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In this month's issue:

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Readers' comments and inputs are always welcome.
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The Choice/No-Choice Paradox

A common theme amongst the rash of 'irrational economics' texts doing the rounds at the moment is one examining the often counter-intuitive things that make humans 'happy' or 'unhappy'. Economists seem to love reporting these counter-intuitives, largely I think, because they offer up a whole new tranche of quasi-explanations to the 'why are we so bad at making predictions about the future?' economics question. The general answer to the question, of course, is that top-down economic models of complex systems can never work. The more specific one is that a long time ago, back at the beginnings of economic evolutionary time (think Adam Smith), a bunch of assumptions surrounding the 'rationality' of customers were made, and we're only just beginning to allow ourselves permission to challenge the naivety of some of those assumptions.

One of our favourite economic counter-intuitives involves the question of choice. An economic model built around 'rational' behaviour will typically have built into it the assumption that consumers are happier when they have a greater degree of choice regarding their purchase options. Certainly the FMCG sector has built a large part of its land-of-a-thousand-dances market segmentation around the assumption that if the consumer is happy to choose from a hundred different types of shampoo, they will be even happier if they have one hundred and one to choose from.

Several recent studies have reported the counter-intuitive finding that in actual fact, consumers are often significantly less happy when they are offered more choice. A typical story (thanks Dan Ariely from Predictably Irrational, Reference 1) relates two groups of students, each given a short course in taking black and white photos and then taught how to develop their pictures in the darkroom. Half the people were told that they could pick one of their pictures to be professionally enlarged and developed, which they could then keep. The other half were told to pick two pictures to keep, and that they could change their minds until the minute that the film was sent off. These people had a continual temptation to change their choices, so they had time to consider and reconsider which of their prints were the best.

Later, each participant was asked to rate their level of happiness with their prints. Guess who was happier, those who chose a photo and stuck with it, or those who had flexibility and time to make the perfect selection? As it turned out, the people who could alter their choices were much less happy than the first group.

The principle behind this particular 'counter-intuitive' finding is that when we have to deal with a certain reality, we get used to it and often come to prefer it. But if we think we can change it, we don't force ourselves to cope, so inevitable imperfections—whether in people or in pictures—can drive us to distraction. And the same thing happens with marriage. If we think of marriage as an open market and always have half an eye on other options, we'll be less likely to be happy than if we make our choice (or, in some cultures, have it made for us) and close our eyes to other 'options'.

The point is – at least from a Systematic Innovation perspective – that the whole issue of choice and happiness is such a thorny problem full of 'counter-intuitives' very simply because it is all about a network of conflicts and contradictions. And as such, so long as we try and deal with the problem as one of optimization rather than contradiction-resolution, we'll never really get to grips with delivering better solutions to consumers.

Figure 1 illustrates what we think is the basic high level conflict/contradiction network for the interwoven choice/no-choice, happy-sad story:
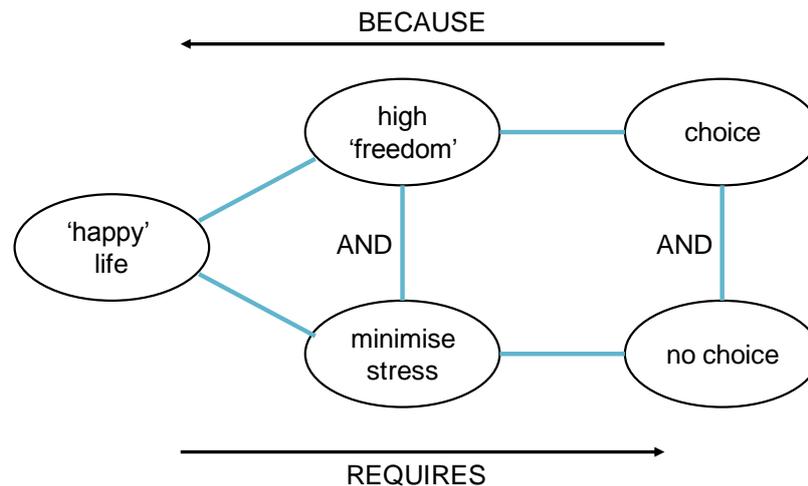
BECREASE ← illustration

BECAUSE

high 'freedom'   choice

'happy' life   AND   AND

minimise stress   no choice

REQUIRES

Figure 1: Choice/No-Choice Contradiction Map

It is probably worth spending a little time exploring the structure of this map and particularly the links between the various statements. The overall format is the usual for the template with the physical contradiction ('we want choice and we don't want choice') on the right hand side. Then, reading the map from right to left: we want choice because we associate choice with freedom, and – in the capitalist, Western mindset at least – we tend to associate freedom as one of the key distinguishing features of society: from the freedom of speech to, in some countries, the freedom to bear arms, freedom is seen as a basic human right.

On the other hand, looking at the bottom part of the Figure, what Dan Ariely and others are increasingly finding is that we actually don't want choice – or rather 'too much' choice – because it can be stressful, and generally speaking, as a species we tend to want to avoid stress.

Finally, on the far left of the Figure, the reason we want both freedom and low stress is because the 'ideal' outcome we're looking for is a happy life. Or rather, according to another behavioural economist, this time Gary Marcus (Reference 2), because 'happiness' is both difficult to define and inherently transient in nature, our actual driver in life is the 'pursuit of happiness'.

Okay, once we have the completed template in front of us, there are a number of things we can do to start tackling the various conflicts and assumptions described therein.

Each of the blue connecting lines represents an assumption. This being the case, it is worth spending some time exploring what those underlying assumptions are. Why, for example, do we assume that freedom requires choice? Or why do we assume that we want choice because we associate it with freedom? Why does too much choice cause stress?

This kind of thinking can quite quickly get us into some quite deep water thinking-wise. Usually whenever this happens an often easier and more fruitful alternative is the adoption of a viewing lens that focuses on the blue connecting lines as contradiction solving opportunities. From the physical contradiction perspective, for example, how can we have 'choice *and* no choice?' Can we separate the two sides of the choice/no-choice spectrum?

We know this is a better question than the typical 'optimization' type questions that traditionally get asked at this point. Nevertheless, we know several organizations for example that still spend an inordinate amount of time trying to find the 'optimal' level of choice to offer consumers. As if there is some kind of magic number.

Instinctively, I think we all know this can't be the case. We merely have to look at examples in our own lives through the lens of the 'optimal choice' lens to know that the answer depends on a variety of factors. Some more visible than others. When my other half is choosing paint colours (or shoes!) she can happily spend hours searching through paint charts and still seemingly never find the 'right' answer, no matter how many hundreds of different shades are on offer. On the other hand, take her into a supermarket for milk and you're in for a suspenseful number of minutes while the trauma of choosing from half a dozen different alternatives is worked through. Sometimes the optimal number of choices (paint, shoes) is high; sometimes it is 'I just wanted milk'.

