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In this month's issue:

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Solving The 'Systematic But Not Sequential' Contradiction

Just over a year ago we wrote an article showing some of the fundamental problems associated with trying to solve problems requiring an inventive solution (Reference 1). In simple terms, what the article talked about was a fundamental disconnect between the way our brain work in these situations and the attempts of problem solving method designers (think ARIZ in particular) to try and design sequential step-wise processes. The big disconnect is that one assumes things can happen linearly, and the other shows that in creative situations, the brain needs to work in highly non-linear ways.

We later updated this article (Reference 2) and presented a table which is reproduced here:

Case Study	D 1	2	3	4	5	6	7	8	9	10	11	12	13	S 1	2	3	4	5	6	7	8	9	10	11	12	13
Bag (ref 3)	1		2											3												
DVD (3)	1				3										4		2									
Cartridge (3)	1	2	3		4												5									
Massager (3)			1		3				5							6	2			4						
Switch (3)	1	2												3	4										5	
Packing (3)	1						4	2									3			5						
Charger (3)	1				2										4		3									
Dog toy (3)					2	3			5						7		1	6	4							
Nano-ox (4)	1							2							4		3									
Textile (4)	1	3		2	5									4								5				
Clip (4)	1	2											4	5	3					6					7	
Chocolate (4)	1		2											5		3	4									
Charity (4)	1			3	2													5				4				
File (4)					1	2							4		3			5								
Freshener (4)	1										2				3									4		
Rail (4)	1	2	3			4			5					6	7											
Tyre (4)	1					4				2					3			5								
Testing (4)	1					2	3											4	5							
Advert (4)				1										3								2				
Coriander	1				4	6					2				5		3		7	8						
Carbon fibre	2		9		1		4							5	6					3					7	8
Gravy	1			8			2						4	3	5			9				6	7			
Print	1																									
Traffic					4		1		6				2	3	5		8			7	9					
Light								4	3			1	5	7	2									6		
CIO	1			2					4					3	5				6			7				
Insurance			4	2										1				3				5		7		6

Table 1: Tool/Template Sequence Used By Problem Solvers On Different Case Studies
(numbers in boxes relate to sequence in which each tool or template was utilised)
(D1 to D13 represent different problem definition tools; S1-S13 are solution generation tools)

The table crudely summarises the sequence of tools that various different problem solving teams followed while working on real-life problem solving situations. Without wanting to get into too much detail about each element of the table here, the main point that its creation was intended to highlight was that there are many ways to work through the different problem definition and solution generation tools to get to a successful outcome. One of the core conclusions arising from this table is that it really doesn't seem to matter what order we do anything in order to get to where we want to be. One of the reasons this works as a strategy is that the whole TRIZ/Systematic Innovation toolkit has been designed to be 'self-correcting'. One of the reasons this in turn has been possible is that evolution of all systems is convergent and so sooner or later different start points will inevitably have to converge on similar ends.

Telling people that 'it really doesn't matter what order you do things' can very easily be interpreted as 'this is the same as normal random problem solving'. Clearly that is not the intended message, important though it is.

At the root of the problem here is a contradiction between the highly non-linear way that the brain works and the desire to create a 'systematic' and therefore reproducible process. That contradiction represents the focus of this article; how to allow problem solvers to be simultaneously linear and non-linear.

A good first step to solving the problem is to get some data. As such, Table 1 was prepared to represent some kind of data pool. Diving into this pool pretty swiftly reveals a number of patterns that repeat no matter how random the sequence of tools used might appear.

The first of these patterns suggests – fairly obviously – that prior to generating solutions, there needs to be at least some kind of focus on problem definition. The second is less obvious, but relates to the well-known pattern of convergence and divergence in the problem solving process – Figure 1.

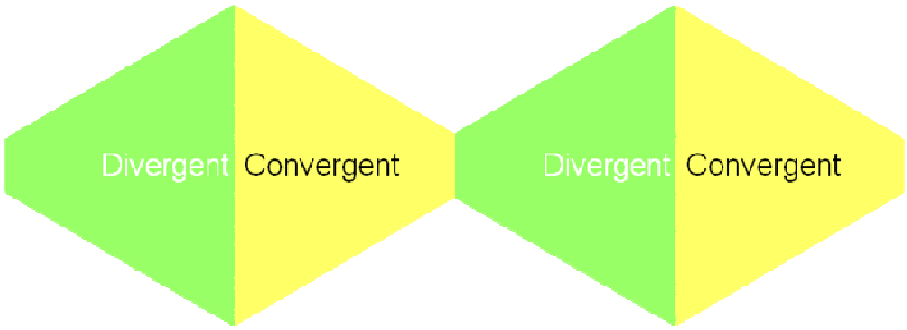


Figure 1: Successive Patterns Of Divergence And Convergence In Problem Solving

Typically, at least two cycles of divergence and convergence can be observed in any given problem situation; the first associated with mapping possible problems (divergence), then deciding which is the 'best' one to try and solve (convergence), then a second cycle occurs in which multiple possible solutions are generated (divergence), then ranked (convergence) in order to identify the final 'best' solution. Figure 1 shows two of these divergent-convergent cycles as some kind of default. In practice, there is no real limit on how many cycles might follow one another. The general rule, however, irrespective of how many cycles there are – or even if they are definition or solution generation cycles – is that a period of convergence logically follows from a period of divergence.

While there are exceptions to this (one or two quite important – as we will see later), it seems to represent at least some kind of a start point for a 'systematic' problem solving scheme. Assuming that it is for a moment, Figure 2 makes a first attempt to plot the various tools found in and around the Systematic Innovation toolkit into the different parts of each of the problem definition and solution generation cycles.

An important thing to remember when looking at this picture is that its content has been personally derived for this author. Of course, the moment anyone tries to fit anything into a pigeon-hole – as we're undoubtedly doing here – someone else will come along and say that something is 'in the wrong box'. The point when this happens is that there is no such thing as right or wrong in these cases. More important is that everyone can make their

own version of Figure 2, inserting into the framework the various different tools and strategies they use at any given point in their own way of problem solving.

