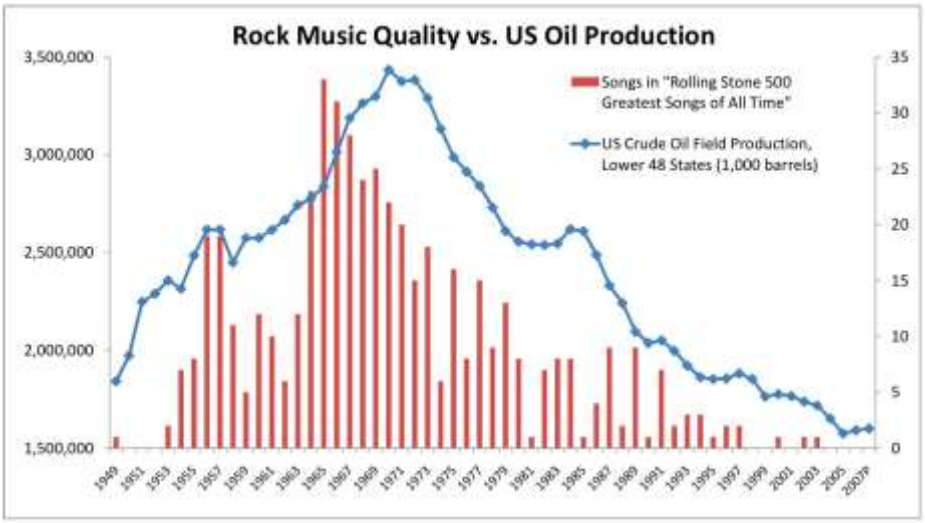
4) Solve global warming by switching off US R&D budgets:



5) Solve global warming by encouraging more movie piracy:



6) Increase US oil production by getting musicians to write better songs:



7) Make the US population smarter by banning Lil Wayne, Beyonce and Jay-Z, and forcing everyone to listen to more Beethoven, Radiohead and Ben Folds:

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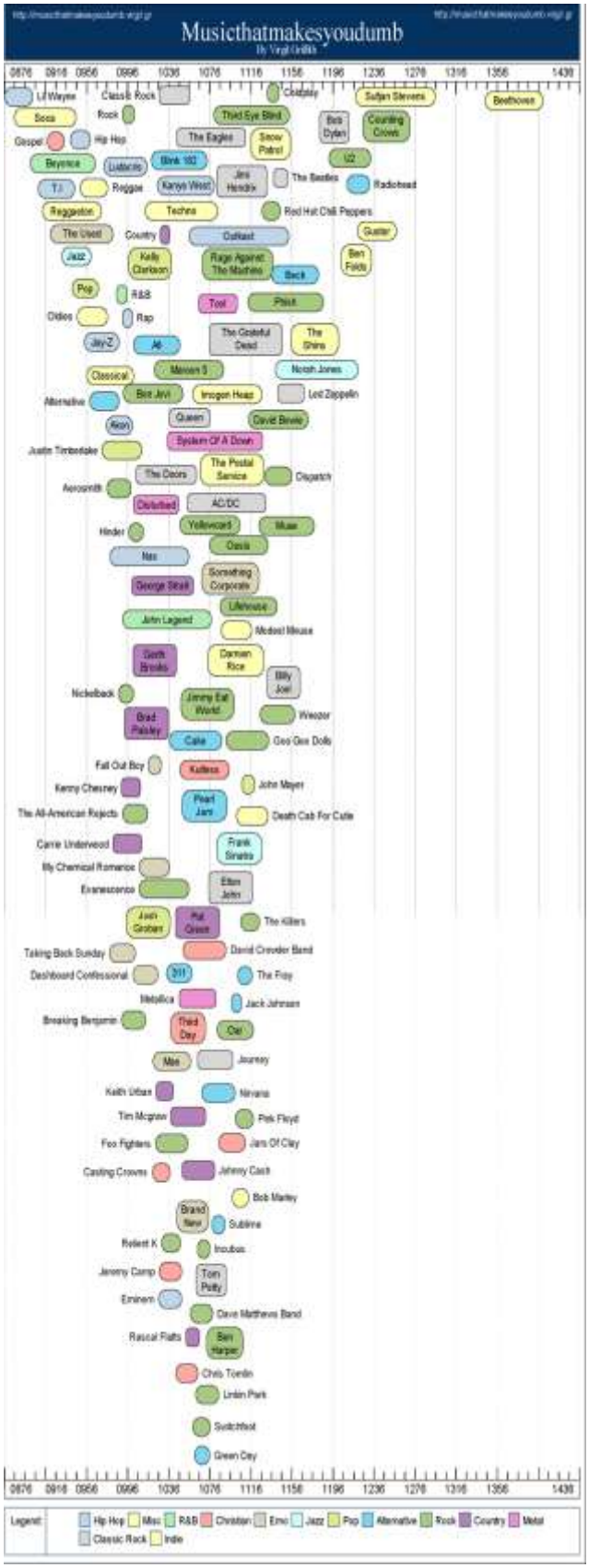