Solving the contradiction is all about finding ways and means to separate or otherwise allow both choice *and* no-choice to occur. When we're thinking about this particular problem in the context of separation strategies, it is perhaps instructive to include a 'new' separation strategy in with the usual separate in space, time, on condition, etc strategies. This new strategy centres around the potential separation of perception *and* reality: thus 'I want the perception of choice in order to tick the 'freedom' box, but also the reality of limited or no choice in order to tick the 'minimal stress box'.

The human mind is often fickle in these kinds of regard. From a personal perspective, when I'm in a restaurant I haven't been to before, usually with a menu printed in a language I don't recognize, if someone took the liberty of ordering on my behalf without asking what I liked, I would tend to be offended that my freedom to choose rights has been taken from me. If, on the other hand, that same someone talked me through the options and gave me the perception of choice, I am very likely to respond with the (stress relieving) comment, 'whatever you recommend'. In this situation, I've solved the choice/no-choice contradiction by separation of perception and reality. That's 'solved' as in I get both the things that I want and am happy… even if my host chooses a food I end up not liking particularly.

Looking more formally at the contradiction map, and using the Matrix+ software wizard to see how others have solved similar problems, we might get something like the picture shown in Figure 2:
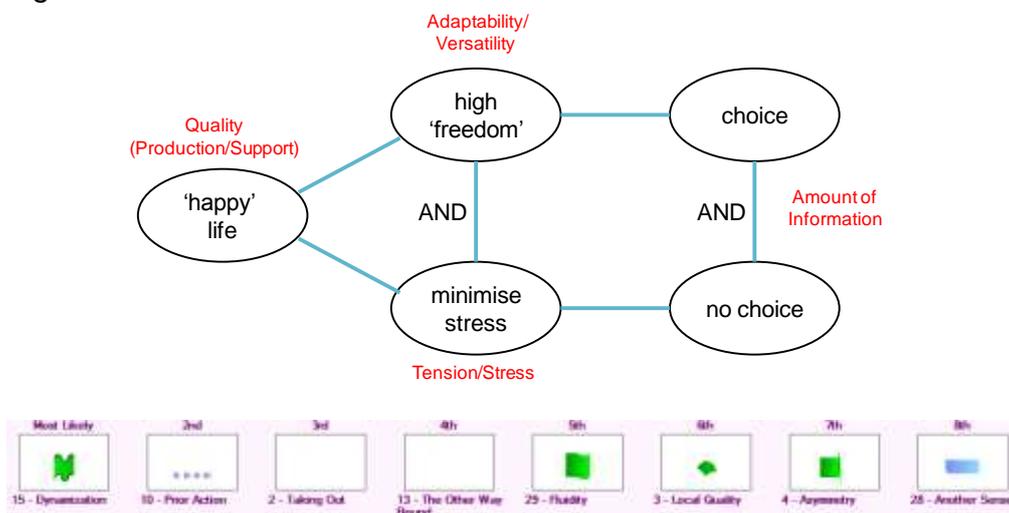

Figure 2: Mapping The Choice/No-Choice Contradiction Onto The (Business) Matrix

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Now we potentially open up a multitude of solution options to not just the physical contradiction part of the map, but also each of the other conflict pairs. While the point of this article is to contain the discussion at a level that says finding a good contradiction is more important than generating a bunch of non-specific solutions, it always provides a better sense of closure if some solution directions are at least hypothesized.

Here, then, are a few immediate thoughts emerging from the list of suggested Inventive Principles shown at the bottom of Figure 2:

15, Dynamics – tune the level of choice to the prevailing mood of the customer (by, for example, tuning in to physiological or other factors that can be feedback to the choice propensity level at a given moment in time) – e.g. Amazon's recommendations list and user-personalised frequency of recommendation emails.

2, Take-Out/Separation – the suite of classic physical contradiction resolution strategies – physically separate the choice activities from the consequence activities; ditto temporally.

10, Prior Action – pre-selection strategies where a customer is asked to make choices at their own convenience, when stresses are known to be low

13, Other Way Around – e.g. paint choice apps that allow the customer to scan a colour they like or wish to coordinate with, and then provide them with just the solutions that match (i.e. the customer in effect has infinite choice at the beginning and ultimately no choice because the system 'decides' what the right matching solution is)

29, Fluidity – e.g. Threadless encourages users to submit their own designs then allow the (fluid) community to vote on best designs; the winners being made into the physical product that again the community can elect to purchase.

4, Asymmetry – on-line car purchase selection algorithms that start with very simple choices ('diesel or petrol') and progressively over a series of questions open up choice menus to greater numbers of options and variants. The basic idea being that once a user of the algorithm has invested time at the beginning, they are inclined to continue investing time (i.e. playing on the 'sunk cost' psychological effect). Also, taking the Threadless example a step further, what eventually happens in these kinds of community-design situations is that eventually a much smaller cohort of influencers emerge – then, for the majority, their 'choices' are in effect made for them by the influencers.

28, Mechanics Substitution/Another Sense – engaging multiple senses in the choice-making part of the process in order to, for example, use scent to trigger memories. Example: supermarkets pump scent of fresh-baked bread into different parts of the store to trigger 'need bread' signals inside shoppers' mind.

We could go on, but hopefully the useful points have already been made. If, however, you feel a need for more choice/no-choice contradiction solving solutions, you might wish to spend a few minutes looking at:
http://www.ted.com/talks/sheena_iyengar_choosing_what_to_choose.html

References

1) Ariely, D., 'Predictably Irrational: The Hidden forces That Shape Our Decisions', HarperCollins, 2008.
2) Marcus, G., 'Kluge: The Haphazard Construction Of The Human Mind', Faber & Faber, 2008.

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Deep Metaphors & 'Meaning' As A System

The book 'Marketing Metaphoria' (Reference 1) offers a compelling insight into an extensive piece of research by the authors into the importance of metaphor in the understanding of consumer behaviour. We first came across the book during the latter stages of our TrenDNA research and, perhaps oddly, in the middle of the China part of the research programme, and the discovery there of a host of what we later described as 'cultural DNA' behaviours (Reference 2). The revealing of these stable and long-held societal patterns first lead us to a search for equivalents in the West, and later to a search for a higher level pattern that would ideally unify the apparent differences between East and West to form what we hoped would be some kind of 'universal' model of human and societal behaviour patterns.