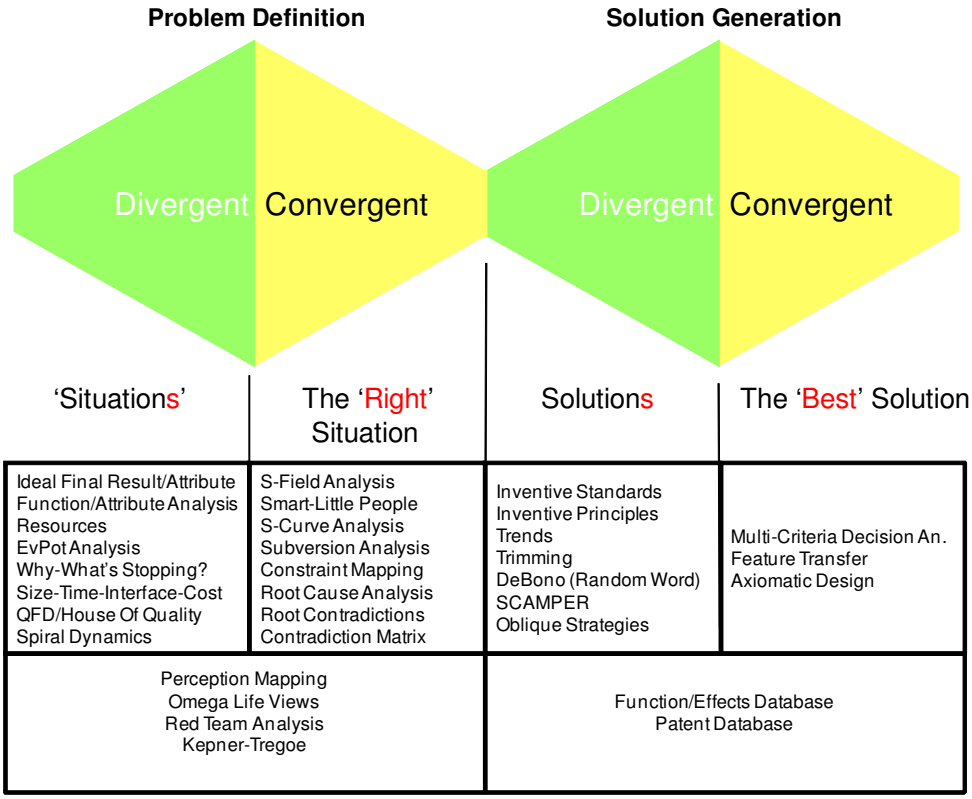


Figure 2: Mapping SI Tools To Divergent And Convergent Problem Solving Phases

As can be seen, some of the tools contain both divergent and convergent phases. A good example of this comes with the Perception Mapping tool, where users are first expected to list out as many perceptions about a situation as possible (divergent), and then, using the 'leads to' analysis and search for loops, collectors and chains, identify which perceptions from the list are more important than others (convergent).

Taking the theme of this being my own personal way of using the different tools, the Figure 2 framework is something we've been experimenting with at the end of public workshops – putting up on the screen a blank version of the template and asking delegates to individually populate the structure with tools they already use and then ones they learned on the workshop that they might consider adding to their portfolio.

What will happen if everyone does this is that they will have designed their own problem solving process map. Moreover, assuming there is more than one tool listed in each half of the cycle, you will have given yourself a menu of possible options to try at any step in the overall divergent-convergent-divergent-convergent cycle. In theory, then, we should all have found our own roadmap for solving the linear *and* non-linear contradiction.

We can do an even better job here if we also bear in mind a couple of additional thoughts:

1) Looking at Table 1, it is evident that not every problem started with the team in problem definition mode. A majority of people find themselves happier in 'solution generation' mode than in problem definition mode. There are always dangers in succumbing to this desire, of course, but providing we keep in mind the fact that even if we don't generate an acceptable answer, we can always revert back into

one of the problem definition tools. From personal experience, I know, for example, that I am often tempted to jump straight onto a patent database to find an off-the-shelf solution, or to jump into the Trends part of the Systematic Innovation method in order to identify jumps that haven't been made yet. These kinds of shortcut can often work because they in effect reverse the sequence of the problem definition and solution generation cycles. Exploiting a previously untapped trend jump, for example, is in effect saying 'here is an answer, now go and work out what problem you just solved'. For many people, it is more often than not easier to do things this way around.

2) The Reference 1 paper was a deliberate criticism of ARIZ. While the intentions of the numerous ARIZ designers have undoubtedly been honourable, besides the fact that the process fails to handle the linear-non-linear contradiction, it also fundamentally fails to recognize the twin divergent-convergent problem definition and solution generation cycles. Take a look at the first step of ARIZ: 'Evaluate the initial situation. Construct the hierarchy of the system (or phase plan of the process). Locate the 'sore point' of the system or process'. Anything but a divergent look at the problem situation. ARIZ, in other words, immediately assumes that the user is in a position to identify the 'sore point' – a very convergent activity. One, in fact, that gives the user very little scope to explore whether they might be looking at anything like the 'right' problem.

Ultimately, though, whether you personally are someone sitting at either the linear or the non-linear end of the problem solving spectrum, our overall recommendation here is that there is a third way. You third way – your way of solving the contradiction in other words – is exactly that. It is and has to be yours. The Figure 2 framework, once you complete your version of it, is your way of finding what it might look like.

References

1) Systematic Innovation e-zine, 'Why ARIZ And Other Schemes Don't Work', Issue 55, October 2006.
2) Mann, D.L., 'The Problem With ARIZ And Other Innovation Processes…. And What We Can Do About It', paper (almost!) presented at 2007, Mexico TRIZ Conference, Monterrey, October 2007.