Oh, wait, this one's actually right.
(Thanks to the person who did a fantastic job of connecting Facebook band 'likes' and SAT scores by the way.)

Job done.Tomorrow we rest.

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Patent of the Month – Thermoacoustic Device

Our patent of the month this month takes us to China and the rather grand sounding Beijing FUNATE Innovation Technology Co., Ltd. Actually, the company just had a cluster of three very closely related patents, all issued on 8 December, on the subject of thermoacoustic devices. US8,073,163, 8,073,164 and 8,073,165 are the three patents under our specific consideration here.

Thermoacoustic devices per se are not unique – the concept of creating sound by rapidly heating a surface so that it expands in order to move the air adjacent to it has been known for almost a century. No-one as yet, however, has managed to make any commercial sense of the concept. What's new about the FUNATE invention is the incorporation of our old friends the carbon nanotube. While carbon nanotubes are widely praised for their strength and electrical properties, no one, prior to the Chinese team's work, has thoroughly investigated their acoustic properties. The inventors first reported in 2008 that zapping sheets of carbon nanotubes with an electric current causes the nanotubes to emit sound (read their fascinating story and (slightly annoying) video at http://www.physorg.com/news144939492.html). Now, eighteen months after starting to file patents, the initial tranche have been granted. Here's what the invention disclosure background section has to say about the motivation for the work:

Acoustic devices generally include a signal device and a sound wave generator. The signal device inputs signals to the sound wave generator such as a loudspeaker. Loudspeaker is an electro-acoustic transducer that converts electrical signals into sound.

There are different types of loudspeakers that can be categorized according by their working principles, such as electro-dynamic loudspeakers, electromagnetic loudspeakers, electrostatic loudspeakers and piezoelectric loudspeakers. However, the various types ultimately use mechanical vibration to produce sound waves, in other words they all achieve "electro-mechanical-acoustic" conversion. Among the various types, the electro-dynamic loudspeakers are most widely used.

The electro-dynamic loudspeaker, according to the prior art, typically includes a voice coil, a magnet and a cone. The voice coil is an electrical conductor, and is placed in the magnetic field of the magnet. By applying an electrical current to the voice coil, a mechanical vibration of the cone is produced due to the interaction between the electromagnetic field produced by the voice coil and the magnetic field of the magnets, thus producing sound waves by kinetically pushing the air. However, the structure of the electric-powered loudspeaker is dependent on magnetic fields and often weighty magnets.

Thermoacoustic effect is a conversion between heat and acoustic signals. The thermoacoustic effect is distinct from the mechanism of the conventional loudspeaker, which the pressure waves are created by the mechanical movement of the diaphragm. When signals are inputted into a thermoacoustic element, heating is produced in the thermoacoustic element according to the variations of the signal and/or signal strength. Heat is propagated into surrounding medium. The heating of the medium causes thermal expansion and produces pressure waves in the surrounding medium, resulting in sound wave generation. Such an acoustic effect induced by temperature waves is commonly called "the thermoacoustic effect".

A thermophone based on the thermoacoustic effect was created by H. D. Arnold and I. B. Crandall (H. D. Arnold and I. B. Crandall, "The thermophone as a precision source of sound", Phys. Rev. 10, pp 22-38 (1917)). They used platinum strip with a thickness of 7.times.10.sup.-5 cm as a thermoacoustic element. The heat capacity per unit area of the platinum strip with the thickness of 7.times.10.sup.-5 cm is 2.times.10.sup.-4 J/cm.sup.2K. However, the thermophone adopting the

platinum strip, listened to the open air, sounds extremely weak because the heat capacity per unit area of the platinum strip is too high.