The Zaltman's work – starting primarily in the world of FMCG and a search for better ways to overcome the shortfalls in traditional consumer surveys – couldn't, in many ways, have started from a more different place. And, at first glance, their resulting model couldn't look much more different than the TrenDNA(China) story either. A deeper look at the two models, however, revealed at least one high level similarity: both models were strongly hierarchical. Figure 1 illustrates the basic idea underpinning the 'deep metaphor' aspect of the Marketing Metaphoria hypothesis:
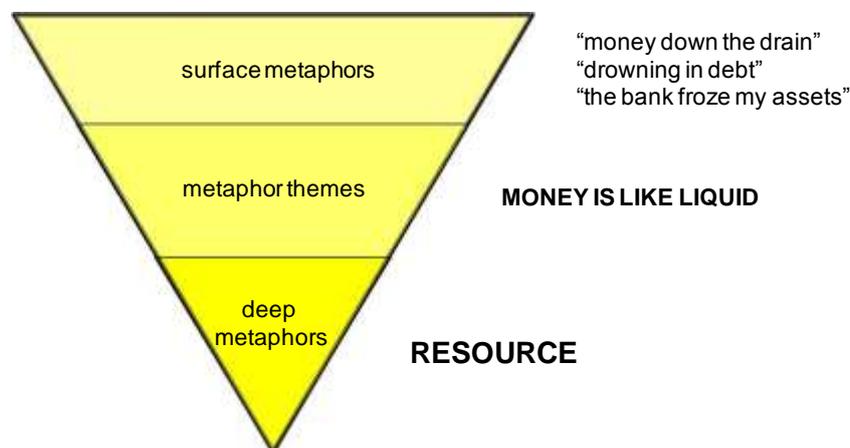

surface metaphors

"money down the drain"
"drowning in debt"
"the bank froze my assets"

metaphor themes

MONEY IS LIKE LIQUID

deep metaphors

RESOURCE

Figure 1: Zaltman Hierarchical Metaphor Model

In simplified terms, the crux of the Metaphoria story is the search for a 'complete' set of the largely unconscious 'deep metaphors' that the Zaltman's claim lay at the roots of all of the myriad metaphors we all of us use in our everyday language. In the end, they found seven. Well, actually, strictly speaking they found more, including four additional ones that they felt were important enough to merit their own brief description in the book, but in reality each of the 'additional' ones seem to us merely as qualifiers to the seven principle deep metaphors, and so we'll stick with seven as the magic number.

Here are the seven, in no particular order of either importance or prevalence:

'**Balance**' – most visible in the Chinese idea of Yin-Yang and their desire to live life according to a 'middle way'

'**Transformation**' – most visible in the form of caterpillar/butterfly images; all about change and changing states or status in life

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'**Journey**' – the idea that life is a journey that we are all on; that we can't always predict the right path and, per the Chinese philosophy, 'finding a way across the river by feeling the stones'

'**Container**' – the idea that we draw boundaries around things, such that they are always either 'inside' or 'outside' the containers we define

'**Connection**' – encompasses feelings of belonging or exclusion, being part of the tribe or not; the 'between' that came to be so significant in the China research – as in 'it's not so much as the things but the relationship *between* the things that drives behaviour'.

'**Resource**' – making the best use of available resources

'**Control**' – the desire to be in control or know who is in control (similar in this regard to your comment about respect for elders)

We could chose at this stage to go no further, and let the potential importance of the Zaltman's findings incubate in your mind. On the other hand, we can proceed with a brief report on what happened after we did the same thing ourselves:

The first connection we actually made was with the seven pillars of the (business and management version) of Systematic Innovation. Initially for no other reason that the number 'seven' was staring out at us and the 'resource' metaphor seemed to make a ready connection to one of the SI pillars. Figure 2 illustrates the outcome of our attempts to find an equivalence between the other six elements of both models:

Figure 2: Alignment Between Zaltman Deep Metaphors & SI Pillars

We used the 'PERFECT' model of the pillars (from Reference 3), and then placed the deep metaphors above the axis and labeled the SI pillars below. Some of the parallels are hopefully obvious, whereas others perhaps require a deeper level of comparison and explanation:

Perfect – is all about the IFR destination of all evolution, and therefore the signpost for any and all evolution journeys

Escape – is all about the ability to break out of psychological inertia and see things from new perspectives in the SI world; in the Zaltman world the 'container' deep metaphor is all about being 'inside' known spaces or 'outside' and exploring the unknown.

Resources – making best use of what exists in and around the system

Function – the means by which apparently dissimilar solutions can be connected; recognise the customer 'wants the function not the solution' and arrange the world's knowledge in terms of function and it becomes possible to connect every functional need with the best means of delivering that function.

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Emergence – the idea, central to the understanding of complex systems, that complex behaviours emerge from small scale events. In the words of the famous butterfly cliché – what innovators should be on the constant look out for are the butterfly wing flaps in one part of the world that create the tornadoes in another part. The connection to the 'transformation' metaphor being that we're looking for the wing flaps that create the desired transformations we want from whatever systems we are responsible for designing. Not to mention the fact that the butterfly is central to the transformation deep metaphor in all of our lives!

Contradiction – is all about finding conflicts and tensions and resolving them… to create balance

Turtles – (always the most (deliberately) troublesome of the PERFECT pillars, some people prefer the terms 'recursion' or 'test') in each case, what Turtles is all about are the repeating patterns and behaviours that ultimately control every kind of system. S-curves, represent an example of a universal pattern of recursive patterns; every system is ultimately controlled by the characteristics of these curves.

Hmm. So much for this view of the world. Hopefully interesting if nothing else: two attempts to uncover 'universal' 'systems' that appear to be converging on the same basic set of ideas.

But then, we thought, if this is all about 'systems', and every system exists to deliver a useful function, what is the function of this 'universal system'? And why seven elements and not the five or six that the Law Of System Completeness would tell us should be present. Hmm again. If nothing else, these kinds of question (and particularly the existence of apparent contradictions) ought to lead us along some potentially interesting new paths.

Often those paths – these days at least – eventually point us in the direction of Edward Matchett and all of his work on 'theory of everything' type unifying models of the world. His biggest insight into the foibles of the human mind is that human systems are all geared towards delivering 'meaning' (Reference 4). Maybe this is what a universal system is design to deliver?

And what would be the essential elements of such a 'meaning-delivery' system? Figure 3 represents a first attempt to map the deep metaphors to the six-element version of the Law of System Completeness:
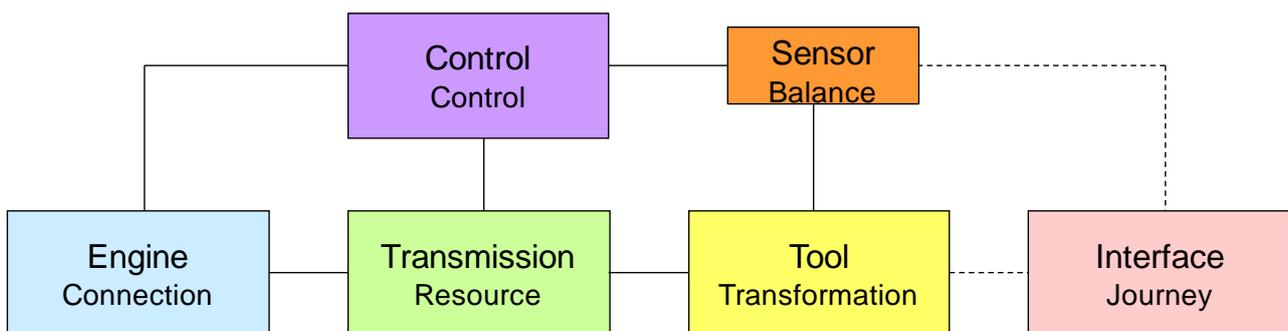

Figure 3: (Six Of The) Deep Metaphors And The Law Of System Completeness

Again, it is probably instructive to explore some of the connections between the metaphors and the various different elements of the Complete System:

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Tool - in the Law, the thing that ultimately delivers the useful function (note: the key word being 'delivers' rather than 'function'). So what is it that delivers 'meaning' in the Matchett worldview? Answer: when we transform ourselves from one state to another.