Solving Software Contradictions

Many software contradictions are easy to resolve. So easy in fact that most programmers aren't aware they've done it. In keeping with the important idea of 'contradiction chains', (Reference 1) however, one of the things we know about resolving trade-offs and compromises is that pretty soon after you've solved one, along comes the next. This article is about a fairly typical contradiction chain to be found in the IT world, and the significance of the new contradictions emerging at the end of the chain.

Figure 1 is a screenshot from the latest 2007 Microsoft Word software. It represents one of the simplest ways to solve a contradiction. The problem being solved in this case is that we want the user to be able to access one of four different page alignment options. The resolution comes very simply by presenting the user with a selection menu so that, at the click of a mouse they can have whatever alignment they want.

Figure 1: Solving The 'I Want A *And* B *And* C' Contradiction

This kind of solution happens so often it has become part of the standard way in which software is designed. We can see the resolution of the contradiction as an example of the Principle 1, Segmentation strategy.

Already clearly with us, the new contradiction that emerges soon after this first one gets solved involves the growing lack of available screen space to present the user with all the different options available. The solution to this contradiction has also entered the realm of 'obvious' thanks to thousands and thousands of examples. Figure 2 shows another one from Word 2007:

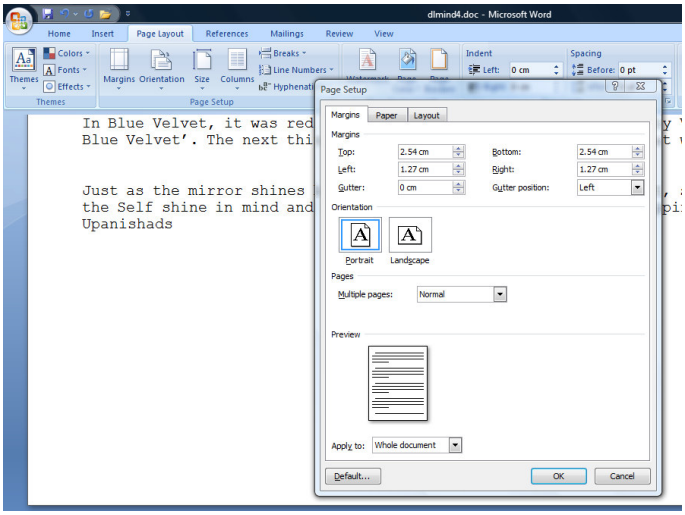


Figure 2: Solving The 'I Want A, B And C' Versus Screen Space Contradiction

What is happening here is that there are so many ways in which the user can alter the page layout they want, the different options get nested, so that they only become visible as and when a change is requested. Fairly obviously, we can see this as an example of a Principle 7, Nested Doll strategy. In the Figure 2 screenshot, in fact, there are multiple

levels of nesting taking place – having opened the 'page layout' option, we are further presented with three other nested options to alter margins, paper or layout.

Herein then, lies the root of the next contradiction. One, as it turns out that Microsoft have largely failed to solve at this point in time. The new problem (and perhaps you have experienced it) is that there are now often so many nested options, you can never remember where the one you want is. When you find yourself dropping down multiple menus to find where the 'insert footnote' function is, for example, you are caught in the middle of this contradiction: so many options that you can't remember how to find them.

When we reach this contradiction, we have just hit the top of the increasing-decreasing complexity curve. A version of this is illustrated in Figure 3.

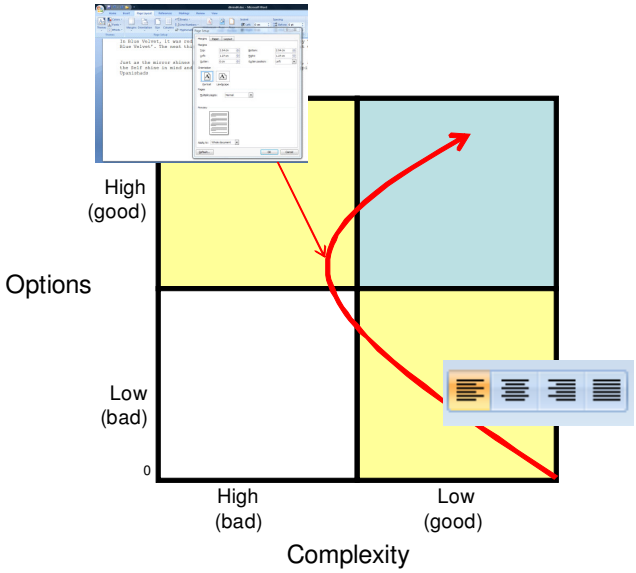


Figure 3: Increasing-Decreasing Complexity Curve For The Software Options Contradiction

Where we'd like to get to when we reach this contradiction is the blue box in the Figure – the place where the user gets all of the selection options that they want, but without any of the complexity. This is a difficult contradiction to solve, and Microsoft aren't the only ones to not solve it. The difficulty is that somehow the software needs to acquire enough intelligence to be able to anticipate what the user intends to do.

Most likely, the required strategy necessary to solve this anticipation problem is Principle 25, Self-Service. If you ever suffered the Microsoft talking paperclip and his annoying 'I see you're writing a letter' inanities, what you were looking at was an early attempt at the required intelligence. Alas, all this 'feature' was doing was making an assumption that anyone writing the word 'Dear' at the start of a sentence was inevitably starting a letter. Not a bad assumption, of course, but – and here is a really difficult paradox – if the software gets it wrong even once, the user somehow makes the connection that the software is not just dumb, but annoyingly so. This is a problem we can also see in the speech recognition software arena. Speech recognition algorithms are presently nudging the 99% accuracy level on the standard tests. And yet, how many of you actually use the speech recognition feature on your mobile phone? Chances are none. Maybe you tried it a couple of times, but after you got tired of repeating the word 'home' two dozen times, you gave up and assumed that the algorithm 'didn't work'. Here is another situation where 99% accuracy isn't good enough.