What is needed, therefore, is to provide an effective thermoacoustic device having a simple lightweight structure that is not dependent on magnetic fields, able to produce sound without the use of vibration, and able to move and flex without an effect on the sound waves produced.

Here's what the key problems – the desire to increase noise output being prevented by mass, thickness and heat capacity of the material being used – looks like when mapped onto the Contradiction Matrix:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Noise (29)

WORSENING PARAMETERS YOU HAVE SELECTED:

Weight of Moving Object (1) and Length/Angle of Moving Object (3) and Energy used by Moving Object (16)

SUGGESTED INVENTIVE PRINCIPLES:

3, 9, 14, 31, 4, 35, 13, 17, 28, 19, 1, 22, 24, 23

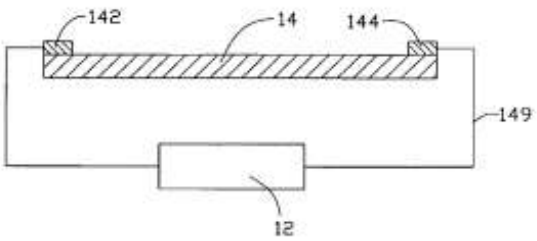
And here's what the main patent claim from 8,073,165 has to say:

An apparatus, the apparatus comprising: a signal device; a supporting element; a sound wave generator, at least part of the sound wave generator is supported by the supporting element, the sound wave generator comprises a carbon nanotube structure, the carbon nanotube structure comprises of one or more carbon nanotube films, the carbon nanotube film comprises a plurality of carbon nanotubes joined end to end by van der Waals attractive force therebetween; and the signal device transmits a signal to the carbon nanotube structure; wherein the carbon nanotube structure is capable of converting the signal into heat, transferring the heat to a medium in contact with the sound wave generator, and causing a thermoacoustic effect.

Without wishing to read too much into the Matrix output, what does seem clear here are illustrations of several of the recommended Principles:

14 – (intriguingly) Curvature = nanotubes
28 – add a field = van der Waals forces
1 – segmentation = a plurality of tubes

These connections aside, the new jump made by the inventors seems to us to be indicative of at least a Level 3 and quite possibly a Level 4 invention. Which in turn means, assuming they're able to commercialise what they've done, there should be a host of thermoacoustic effect application patents heading our way in the coming years. Right now, as is so often the case, the trick will be to find a high value, niche use of the new solution. Something where magnetic fields aren't allowed and low weight is a big benefit…. How about that for something to be thinking about over the New Year holiday?



Best of the Month – Good Strategy Bad Strategy

A nice easy decision this month. 'Strategy's Strategist', Richard Rumelt's newly published 'Good Strategy Bad Strategy' is quite likely the best thing we've read this year. A good sign: we reached page 6 and already knew we had the basis of the article you'll find earlier on in this edition of the e-zine. By the time we'd reached page 100, we'd scribbled half a dozen pages of notes, case study material and new research questions for our in-house team. And by the time we got to the end, it was 'right, we need to try and organize a conference with this guy'… which we might just do, by the way.

The book itself is divided into three main sections: the first defining and providing examples of 'good' and 'bad' strategy; the second, a fascinating look at what Rumelt calls 'sources of power', but what we call 'lever resources', and the third a guide to thinking like strategist.

As suggested by the sources-of-power/resources connection, there is an awful lot in the book that resonates with the TRIZ/SI view of the world. Rumelt never uses the word, but, as hinted in our earlier article, his very definition of strategy encapsulates the idea of finding and resolving contradictions. As such, the book is awash with great case study material: Rumelt having an uncanny knack of getting to the root contradiction of some of the world's biggest success stories. Stories like Sam Walton's biggest insights at Wal-Mart (look out for us using that one!), and Steve Jobs strategy upon his return to Apple ('how will you grow again?' Jobs: 'we'll wait for the next big thing').