Engine – the thing that powers the tool ('transformation' in this case) is, we think, all about being able to make the right connections: nothing new under the sun, merely billions of ways of connecting what we know.

Transmission – the thing that connects the engine ('connection engine' in our case) to the tool (transformation) and therefore makes the desired outcome possible – answer: the resources we have available to us.

Control – same in both models: the thing that controls the various interactions between the other elements

Interface – the connection to the outside world that the tool 'acts upon'. What does the 'transformation' 'act upon'? Answer: the overall journey we're all of us on.

Sensor – the means by which we measure how well the tool is acting on the interface, which in the case of our 'meaning system' is all about sensing the tensions and conflicts that exist. i.e. 'balance'.

Okay so six of the deep metaphors line up with the six elements of the Law of System Completeness. That leaves one metaphor over: 'Container'. How might that fit into the Law?

How about Figure 4 as a first clue to a hopefully insightful answer that might just turn out to have a bigger set of implications beyond merely examining the Metaphoria model:
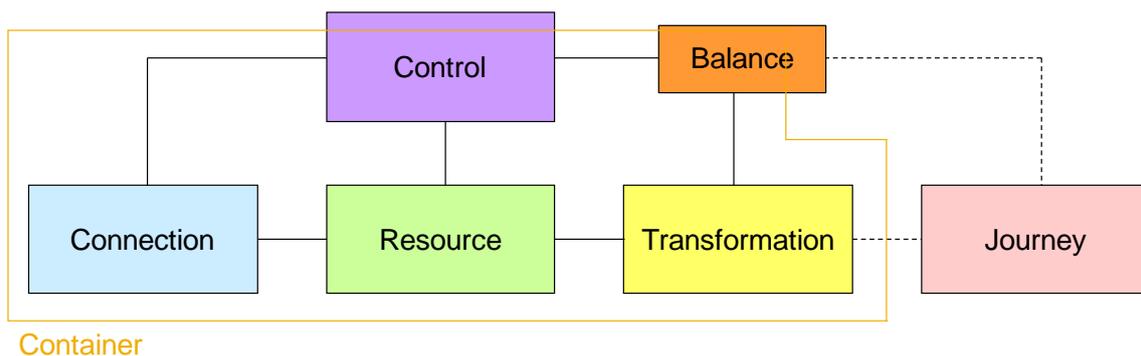

Container

Figure 4: *Seven* **Deep Metaphors And The Law Of System Completeness**

The 'container' in this model – the thing that according to the deep metaphor story defines what is 'inside' and what is 'outside' – effectively becomes a boundary drawn the 'complete system'. In the case of this model, this means that there are entities that are clearly 'inside' (engine, transmission and tool), entities that are wholly outside (interface), and then also entities that have both 'inside' and 'outside' aspects – the sensor that needs to sense what is happening outside and communicate to the system elements inside, and the control system that internally controls the other parts, but also has a likely 'outside' portion that connects to recursively higher level systems. What such 'higher level' systems might be in the case of this 'meaning system' remains to be seen. For now, it feels appropriate that we merely allow ourselves to incubate on some of the various implications of the model elements that have emerged through the Marketing Metaphoria comparison

exercise. Hopefully, you might like to join us in that period of incubation. In the meantime, no doubt this will be a subject we will return to in the coming months.

References

1) Zaltman, G., Zaltman, L., 'Marketing Metaphoria: What Deep Metaphors Reveal About The Minds Of Consumers', Harvard Business Press, 2008.
2) Systematic Innovation e-zine, 'Societal Trend Hierarchies', Issue 119, February 2012.
3) Mann, D.L., 'Systematic (Software) Innovation', IFR Press, 2009.
4) Matchett, E., 'Fundamental Design Method: An Introduction', IFR Press re-print, 2011.

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Not So Funny – Venn Diagrams

Not always obvious, but in theory at least, the Venn diagram has a pretty close connection to the concept of conflict and contradiction:
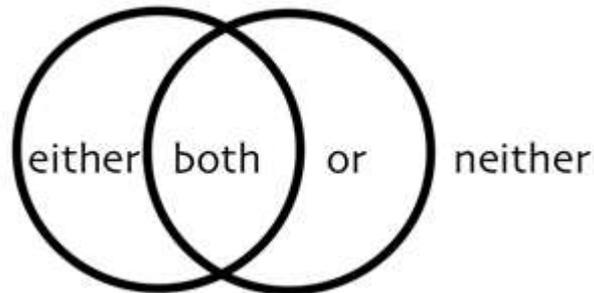

Of course, given that not everyone recognizes the significance of the connection, it opens up the possibility of some quite interesting new insights into some famous and not so famous Venn diagrams. Here's a perennial favourite – one we've now taken to adding in to discussions about Physical Contradictions and the separation principles:
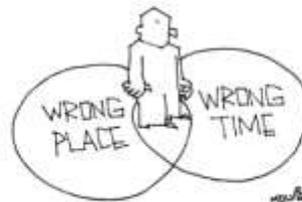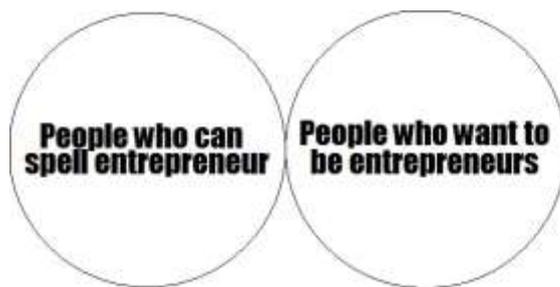