The root of the problem this time is that in order to become intelligent, the software has to 'learn' the personal quirks and foibles of each individual user. But then no user wants to have to spend any time teaching the software. Figure 4 shows how we might map this new contradiction onto the software contradiction matrix:

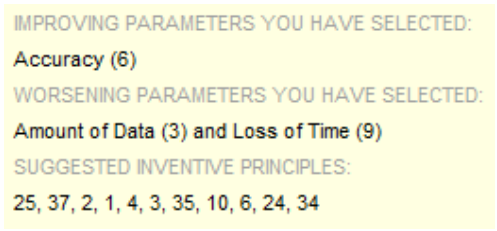


Figure 4: Mapping The Intelligence-Versus-Time/Data Contradiction

What the Matrix is telling us here is that, even though Microsoft haven't yet got any solutions to the contradiction, others have.

A recent example – using Principle 10, Prior Action – is one we quite like. It involves installing intelligence gathering capability into a piece of the software before the user knows that it is there. What this allows the software to do is 'learn' how the user does things (or their speech patterns in the case of a voice recognition algorithm) while sitting in the background. Then, when the software has learned enough, the user can be given an option to turn on (or more likely, purchase) an 'intelligence' add-on. One that doesn't require any time spent training, because the training has already been done.

Naturally, there are still some 'yes, buts..' with solutions like this. Of course, what those yes, buts mean is that we have found the next contradiction in the great chain. And so the game will move forward once more.

Reference

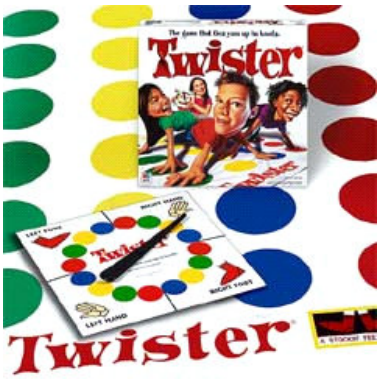
1) Mann, D.L., 'Contradiction Chains', TRIZ Journal, January 2000.

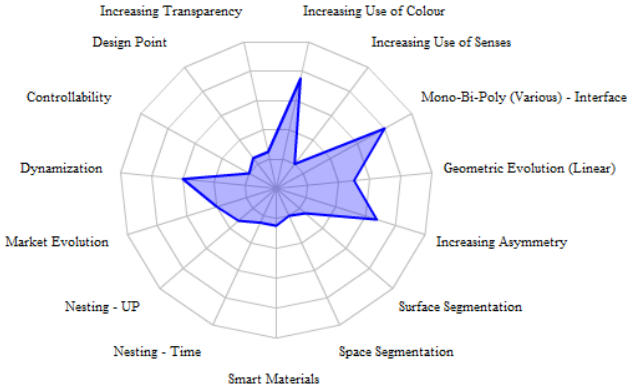
Humour – Twister

With Christmas heading towards many readers, it is time to think about too much food, giving presents and annoying party games. For those growing up in the 70s, Twister was probably high on the list of those games.

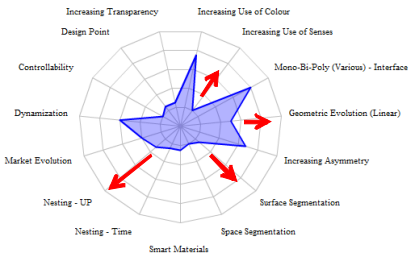
For those (fortunate enough!) to have never been on the receiving end of the Twister experience, the basic idea is very simple. First lay a big sheet on the ground. The sheet contains a number of different coloured circles. Next spin a pointer. The pointer will tell a person whether to put their left or right hand or foot onto a certain coloured circle. Then, err, well, that's about it…

Or rather that was it until some distorted minds began evolving the game. Here's what they might have seen if they'd used TRIZ to help do the job:





And here are some of the recent innovations to the game and the evolutionary jumps they represent:



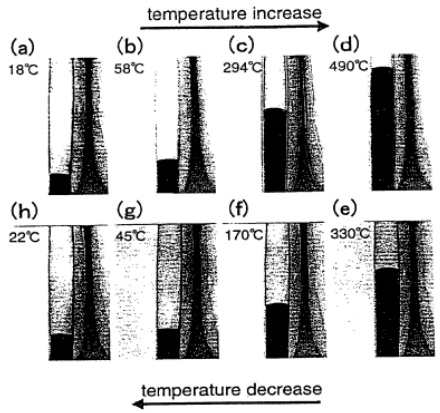
Personally, I've got my fingers crossed hoping that someone sees fit to make a his-and-hers pajama version of the game. Preferably within the next three weeks as I still haven't started my gift shopping.

Patent of the Month - Light-Harvesting Material/Nano-Thermometer

Joint honours for our Patent of the Month this month. Both take us deep into nano-engineering territory. The first patent concerns a novel nano-scale thermometer; the second an important extension of earlier work on light harvesting materials. We'll start with the nano-thermometer:

As the name suggests, the Japanese National Institute For Materials Science inventors of US7,291,299, granted on November 6, have successfully derived a uniquely small temperature measurement system:

A novel nano thermometer, which can be used for temperature measurement of a wide temperature range, in a micrometer size environment, and a method for producing the same. The nano thermometer is a carbon nanotube filled with a continuous columnar gallium, which enables measurement of environmental temperature by length change of the columnar gallium, and is produced by mixing Ga.sub.2O.sub.3 powder and carbon powder uniformly, and performing heat treatment for this mixed powder at a temperature range of 1200 to 1400.degree. C. under an inert gas flow.



The invention is important because as engineers seek to design systems at smaller and smaller size scales the limiting factor on their ability is very often the inability to adequately understand or control what is happening at the small sizes. Engineering at the micron and smaller scales definitely benefits from being able to measure what is going on at the nano-scale. And, thanks to the uncovering of yet another use of carbon nano-tubes (is there anything they can't be used to do?), this is precisely what this invention now offers.