Perhaps best of all, throughout the book, Rumelt pulls no punches when it comes to shaming the bad-strategy CEOs of the world. Some of the examples of 'strategy' exhibited by usually now ex-CEOs are quite jaw-dropping in their failure to grasp what strategy is and what they needed to do to ensure the future prosperity of the organizations they were charged with overseeing. Rumelt's overall thesis is very much that strategy is about strong thinking and hard work. Most companies that fail because of poor strategy failed because it turns out they either didn't have a strategy at all (usually because they thought a shopping list of goals was the same thing), or because they thought strategy was all about

filling in templates. It is to the hundreds of consulting companies offering such management-by-numbers approaches that Rumelt reserves his biggest criticisms. Which all goes to show how easily the words of the gurus (a title I think Rumelt can justifiably own) can be simplified to the point of meaningless inanity by those in the consulting world that think they're helping by making a 'simplified' fill-the-boxes version of what is inherently a complex, highly inter-connected subject.

Enough already. The only other thing you need to know about this terrific read is that its currently for sale on, ahem, a major on-line book retailer's website at almost half the cover price. It's the bargain of the year I tell you.

Conference Report – Innovations Kongress, Villach, Austria

Well, this sure was an interesting one. If someone had asked you where the biggest German speaking innovation conference of 2011 was going to be, I suspect no-one would've thought of the small town of Villach in central Austria. As it happens, though, over 600 people turned up for this two day event, held on 17 and 18 November. If you didn't book early, there wasn't a hotel room in the whole town to be had.

I was only there for part of the first day, giving a keynote on 'Innovation As A Repeatable Science'. As it turns out, this was the only English speaking part of the whole two days. On one level, I feel totally honoured and privileged to have been invited, on another it made me feel guilty that my German language skills are (still) so bad.

I was able to glean enough to know that it was a very varied programme, covering as diverse a range of innovation topics as I've seen on show at any other equivalent conference anywhere. Unusually too, the audience was in extremely high spirits throughout, bursting with questions (I spent as long answering questions as I did presenting the slides I think – quite worryingly as it turns out because I had to literally run to the train station to get my train the moment I stepped off the stage).

Maybe it was just me, but I'd have to say it felt like there were definite signs that innovation has really started to hit the consciousness of the broad based business community. It's no longer about buzzword; it's now about 'we're all going to have to do this, so we need to understand what it's really all about'.

See the conference website at http://www.innovationskongress.at/Home.

Download my slides at:
http://www.innovationskongress.at/Programm/Keynotes/Donnerstag-17.-November-2011-16-10-Innovation-As-A-Repeatable-Science

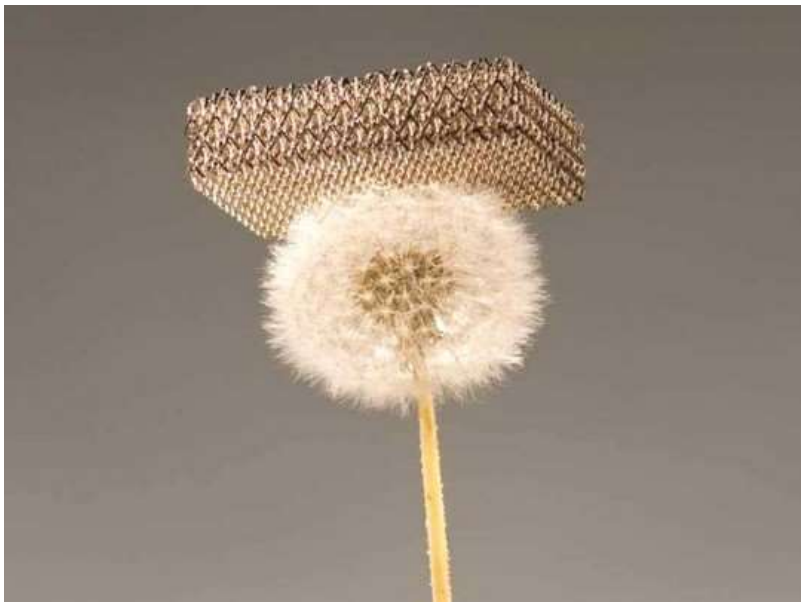
And for those that read a little German, here is the programme for the first (keynote-filled) day:

Tag 1 - Moderation: Armin Wolf, ORF

13:00	Begrüßung und Eröffnungsinterviews Moderation: Dr. Armin Wolf **Helmut Manzenreiter**, Bürgermeister der Stadt Villach **Mag. Harald Dobernig**, Finanz- und Technologielandesrat, Land Kärnten **Dr. Walter Walzl**, Geschäftsführer, Kleine Zeitung **DI. Siegfried Spanz**, Geschäftsführer Fachhochschule Kärnten **Mag. Peter Gauper**, Vorstandsdirektor, Raiffeisen Landesbank Kärnten **Dr. Sabine Herlitschka**, Vorstandsmitglied Infineon Technologies Austria AG **Prof. (FH) Ing. Mag. Dr. Peter Granig**, wissenschaftlicher Leiter, Innovationskongress
13:30	Keynote Innovation als Schlüsselfaktor für Wachstum, Beschäftigung und Wohlstand **Sektionschef Mag. iur. Andreas Reichhardt**, BM für Verkehr Innovation u Technologie
13:45	Keynote Innovation - Kreativität versus Disziplin **Univ. Prof. Dr. Oliver Gassmann**, Direktionsvorsitzender des Instituts für Technologiemanagement, Universität St. Gallen
14:30	Keynote Regionale Innovationssysteme – Potenziale und Grenzen – „Fünf Thesen zur Innovation“ **DI Herbert Paierl**, Präsident Management Club Österreich
15:00	Coffeebreak
15:30	Keynote Think innovative! Lust auf Ideen: So entsteht Innovationsklima. **Bernhard Wolff**, Bestsellerautor
16:10	Keynote Innovation As A Repeatable Science **Darrell Mann**, Innovationsforscher und Autor, Präsident der Europäischen TRIZ Vereinigung
16:30	Keynote Innovationskiller – Management **Dr. Richard Straub**, Präsident, Peter Drucker Society Europe
17:00	Coffeebreak
17:30	Kunst und Innovation Faszination – Corporate Groove – innovieren mit Musik
17:45	Keynote The Innovators Dilemma **Univ. Prof. Dr. Kurt Matzler**, Professor für Strategisches Management an der Universität Innsbruck, Partner von IMP, einem internationalen Consulting-Unternehmen.
18:15	Keynote Vom Spinner zum Winner **Johannes Gutmann**, Geschäftsführer SONNENTOR Kräuterhandelsgesellschaft mbH
19:00	Networking bei Buffet und Musik
20:00	Sideevent Future Ideas for Karawanks Preisverleihung - grenzüberschreitender Ideenwettbewerb
20:00	Sideevent Kaminabend mit Johannes Gutmann - Unternehmer des Jahres 2011 Kaminabend unter dem Titel "Nachhaltigkeit und „Marketing" waren einmal, jetzt geht´s um Authentizität und Gemeinwohl!" mit Johannes Gutmann – dem Unternehmer des Jahres 2011 - im Zuge des Innovationskongresses in Villach. Veranstalter: Institut für Innovation in Kooperation mit dem Marketing Club Kärnten

SYSTEM ·ATIC INNOVAT· ION

Investments – World's Lightest Material



A team of engineers claims to have created the world's lightest material.

The substance is made out of tiny hollow metallic tubes arranged into a micro-lattice - a criss-crossing diagonal pattern with small open spaces between the tubes.

The researchers say the material is 100 times lighter than Styrofoam and has "extraordinarily high energy absorption" properties.

Potential uses include next-generation batteries and shock absorbers.

The research was carried out at the University of California, Irvine, HRL Laboratories and the California Institute of Technology and is published in the latest edition of Science.

"The trick is to fabricate a lattice of interconnected hollow tubes with a wall thickness 1,000 times thinner than a human hair," said lead author Dr Tobias Schaedler.

Low-density

The resulting material has a density of 0.9 milligrams per cubic centimetre.

By comparison the density of silica aerogels - the world's lightest solid materials - is only as low as 1.0mg per cubic cm.

The metallic micro-lattices have the edge because they consist of 99.99% air and of 0.01% solids.

The engineers say the material's strength derives from the ordered nature of its lattice design.

By contrast, other ultralight substances, including aerogels and metallic foams, have random cellular structures. This means they are less stiff, strong, energy absorptive or conductive than the bulk of the raw materials that they are made out of.