Sometimes, the contradiction never gets resolved:
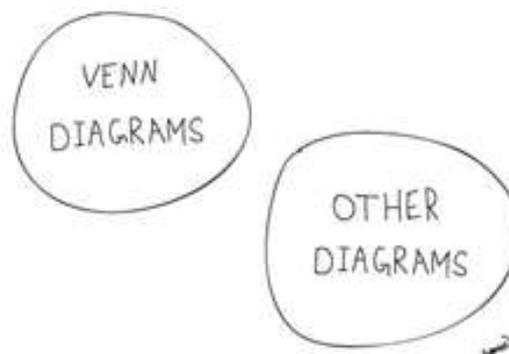
I wonder if John Venn had that one figured out when he was busy inventing the diagram? Similarly:
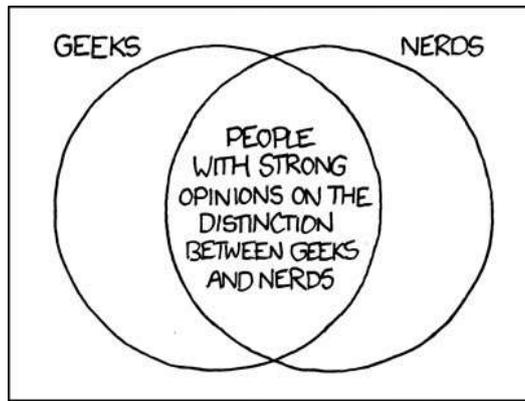
For some reason, in my mind, I may be wrong but I think John Venn would've cared a lot about solving this geek/nerd contradiction. Not quite so sure about this one, but we also find ourselves using this one a lot these days:

We also have something of a soft spot for this one:
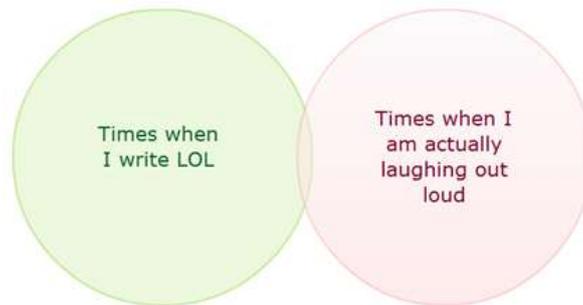
Also, in true Mono-Bi-Poly trend fashion, any bi-system eventually finds its way to becoming tri-. Which reminds me, someday I ought to complete the third part of the Trilemma article series…

Finally, this one should also help in all of our attempts to resolve some of the conflicts and contradictions that come with the shady world of social media…

…there, somewhere deep down, I knew Twitter was the ultimate contradiction solver!

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Patent of the Month – PageRank Algorithm

Our patent of the month this month takes us squarely into the world of IT and the Internet. US 8,250,069 was granted to a University Of Washington inventor on 21 August. Here's what their invention disclosure tells us about the problem being addressed:

The Internet or world wide web can be viewed as a "directed graph," in which web pages are the nodes of the graph, and each directed edge of the graph indicates a hyperlink from one web page to another. The norm of a node or web page is thus the number of outward-pointing links from this node, denoted |P|. The rank of a node is given by the equation:
r(P.sub.i)=.SIGMA..sub.jeln(i)r(P.sub.j)/|P|.

PageRank values for web pages play an important role in the method used to determine the order of search results displayed to a user who initiates a search on key words or phrases. Search engines thus use PageRank values and other parameters to determine the ordering of the web pages produced in response to search queries of the Internet, subsets of the Internet, or other networks. The ranks r(P) of nodes or web pages are conventionally computed through an iterative process using over one hundred heuristics to guarantee convergence.

As the size of the Internet has continued to grow over time, the number of nodes in the graph has increased by more than two orders of magnitude. More specifically, the number of web pages on the world wide web has recently grown from about 10.sup.9 to 10.sup.10 and will soon be more than 10.sup.11. The iterative solvers that are now used to determine PageRank operate in O(N.sup.2) time in the number of nodes, so using the current methods to compute PageRank for 10.sup.11 web pages in the future will require about 100 to 10,000 times as long to compute as is currently the case.

In addition, the connectivity of web pages on the Internet is increasing, which means that the matrix G is becoming less sparse and will have increasingly more dense sub-matrices corresponding to online communities, blogs, and social networks, each of which represents a block of related interconnected nodes. Sparse matrix techniques operate in O(N.sup.2) time in the number of nodes and require O(N.sup.2) memory. With the growth in the size of the Internet, this increased time and degradation of memory performance will become a problem, unless alternative approaches are used to determine PageRank and related web page scores.

Other requirements that are being considered will also increasingly impact on the need for efficiently determining the ranking of web pages. For example, it has been recommended that search and ranking be user-dependent. The effect of making such a change in the current manner of determining rankings for web pages would be to replace the uniform row-weights in the G matrix with other values. All of these trends will combine to create a new matrix H, which is large and dense. Accordingly, a new approach will be needed to derive rankings from H, with efficiency in both time and memory requirements.

The problem represents a classic contradiction: we want to rank information with maximum time and memory efficiency, but the growth in the amount of information makes it increasingly difficult to do so. Here's how we might map that problem onto the IT version of the Contradiction Matrix:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Size (Static) (1) and Speed (5)

WORSENING PARAMETERS YOU HAVE SELECTED:

Amount of Data (3)

SUGGESTED INVENTIVE PRINCIPLES:

10, 7, 5, 2, 1, 24, 37, 3, 25, 28, 4

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And here's how the inventor has solved the problem:

The method includes the steps of creating a directed graph that defines regions for at least a portion of a network, based on properties associated with the regions, wherein the web pages included in each region have the same score. The scores of the web pages in the regions of the directed graph are then determined using a Helmholtz equation. The scores of the web pages are then used in a physical function. For example, the scores can be stored in a non-volatile storage, or displayed. Or, a sequence of the web pages can be displayed in an order that is based upon their scores of the web pages, or the web pages can be displayed in groups based upon the scores of the web pages in each group.

The method can also include the step of accelerating the determination of the scores using the Helmholtz equation. This step may include the steps of setting up a mesh for the regions, and a compressed matrix for the mesh. The compressed matrix is then iteratively solved to obtain a value at each node of the directed graph, where nodes of the directed graph correspond to web pages. The values that were obtained for the nodes can then be normalized to determine the scores of the web pages.

While other types of scores are contemplated, the scores can comprise either PageRanks or TrustRanks for the web pages. It is also contemplated that scores can be determined that are specific to a user, or to a domain, or to a context.

Further, the step of accelerating the determination of the scores using the Helmholtz equation can employ a block decomposition of an associated Green's function method of moments approach.

Optionally, the method can include the step of selecting an appropriate mesh for the directed graph and an appropriate basis function when solving for the scores of the web pages, so as to achieve a desired level of coarseness for the directed graph. This approach can produce a desired resolution for the scores of the web pages.

Another option is to provide a time-varying term to the Helmholtz equation before determining the scores of the web pages.