Rather than offering any tangible example of a contradiction being solved, this is very definitely one of those problems where, although it is clear what we want to improve (measurement of temperature), the thing that is stopping us from achieving what we want is we don't know how to do it. As such the invention represents a new entry in our Attribute Database. How to measure temperature at the nano-scale? Answer by placing gallium inside a carbon nano-tube. The reason Gallium was chosen, according to the inventors is because the element has one of the longest liquid ranges of any metal (30 to 2,403degC), thus making it suitable for measuring a very wide range of temperatures. That being said, no doubt we can expect to see a contradiction being solved in the future in order to get the measurement range down below 30 degrees! As it is, what we have here is an important Level 4 invention.

Our second patent, being a follow-on to an earlier fundamental invention, takes us into richer territory as far as contradiction solving is concerned. US7,291,727, was also

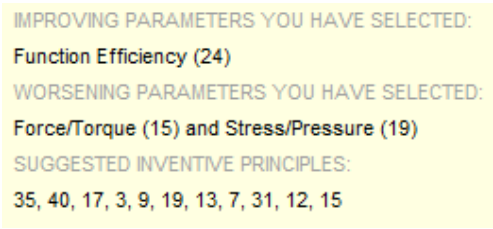
granted on November 6, this time to inventors at Kent State University in the US. The invention concerns the improvement of light harvesting materials – another important area in terms of potentially making a positive difference to the world. Or, as described by the inventors in their disclosure:

In the long term, solar energy is the only source of renewable energy that has the capacity to fill humanity's technological needs. A grand challenge is to convert solar energy into green electric energy in an inexpensive and efficient way. Crystalline silicon photovoltaic cells, though efficient, are too expensive to compete with primary fossil energy. Organic photovoltaic (OPV) technology would hold the promise for cost reduction since the OPV materials are potentially cheap, easy to process, and capable of being deposited on flexible substrates such as plastics and bending, where their inorganic competitors e.g. crystalline silicon would crack.

New OPV materials able to efficiently absorb sunlight and new approaches based on nanostructured architectures holds the potential to revolutionize the technology used to produce solar electricity; however the availability of such new materials with tailored properties has undoubtedly posed a bottleneck to the OPV technology. A breakthrough of new material development is urgently needed to boost the feasibility and prevalence of OPV technology. Currently widely used OPV materials, e.g. polycrystalline Cu phthalocyanine, suffer from the scattering of electron/exciton between small crystal grain boundaries in which random arrangement of molecules results in poor charge mobility. The existing grain boundaries and defects act as deep traps that dramatically reduce the charge mobility. In addition, polycrystalline materials are intrinsically inhomogeneous. The attainment of large defect-free single crystals or single crystalline film of large area of either inorganic (e.g. silicon) or organic molecules is difficult and costly.

A challenge for OPV, with the possibility of very significant cost reduction, is to make them in desired macroscopic order to improve charge transportation etc. Discotic liquid crystals (LCs) capable of being homeotropically aligned (i.e. the columns formed by intermolecular strong stack are perpendicular to the electrode surface) would be a desirable candidate to meet the challenge since they can form ordered nanostructures at macroscopic scale for photovoltaic application. Unfortunately, the preferable homeotropic-alignment of discotic LCs, especially those having large conjugated systems, is difficult to achieve due to their high viscosity and poor affinity to substrates, as compared to the well established technologies for their calamitic counterparts in the display industry.

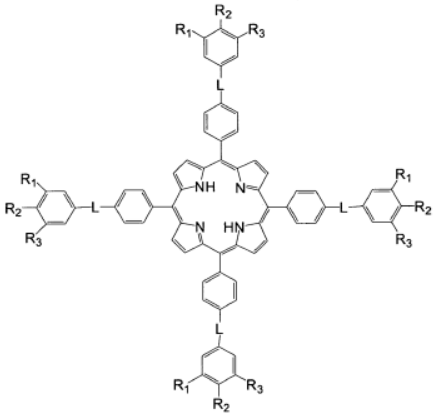
Does that last paragraph sound like there might be a contradiction? According to us, there is, and it looks like this:



Which seems to map pretty nicely to the strategies employed to create the main inventive steps of the patent. This again from the disclosure:

The present porphyrin molecules can be aligned into an ordered architecture, in which the columns formed by intermolecular .pi.-.pi. stacks are spontaneously perpendicular or parallel on the surface, i.e. homeotropic alignment or homogenous alignment. The ordered aligned architecture, which is stable, can excellently enhance the charge carrier mobility, and thus can dramatically improve the light induced electric generation. The intermolecular interaction between discotic mesogens might mainly come from 1) .pi. conjugated, core-core attraction, and 2) hydrophobic interaction between the flexible chains.

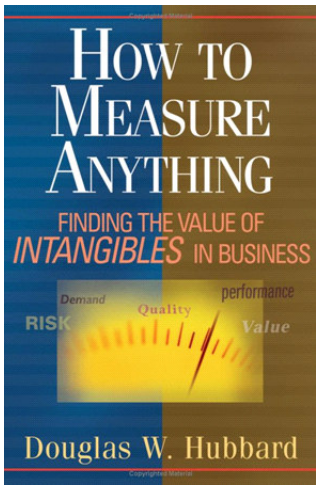
Pretty good illustrations of mainly Principle 12, Equi-potentiality, with definite elements of Principles 35C, and 9. While our chemistry isn't good enough to understand what is happening or why it happens at any greater depth, here is a pretty picture of the resulting chemical structure that forms the basis of Claim 1 of the patent:



Assuming the inventors have done what the disclosure says they've done, what we have here is another strong Level 4 invention candidate.

Best of the Month – How To Measure Anything

Someone, somewhere already solved your measurement problem. That seems to be the starting premise for our book recommendation this month. 'How To Measure Anything: Finding The Value Of Intangibles In Business' by Doug Hubbard very definitely begins to restore our faith that there is some interesting stuff happening out there in management land following several months of bleak desert.