William Carter, manager of architected materials at HRL, compared the new material to larger low-density structures.

"Modern buildings, exemplified by the Eiffel Tower or the Golden Gate Bridge are incredibly light and weight-efficient by virtue of their architecture," he said.

"We are revolutionising lightweight materials by bringing this concept to the nano and micro scales."

Robust

To study the strength of the metallic micro-lattices the team compressed them until they were half as thick.

After removing the load the substance recovered 98% of its original height and resumed its original shape.

The first time the stress test was carried out and repeated the material became less stiff and strong, but the team says that further compressions made very little difference.

"Materials actually get stronger as the dimensions are reduced to the nanoscale," said team member Lorenzo Valdevit.

"Combine this with the possibility of tailoring the architecture of the micro-lattice and you have a unique cellular material."

The engineers suggest practical uses for the substance include thermal insulation, battery electrodes and products that need to dampen sound, vibration and shock energy. As with any good disruptive technology (which we certainly think this is), the real trick now will be to target the highest-value niches, the ones that will deliver early profits and allow the vital journey towards economy-of-scale to proceed.

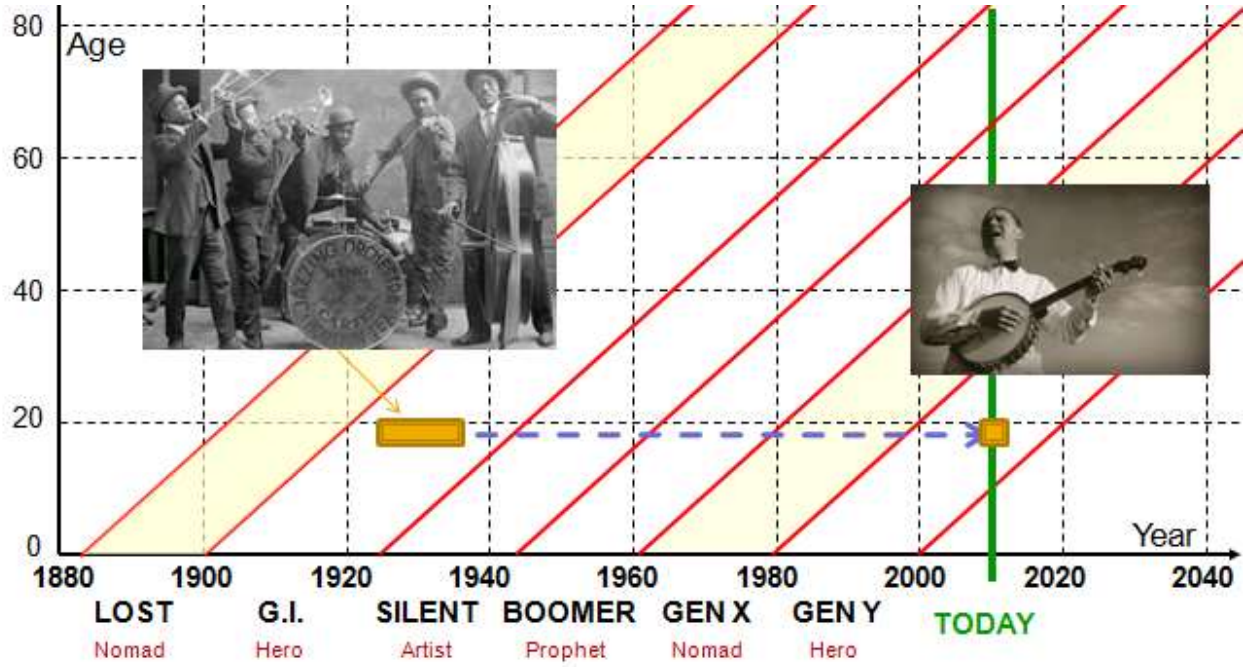
Generational Cycles – C.W.Stoneking

Last month I went to see C.W.Stoneking play a gig at one of the biggest music venues in Bristol. For the uninitiated, C.W.Stoneking is an Australian born banjo player whose act involves wearing a bow-tie and playing early New Orleans jazz, blues and calypso music. With the occasional bit of yodeling thrown in for good measure.