FIG. 5

FIG. 6
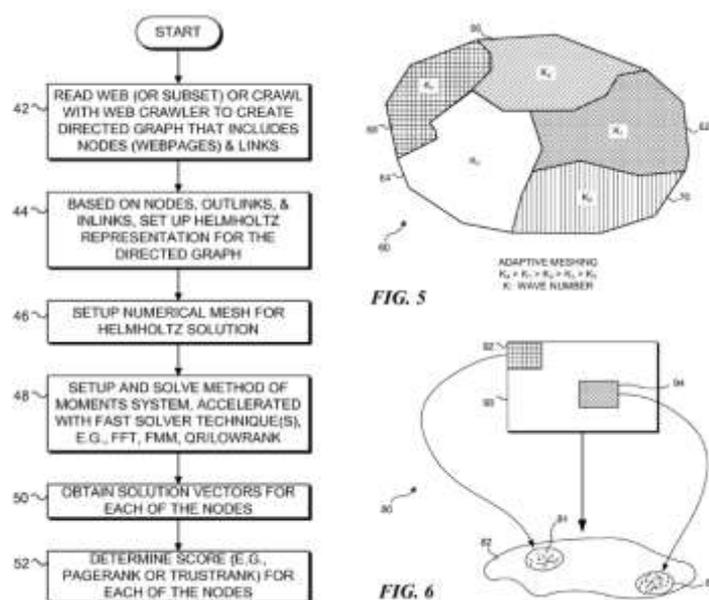
Taken at the level of this description, the most obvious inventive step contained in the invention involves a means of segmenting (Principle 1) the web page search space in such a way that the characteristics of different regions (Principle 3, Local Quality) can be

used to guide the parameters used in the Helmholtz equation. That said, it would have to be said also that it is the incorporation of the Helmholtz equation itself (DELTA.y(i)+k.sup.2(i)y(i)=0) that represents the key to the success of the new calculation strategy. Although difficult to map directly as an 'Inventive Principle', relative to other calculation schemes, one of the main characteristics of the equation is the use it makes of relative difference… which takes us directly or otherwise to the hint provided by Inventive Principle 37.

Interesting, finally, to note also is the fact that the solution is described as coming through the establishment of an analogical problem from another industry: '*However, it has been discovered that a direct analogy to determining PageRank can be made to a very different field of technology. Specifically, it has been discovered that the method of moments or Green's function, which is an approach that is frequently used for computing capacitance in electrostatic simulations, can be applied for computing PageRank, or more generally, the "score" of a web page in regard to some other defined parameter or characteristic of the web page. While it can be used for other purposes, PageRank is most often employed in determining the relevance or importance of a web page in regard to other web pages that are returned for a search that is carried out in response to a query entered by a user.*'

This, ultimately, might be the main point to take away from this invention – smart inventions come through making elegant analogies to other – more extreme – domains, and then going to find someone or something from those domains that can be transferred to yours. As ever, there is nothing new under the sun, merely new ways of combining and using what we already know.

Best of the Month – The Other Side Of Innovation

Innovation supremo, Thomas Edison, is famously reported to have declared that innovation was '1% inspiration and 99% perspiration'. Which is something you'd not really get if you used the innovation literature as your measure. No doubt exaggerating wildly to make the pattern look better, a brief scan of the literature would appear to show that the ratio was 180 degrees the wrong way around: 99% of books being about the inspiration part and 1% focusing on the perspiration bit. Most likely the reason for the reversal is that it's far easier to write an interesting story about inspiration than it is to write about all of the dull, monotonous, plain hard work that sits behind all the perspiration. There's little or no 'story' to be told in the world of perspiration – it being the stuff that happens *between* the interesting, story-progressing 'inspirational' elements of a book or a film.

This wasn't the reason we originally rejected Vijay Govindarajan and Chris Trimble's 2010 book 'The Other Side Of Innovation'. Indeed, as an attempt to make the 'perspiration' part of the innovation story into a compelling read, they succeeded remarkably well. Plus – always a seemingly increasing rarity in the world of management literature – the book is full of actual research, actual insight and meaningful content.
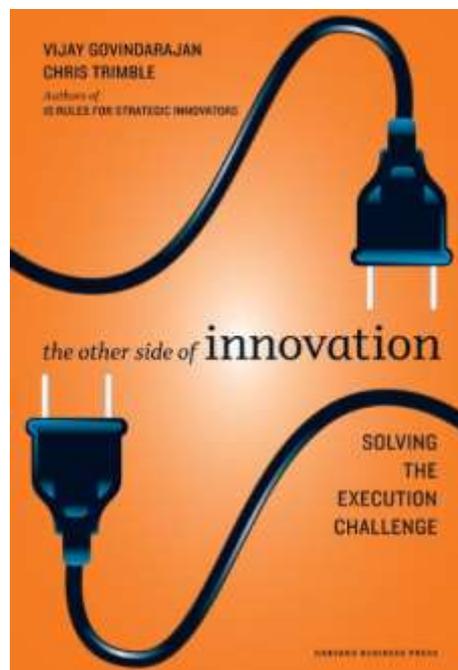
No, the reason we rejected the book at the time was we felt it presented a rather dangerous 'universal' recipe when the world it was being published in to was not following all of the traits of the universe assumed to be present by the authors. Someone could, in other words, implement the recommendations of the book and end up with a disastrous set of outcomes.

What we know now (or rather what we can now put a language around) is that the book covers just a segment of a rather bigger innovation universe as defined by our Innovation Capability Maturity Model. Albeit an important segment. Such that, for any ICMM Level 2 organisation attempting to increase their capability to Level 3, this book is just about the ideal play book. Still not perfect, but during the process of putting the finishing touches to our ICMM 2-3 Journey book, we've found ourselves coming back to Govindarajan and Trimble's tome on what is probably rather too many occasions.

The crux of the book centres around the assumption that any innovating business entity is built around an organization structure in which the 'innovation' job is done by a group of people peripheral to the main job of the business:
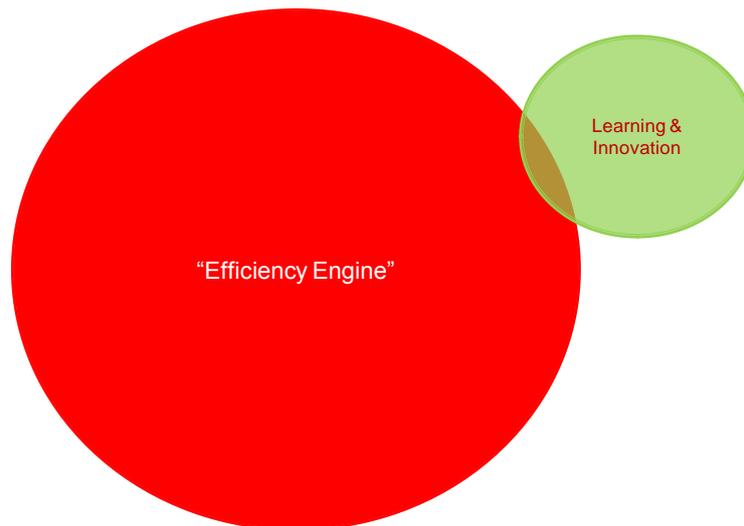
That 'main job' being to do whatever the organization delivers to generate revenue as efficiently as possible. The authors call this part of the business the 'Performance Engine' – we prefer to think of it as being more specifically focused on 'efficiency'. Such that, if I'm an automotive OEM, my primary job is to churn out incrementally better and better cars at lower and lower cost, with fewer and fewer harmful side-effects. This part of a business has a starkly different job to those tasked with coming up with step-change innovations based on new rules and successfully challenged assumptions about the 'best' way to do anything. This peripheral (in a Level 2 ICMM organization at least) 'learning and innovation' function inherently operates on a very different set of goals and objectives to the Efficiency Engine. The Other Side Of Innovation is all about managing the interface between these two conflicting parts of an organization. And, it has to be said, it performs that job very thoroughly indeed.