As suggested by the title, the book also makes some fairly strong claims concerning creating an ability to literally measure 'anything'. If these claims appear to run counter to both most peoples' common sense, and to W Edwards Deming's oft quoted suggestion that the most important numbers are 'unknown and unknowable', the resolution to the contradiction comes through Hubbard's insightful re-definition of the word 'measurement'. Actually, the re-definition doesn't come from Hubbard at all, but rather from Claude Shannon, the father of Information Theory. As far back as 1948, Shannon defined 'information' as '*uncertainty reduction in a signal*'. That insight is behind just about everything that has happened in the ICT and system thinking world ever since. Hubbard's new insight is that 'measurement' – being first and foremost 'information' – is also fundamentally about uncertainty reduction.

By re-defining measurement in this way, Hubbard makes a deliberate attempt to break the default connection that many people possess between 'measurement' and some kind of quantified number. A series of big ideas stream out once the connection is broken. Sure, for example, it is very difficult to 'measure' how many customers will buy a new product. Or risk the company is taking in launching the product in the first place. Or how many employees will buy into a new quality initiative. Or staff morale. Or any other fuzzy and seemingly intangible thing. We perceive these things to be difficult (or 'impossible') to 'measure' if we imagine that we are going to end up with a number. But if we think about those issues – serious business success factors everyone – as things where we currently have a high level of uncertainty, then Hubbard convincingly argues, anything we can do to reduce that uncertainty should be seen as a valuable business thing to do.

The whole of the book essentially builds from this insight and premise. Several very elegant things emerge. Not least of which is that we can adapt and adopt a number of sophisticated statistical techniques – the book has sections on Random Sampling, Monte

Carlo methods, Bayesian statistics, Rasch and Lens techniques – and use them without worrying about whether we have a degree in mathematics or not.

A second big idea underpinning the book is that humans, despite being prone to some characteristic biases, are actually pretty good at parallel processing lots of complex and fuzzy data and making sense out of it. From this assumption, Hubbard makes the point that once a person is 'calibrated' and is aware of the various biases, they are pretty well placed to make sensible 'measurements' (i.e. uncertainty reductions) in some very, very fuzzy problem situations. Furthermore, Hubbard argues, because humans are far better able to take into account past and present problem contexts than any mathematical method is able to do, that once calibrated, most people are far more able to make sensible measurements than even the best, most sophisticated mathematical model.

All that being said, Hubbard is also very pragmatic in terms of recognizing what computers are far better than humans at doing, and that is number crunching. At relevant points throughout the book, therefore, there are excellent links to Excel macros (some of which can be found on the website built to accompany the book) that can do any of the mathematical heavy lifting.

Although the book never uses the word 'TRIZ' anywhere, it is peppered throughout with an awful lot of thinking consistent with the underlying philosophy of TRIZ. Firstly is the aforementioned 'someone, somewhere already solved…' idea (which Hubbard expresses very nicely as a suggestion that unless your aim is to win a Nobel prize for Economics, someone out there really has already been thinking about ways to measure even the most intractable intangible). Second up is a direct connection to 'function': measurements should only be made where and when they serve a useful function. If the measurement is not there to support a business decision, Hubbard concludes, and if it is not going to influence that decision in any way, then there is absolutely no point or value in making the measurement. From here, the discussion moves into the territory of 'ideality', with Hubbard building on the function idea by defining the term 'Expected Value Of Perfect Information (EVPI)'. The EVPI turns out to be a simple way of establishing how much effort should be put into the uncertainty reduction task; if even a perfect 'measurement' has little added value, then clearly, in Hubbard's terms, there is little value in spending a lot of resource effort to reach 'perfect'. The book compellingly argues at this point that the level of uncertainty reduction achievable in any problem is strongly biased in such a way that an awful lot of uncertainty reduction can be achieved in the first potentially crude attempts, while later on even small incremental reductions in uncertainty can become very expensive. Measurement pareto in so many words.

All in all, then, here is a book that anyone involved in measuring anything ought to have on their bookshelf. Not always an easy read (Hubbard himself recommends skipping certain parts of the book for readers with an aversion to mathematics), but at the very least this has to be a strong contender for the best book on statistics ever. Certainly the best the team here has ever seen. At the most, it is quite possibly a book that will cause an awful lot of re-thinking about the whole measurement subject. And all that coming from a simple re-definition of what 'measurement' means.

Conference Report – A Tale Of Two Cities – Birmingham & Merida

Well, we missed the ETRIA TRIZ conference yet again, but hopefully it was worthwhile. We were busy travelling to and then presenting at the CANIETI annual conference in Merida, Mexico when we were supposed to have been at the TRIZ conference in Frankfurt. For those that don't know, CANIETI is a Mexican National trade association for the electronics and ICT sectors. Their annual convention is such a big-time affair these days that Government ministers come along to hear and speak. It's also a place where all the high and mighty of Mexican industry turns up – so we got to shake hands with not only Economics Ministers but the General Managers of Intel, HP, Philips and a bunch of other big hitters.

All in all, the conference (and our presentation at it) was attended by well over a hundred people. Our theme (as per invitation request) was to try and dispel the myth that 'innovation' is only for big companies with very deep pockets. Inevitably, TRIZ and Systematic Innovation played a big role in the discussion. As did several case studies from Indian and Chinese companies using the method. I don't speak an awful lot of Spanish, but listening to the other presenters, it seems like a nerve was hit with these two words. They were liberally peppered through just about every other presentation over the course of the three days. Mexico is already, it seems, beginning to lose lots of work to both nations and the gist of what I was hearing and seeing was that the crisis is happening right now, and companies need to do something right now.

Talking of crisis, despite coming across as a vaguely cynical attempt to sell more energy-efficient light bulbs, the keynote presentation from Philips highlighted the staggering (to these ears anyway) fact that Mexico City generates 1% of the world's greenhouse gases and pollutants. That's the City. As opposed to the country. Wow.