Now if this doesn't sound like your idea of a fun night out in 2011, think again, because not only was the house full, but it was full of young, happening Generation Y hipsters, many of whom had completely got into the swing of things by coming appropriately dressed in 1930s New Orleans style.

I'd have to say that, apart from feeling like the oldest swinger in town, it was a fantastic gig. Great music; great between song banter, great atmosphere. Clearly, it seems, C.W.Stoneking has hit upon something important.

Here's what we think it is:



C.W. was born in 1974 – which makes him a definite GenX Nomad – but his audience is very definitely the late-teen/grown-up GenY Hero. Whether by luck or judgement (based on his very X-like skepticism as exhibited in his stage patter, more likely the latter), what we think he has hit upon is that the style of music he plays resonates beautifully with Depression-era Hero generations. What he's playing today (surreal lyrics aside! – the Nomad-gene had to kick in somewhere) is exactly the style and type of music that got people through the Great Depression in the 30s.

Given that we're heading in to the heart of similar economic territory again in Europe and the US, our guess is that C.W. will have a solid and longstanding career to look forward to.

Which all makes one wonder what other forms of entertainment from the 30s we can anticipate being successfully revived? I'm voting for Bessie Smith.

Biology – “Shrilk”

Web-slinging arachnids already have researchers toiling away looking to replicate the remarkable properties of spider silk. Now spiders, along with their insect and crustacean arthropod cousins, have provided inspiration for a new material that is cheap to produce, biodegradable, and biocompatible. Its creators say the material, dubbed "Shrilk," has the potential to replace plastics in consumer products and could also be used safely in a variety of medical applications, such as suturing wounds or serving as scaffolding for tissue regeneration.

Arthropods have an outer skeleton made up of a composite material called cuticle that consists of layers of a polysaccharide polymer called chitin and protein organized in a laminar, plywood-like structure. In its unmodified form, which can be seen in the body wall of a caterpillar, chitin is translucent, pliable, resilient and quite tough, but arthropods are able to modify its properties to make it tough and rigid, as seen in the body wall of a beetle, or to make it elastic, as seen in arthropod limb joints. Not only does cuticle protect the arthropod's internal components and provide structure for muscles and wings, it does so without adding weight or bulk.

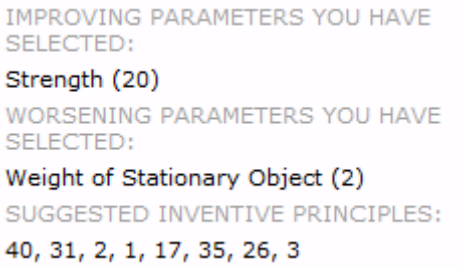
It was this extraordinary strength, toughness and versatility that researchers at the Wyss Institute for Biologically Inspired Engineering at Harvard University claim to have replicated with the development of ‘Shrilk’. By recreating the unique chemistry and laminar design of arthropod cuticle in the lab, Wyss Institute postdoctoral fellow, Javier G. Fernandez and Wyss Institute Founding Director Donald Ingber were able to engineer a thin, clear film that has the same composition and structure as arthropod cuticle.

Dubbed Shrilk because it is composed of fibroin protein from silk and from chitin, the material is similar in strength and toughness to aluminum alloy, but is only half the weight. Since chitin can be extracted from discarded shrimp shells it can be produced at very low cost. It is also biodegradable and can be molded into complex shapes. By controlling the water content in the fabrication process, the researchers were also able to vary the stiffness of the material, ranging from elastic to rigid.

The researchers say that these attributes make Shrilk suitable for a wide range of applications, including providing a cheap, environmentally safe alternative to plastic, and for making garbage bags, packaging, and diapers that degrade quickly. Since it is also biocompatible and strong, it could also be used to suture wounds that bear high loads, such as hernia repair, or as a scaffold for tissue regeneration.

"When we talk about the Wyss Institute's mission to create bio-inspired materials and products, Shrilk is an example of what we have in mind," said Ingber. "It has the potential to be both a solution to some of today's most critical environmental problems and a stepping stone toward significant medical advances."