The reason we've come back to the book and now see fit to give it its due and feature it in this 'Best Of' part of the e-zine is that this distinction between 'Efficiency Engine' and 'Learning & Innovation' Function is one that we've seen to resonate strongly whenever we've been working with clients or speaking at conferences about the Innovation Capability Model. For the management team within an organization to 'merely' recognize the fundamental differences between these two parts of an organization's role it seems in reason enough to say to people, 'you should go and read the book'. That's the 'aha'.

No, it doesn't get the solution recipe completely right. Nor does it recognize all of the possible Level 2 to Level 3 ICMM Journey challenges, but given the question 'would I rather someone has read this book before they read the ICMM2-3 Journey book?' I'd have to answer strongly in the affirmative.

It's not a recommendation for everyone, but rather anyone that works in an ICMM Level 2 organization specifically, and anyone that feels like their drowning in 'inspiration' books and wants to dip a toe or two in the turbulent waters of innovation execution generally.

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Conference Report – SI/X Future

On 13 August, a dozen brave souls from the UK TRIZ/SI community converged on our Clevedon offices to discuss the question of the spread, or otherwise, of TRIZ/SI/innovation-in-general in the country. Part of the plan for the day was to use some of the SI tools to help make sense of both question and possible answers. In reality, we knew we'd have to spend some of the time agreeing what the actual question was. Here were the candidates we started with:

How can we best use our extremely limited resources to spark a new wave of innovation capability and activity within the UK?
1. How can we start a conversation in the UK about the gap between (some parts of) UK industry and respected innovation leaders? (to recognise the "two speed" innovation situation)
2. How can we get a few key (senior or "influential") UK industry people to recognise that the reason their competitors (or industry leaders) are repeatedly winning in the area of innovation is because they are adopting a systematic approach?
3. How can we nurture and support those in UK industry who want to adopt a more systematic approach to innovation?
4. How can we give a voice to those in UK industry who are passionate about the benefits of a more systematic approach to innovation?

Rather than spend the day arguing over the relative merits of each, we instead adopted the following protocol for the day:

        0) What is the question?
        1) Tapping in to the mind of the individual problem solver
        2) Tapping in to the mind of the organisation
        3) Now what is the question?
        4) Trend Mapping
        5) Contradictions & Solution Clues
        6) And now?

Which, at step 3) allowed us an opportunity to iterate on the question after having done a couple of exercises to understand what, first, individual problem solvers wanted out of TRIZ/SI, then what organizations might want. To answer these two questions, we used the 2x2 outcome map template, first time through looking through a Spiral Dynamic lens at Blue, Orange and Yellow thinkings styles, and then second time through, looking at three ICMM Levels (1, 2 and 3).

One other important aspect of the day's design was recognizing that the room was full of busy people that, at the end of the day, were very unlikely to have masses of untapped (time or other) resource to commit to doing anything differently. What we therefore needed to be on the look-out for were the 'flapping butterfly wings' that we could harness to create the desired innovation tornado effect.

From my personal perspective, I think we found one or two butterfly-like clues in the morning session, but it was only when we started digging deeper by constructing market and consumer trend maps (one individual person based; one B2B based) that some of those clues started to make sense. One particularly useful (again, 'for me' – I can't speak for others) was what turned out to be the downward spiral loop at the centre of the individual trend map:
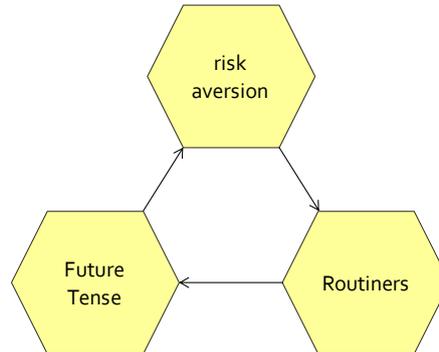
Literally, this loop was a very definite downward spiral when it comes to innovation and how we might motivate individuals whether to or how to take the plunge. In effect what this loop says is that any attempt to encourage individuals to innovate is fighting a tornado heading in the exact opposite direction. The key clue from this insight seemed to be, 'if you want people to innovate in the current market, the emphasis needs to be placed on the adverse consequences of not doing it, rather than the possible merits that might come from doing it.

At the end of the day, when asking the dozen attendees whether we thought we had found the magic 'butterfly' solution, the answer was a no. When we asked whether there were things that people would do differently in terms of presenting TRIZ/SI to others, the answer was an almost unanimous 'yes'. To that extent, the day probably justified itself. To the extent that people said they wanted to run a follow-on session before the end of the year, it probably did rather better. With that in mind, if anyone thinks they might want to join such a session, Hannah is about to circulate the total set of outputs from each of the exercises conducted on August 13 – feel free to contact her to get hold of a copy.
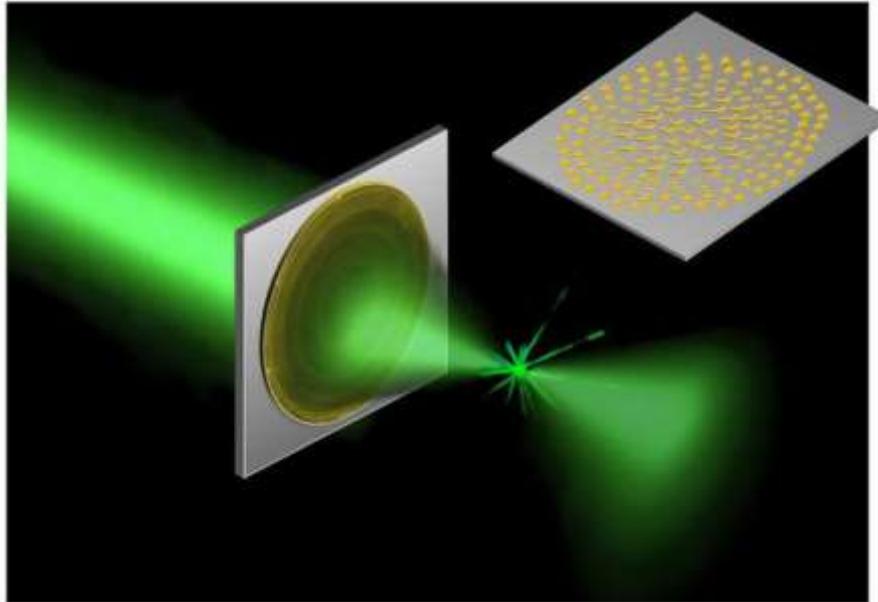
Applied physicists at the Harvard School of Engineering and Applied Sciences (SEAS) reported this month that they have created an ultrathin, flat lens that focuses light without imparting the distortions of conventional lenses.