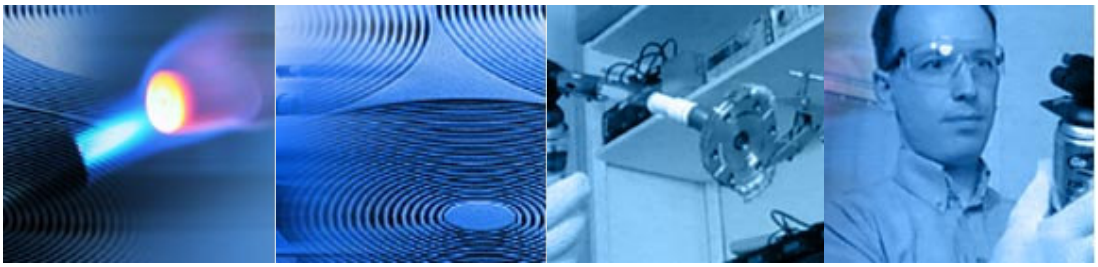
The Merida conference happened from the 8th to 10th of the month. Back in the UK, the 15th saw our Innovation Owner Network launch event in Birmingham. The reason we picked this event as a good launch pad was that we were part of a bigger 'Festival Of Innovation'. The event was held at the National Exhibition Centre in Birmingham. Key word: National – i.e. it is a big venue.

Enter comparisons between chalk and cheese. Only think Merida and Birmingham. Despite being in a venue the size of a small town, there were few if any signs of life in the Birmingham event. Actually, the building volume to people ratio if anything made things feel worse than they actually were. Nevertheless, while we weren't quite experiencing tumbleweeds rolling across the hall, there was little of note happening. Fortunately, the ION event did rather better than the average for the rest of the event. Thanks in no small part to very generous speaker contributions from senior P&G and Intel people, we managed to attract over 80 signed-up delegates over the course of the day. That's the good news. The slightly more depressing news is that there was little if any opportunity to be shaking hands with the high and mighty company influencers as had been the case in Mexico.

Maybe it's because the UK hasn't quite got the same level of work moving overseas that Mexico is seeing. Or maybe it's because we are, but the connection between lost jobs and the need for innovation hasn't been made sufficiently well yet. Either way, something is going to have to change if the UK isn't going to turn into a History Theme Park in the coming years. Or maybe that's where the innovation focus needs to be positioned? Hmm. Pass me my Henry VIII costume…

Investments – Oxsensis Extreme Temperature Sensor

UK-based company,Oxsensis, develops fibre-optic instrumentation for precision controls in super harsh environments such as aero engines, power-generating gas turbines and ultimately automotive applications. It is poised to revolutionise instrumentation in these sectors having recently announced the development of the world's only commercial temperature and pressure sensors capable of functioning at over 1000degC, a temperature at which no such sensor has been capable of operating to date.



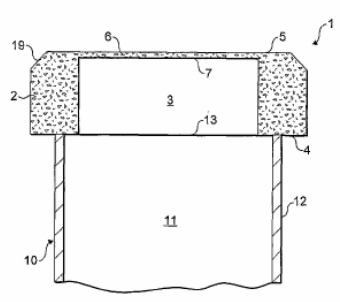
Oxsensis is a spin-out from one of the UK's most prestigious research establishments, STFC Rutherford Appleton Laboratory in Oxfordshire. The company was formed in 2003. The company is backed by a cluster of corporate and individual investors. It has already won numerous awards including the Daily Telegraph / Carbon Trust Innovation Award 2007. The company currently lists Rolls-Royce (the aero-engine business always has high temperature measurement problems!) and Siemens as partners. Neither of which can be considered a bad launch pad.

The company designs high temperature optical and opto-mechanical structures using materials such as sapphire and silicon, including membranes, waveguides and fluorescence structures. The novel technology was initially developed at the Central Microstructure Facility of the Laboratory.

The company was in the news recently having just received over £4M in funding to transition the high temperature sensing technology to full production. The company is quoted as saying that first deliveries will begin in mid 2008.

High temperature is closely correlated with high efficiency in a large number of power industry applications. One of the main limits on temperature increase has been the inability to achieve suitably robust control measurements at the elevated temperatures. Oxsensis looks set to move the state-of-the-art, and, in so doing, open themselves a considerable market opportunity.

An optical sensor having a sapphire body is disclosed. A hollow in the sapphire body defines a surface which is used as a surface of a Fabry-Perot cavity. Interferometry is used to detect changes in the length of the Fabry-Perot cavity, and hence changes in, for example, the temperature or pressure of an environment in which the sensor is placed.



Oxsensis patent: WO2005098385

Generational Cycles – PT Cruiser

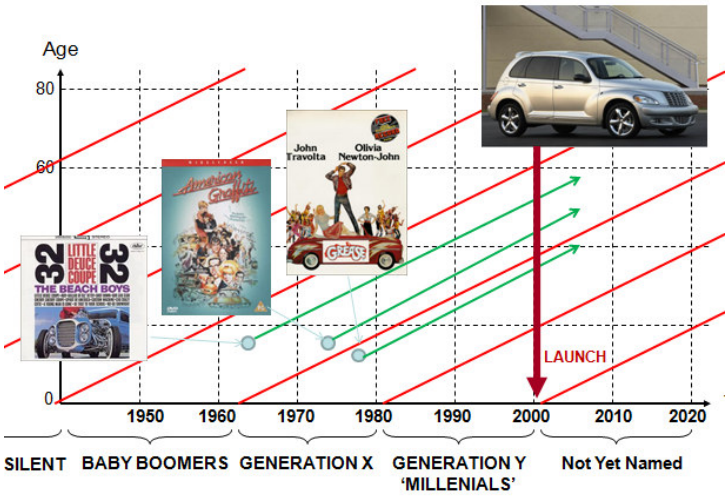
The highly successful PT Cruiser from Chrysler has now sold over a million units since its launch in 2000. Not bad for what was always seen by the company as something of a niche product.