From a TRIZ/SI perspective, shrilk offers a step-change jump solution to the classic strength-versus-weight contradiction. Here's what the 2010 Contradiction Matrix has to say on that subject:

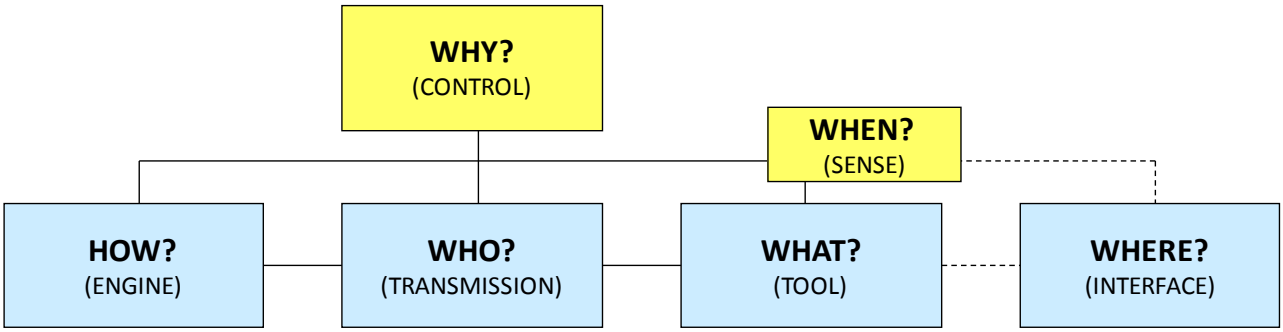


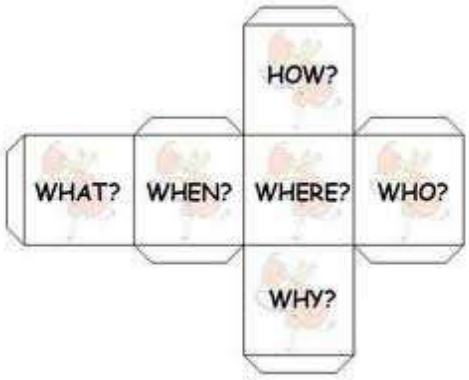
Nothing surprising here in terms of what the shrilk 'designers' have done: it's a composite of chitin and silk (Principle 40), laid down in adjacent laminar layers (Principles 1, 3)… which basically then just leaves us wondering what additional benefits would come through incorporation of a few holes (Principle 31), and going non-planar with the layers (Principle 17). Either way, it would be nice to see this one make it all the way to some kind of recognisable commercial success.

The Wyss Institute team's research findings were published during December in the online issue of *Advanced Materials*.

Short Thort

The ‘5Ws and an H’ form a complete system.





News

UK TRIZ Forum#4

Due to popular demand, the fourth UK TRIZ forum event will take place in Clevedon again in 2012. The dates are 15 and 16 May. This time around, as well as the usual day of papers, we will be including a special half day focusing on the Innovation Capability Maturity Model. Anyone interested in presenting on the day of papers is invited to submit a title and brief outline to Darrell. Ideally before the end of January.

UK Public Workshops

2012 will see us conducting regular monthly workshops dotted around the UK. In addition to the already announced Certification workshops to be held in Clevedon during January, February and March, we have scheduled TrenDNA/Voice Of Customer workshops in London in February and Manchester in April. In a slight change of style, we’re actively marketing the workshops for the first time ever, so they will be running in bigger venues, with – hopefully – larger numbers of delegates.

HongKong

A bit short notice, but if you happen to find yourself in the Hong Kong area in January, we are giving a TrenDNA seminar on the evening of 9 January, and then a full one-day workshop on the 13th. Details on the website.

Women In (Innovation) Leadership
Not sure we've ever spotted any scientifically provable gender difference in terms of innovation propensity or success, but nevertheless (or maybe that's the point?), we will be presenting at a Women In Leadership event to be held in London in January.

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

FMCG – IP study
Aerospace – certification workshops
IT – IP strategy project
Automotive – innovation strategy workshops for Board members
Finance – market positioning strategic study
SMCG – NPD project support

Happy Holidays
In an unplanned fit of organization, this edition of the e-zine may well reach our readers before the start of the end of year/New Year holiday season. Which means we get to wish everyone that gets to have one a restful break, and for everyone, a peaceful and prosperous 2012.