The company's published market research suggested that the retro-appearance car would sell to a wide demographic. According to published figures, that appears to be sort of true. Although it has to be said that the apparently broad age range of vehicle owners actually masks the presence of two distinct spikes; (Baby Boomer) Men in their 40s and 50s, and (Early Generation X) Women in their mid-to-late 30s

Neither group was what Chrysler had predicted. The automaker, and indeed most auto writers, thought the funky looking 4-door would become a favorite of the young. The basic idea was that they would festoon it with aftermarket goodies as they did those little 'Fast and Furious' screamers from Japan. Not so, to the extent that three years after the launch of the car, only 4% of customers were in the under 30 age group. Instead, and most surprisingly, it was the later-30s women who fell for the PT Cruiser in the biggest way.

So why did Chrysler get their predictions so wrong? And why did all the 'wrong' people end up making the car such a big success – big enough at least that GM finally felt they had to get into the market with their far less successful 'Me-Too' Cruiser.

How about this as an explanation:



The sale of 'retro' products like the PT Cruiser depends absolutely on the prior cultural priming of the customer. For the Boomer males the car turns out to allow an opportunity to re-live the 60s 'Hot Rod' period; for the women, our guess is that Grease – one of the absolute (girly!) iconic films of the 70s – is the root source of the priming.

SYSTEM ATIC INNOVAT ION

Biology – Winged Snail

The winged snail Clione limacina lives in oceans of temperate latitudes and in the Arctic. Together with numerous other animal species drifting in the current they constitute the zooplankton. The wing-like protrusions that have given the snails their name enable them to move relative to the current and hence locate local prey. It feeds exclusively on another species of winged snail, Limacina helicina, which, in turn, consumes microalgae. The extreme degree of diet specialisation and the often uneven distribution of predator and prey in the ocean can lead to extended periods of starvation.



Investigators at the Alfred Wegener Institute for Polar and Marine Research recently reported that the snail is able to go without food for a whole year. The team have demonstrated that the snail's ability to survive extended periods without nutrition is based on a combination of an extremely low metabolic rate, the breakdown of body cells and the utilisation of special lipids. The snail is capable of surviving following the consumption of over 80% of its own body mass. Although other life-forms are known to possess a similar self-consumption strategy, typical capabilities are around 20% of body mass – as such the winged snail capability must be viewed as a unique and radical advance.

Laboratory investigations at the Institute have shown that Clione synthesises substantial amounts of rare so-called ether lipids. "We were able to demonstrate that these ether lipids function as a long-term energy depot. During periods of starvation, they are metabolised much more slowly than the triacylglycerols which occur more frequently in nature", explains Dr Marco Böer. "In addition to that, the Arctic winged snail has by far the lowest metabolic activity of all marine invertebrates."

Not only are the high-energy lipids depleted during extended periods of starvation, but the snails also begin consuming their own body mass, shrinking in the process. As soon as the vegetarian sibling Limacina is available again, Clione takes advantage of the food and restocks its reserves.

Further investigations have revealed that ether lipids are embedded as droplets in the skin of the animals. In this location, these specialised lipids probably function in chemical defence against parasites. Similarly, the snail produces other chemical compounds, rare in the animal kingdom, to protect against predation. Pteroenone represents one of the molecules turning the snail into a distasteful bite for fish and other predators.

The main reason for featuring the winged snail in this article, though, is the phenomenal capability to survive for long periods without food. From a contradiction perspective, the problem concerns the desire to live for long periods, and what traditionally prevents it is the potentially long term absence of food. The best way to map this problem is:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Duration of Action of Moving Object (12) and Reliability/Robustness (35)

WORSENING PARAMETERS YOU HAVE SELECTED:

Amount of Substance (10)

SUGGESTED INVENTIVE PRINCIPLES:

3, 40, 17, 35, 6, 10, 13, 28, 31, 5, 25, 4, 2

The snail resolves the contradiction through a combination of a very low metabolic rate (Principle 35, Parameter Change and/or Principle 2, Taking Out), consumption of body cells (Principle 25, Self-Service) and the use of the special high energy-density lipids (Principles 3, Local Quality and 35, Parameter Changes again – noting the importance when using this Principle of crossing some kind of non-linear phase boundary).

Short Thort

From A Spark To A Flame:

"It would be great if the entire film came all at once.
But it comes, for me, in fragments. That first fragment is like the Rosetta Stone.
It's the piece of the puzzle that indicates all the rest. It's a hopeful puzzle piece.
In Blue Velvet, it was red lips, green lawns, and the song – Bobby Vinton's version of Blue Velvet'. The next thing was an ear lying in a field. And that was it."
Film Director David Lynch

"It all began with an experiment; what would happen if you played a grand piano through a Leslie amplifier."
Richard Wright, Pink Floyd on a recent BBC documentary, explaining how the group's track 'Echoes' came about. The track has a running time of 23:31, it begins with a distinctive series of 'ping's. The noises are the result of the grand piano/Leslie experiment. The track is widely believed to be the thing that transformed the group from a cult to a worldwide phenomenon. It is also widely considered one of Pink Floyd's most ambitious and musically diverse compositions

News

Systematic Innovation (Ireland)

Following the formation of a new off-shoot of the Systematic Innovation family in Ireland, we are pleased to announce our involvement in a number of IP creation and licensing projects in and around the medical devices and infection control arenas. More news as patents get filed.

Sharing Innovation Wisdom

Following the Innovation Owner Network launch event at the Festival Of Innovation in Birmingham (see review in Conference Report section of this issue of the e-zine), we are happy to announce that the first version of the Network website is up and running at www.ion.uk.net. While it is still not certain of how quickly the UK branch of the Network will take-off, we already have plans in hand to create Malaysian and Mexican versions.

Atlanta Innovation & Creativity Conference

Atlanta's first innovation and creativity conference will take place from the 15th to 18th of May, 2008. We will be conducting a half-day Systematic Innovation seminar on the 17th or 18th.

Cologne Tyre Conference

We will also be conducting a seminar at the annual European tyre technology conference. This year's event will be held in Cologne, Germany on the 21st and 22nd of February. Darrell Mann and Paul Filmore will be running the workshop. Dr Filmore has a long history of working with Michelin in and around the Systematic Innovation arena, so hopefully we will be able to present some real case studies.