At a mere 60 nanometers thick, the flat lens is essentially two-dimensional, yet its focusing power approaches the ultimate physical limit set by the laws of diffraction. Operating at telecom wavelengths (i.e., the range commonly used in fiber-optic communications), the new device is completely scalable, from near-infrared to terahertz wavelengths, and simple to manufacture. The results have been published online in the journal *Nano Letters*.

"Our flat lens opens up a new type of technology," says principal investigator Federico Capasso, Robert L. Wallace Professor of Applied Physics and Vinton Hayes Senior Research Fellow in Electrical Engineering at SEAS. "We're presenting a new way of making lenses. Instead of creating phase delays as light propagates through the thickness of the material, you can create an instantaneous phase shift right at the surface of the lens. It's extremely exciting."

Capasso and his collaborators at SEAS create the flat lens by plating a very thin wafer of silicon with an nanometer-thin layer of gold. Next, they strip away parts of the gold layer to leave behind an array of V-shaped structures, evenly spaced in rows across the surface. When Capasso's group shines a laser onto the flat lens, these structures act as nanoantennas that capture the incoming light and hold onto it briefly before releasing it again. Those delays, which are precisely tuned across the surface of the lens, change the direction of the light in the same way that a thick glass lens would, with an important distinction.

The flat lens eliminates optical aberrations such as the "fish-eye" effect that results from conventional wide-angle lenses. Astigmatism and coma aberrations also do not occur with the flat lens, so the resulting image or signal is completely accurate and does not require any complex corrective techniques.

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The array of nanoantennas, dubbed a "metasurface," can be tuned for specific wavelengths of light by simply changing the size, angle, and spacing of the antennas. "In the future we can potentially replace all the bulk components in the majority of optical systems with just flat surfaces," says lead author Francesco Aieta, a visiting graduate student from the Università Politecnica delle Marche in Italy. "It certainly captures the imagination."

We expect big things from this one… watch this space.

Or find more here:
Francesco Aieta, Patrice Genevet, Mikhail A. Kats, Nanfang Yu, Romain Blanchard, Zeno Gaburro, Federico Capasso. Aberration-Free Ultrathin Flat Lenses and Axicons at Telecom Wavelengths Based on Plasmonic Metasurfaces. *Nano Letters*, 2012; : 120821091337009 DOI: 10.1021/nl302516v

Or, more generally, go do a patent search on 'Federico Capasso' and be prepared to be impressed.

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## Generational Cycles – You're Never Alone With A Strand

The above 1959 UK advertising campaign for Strand cigarettes is generally regarded as one of the most disastrous tobacco advertising campaigns of all time.

The television advertisement depicted a dark, wet, deserted London street scene in which a raincoated character, played by Terence Brook, looking similar to Frank Sinatra in the contemporary movie hit, Pal Joey, lit a cigarette and puffed reflectively. This was accompanied by an instrumental, "The Lonely Man Theme" by Cliff Adams, playing in the background and a voice-over declared, "You're never alone with a Strand. The cigarette of the moment.

The commercial, written by star copywriter, John May, from iconic advertising agency S H Benson was popular with the public, with Brook becoming a star, and the music reaching Number 39 in the UK Singles Chart. However, sales of the brand were poor and it was soon taken off the market. The target 20-30 year-old target audience purportedly associated smoking Strand cigarettes with being lonely and were put off from buying them.

Here's a different, generational, perspective on the problem:
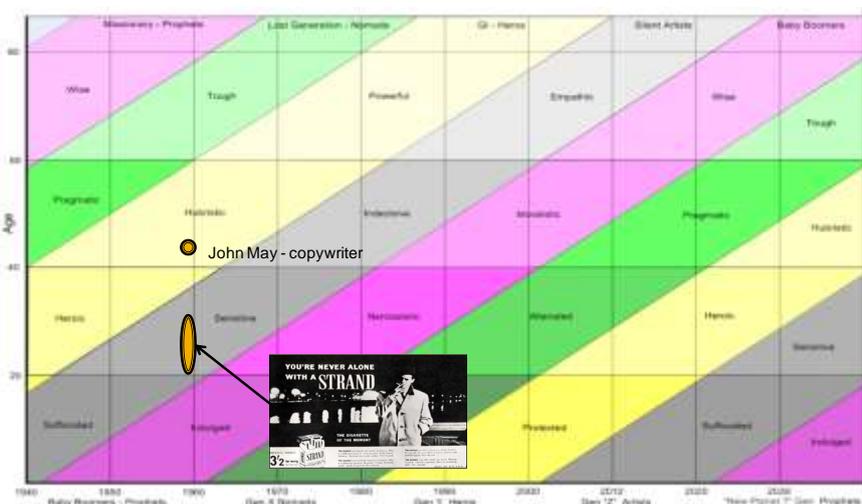
Looking at the four generational archetypes and their primary characteristics in their 21-40 lifestage, we see 'sensitive', 'narcissistic', 'alienated' and 'heroic'. If you had to chose which of these characteristics was least suited to a campaign based on the idea of the

happy loner? I think you'd have to say that the 'sensitive' artist was the most likely candidate. Which is, of course, precisely the consumer John May inadvertently found himself selling to… not helped either by the fact that May himself was from a different, older generation in its 'hubristic' phase. May, in true Hero manner, purportedly never did any research for the campaign and seems to have assumed the Pal Joey character perfect for his generation was equally well suited to his younger consumer.

There's no proving that it was this generational mis-match that caused the campaign to fail so miserably, but there are a couple of pieces of downstream evidence that would appear to suggest that there is a causal link:

Firstly, 'Do The Strand' a song by Roxy Music was based on the advert for the cigarettes was a big hit in 1973. The song continues to be viewed as an iconic classic.

Secondly, Strand Cigarettes were mentioned in David Bowie's 1987 song Absolute Beginners and its music video was heavily influenced by the adverts. The movie was also a big hit at the time, albeit it appears to have aged badly.

Here's what happens when we map these two moments onto the same generational map:
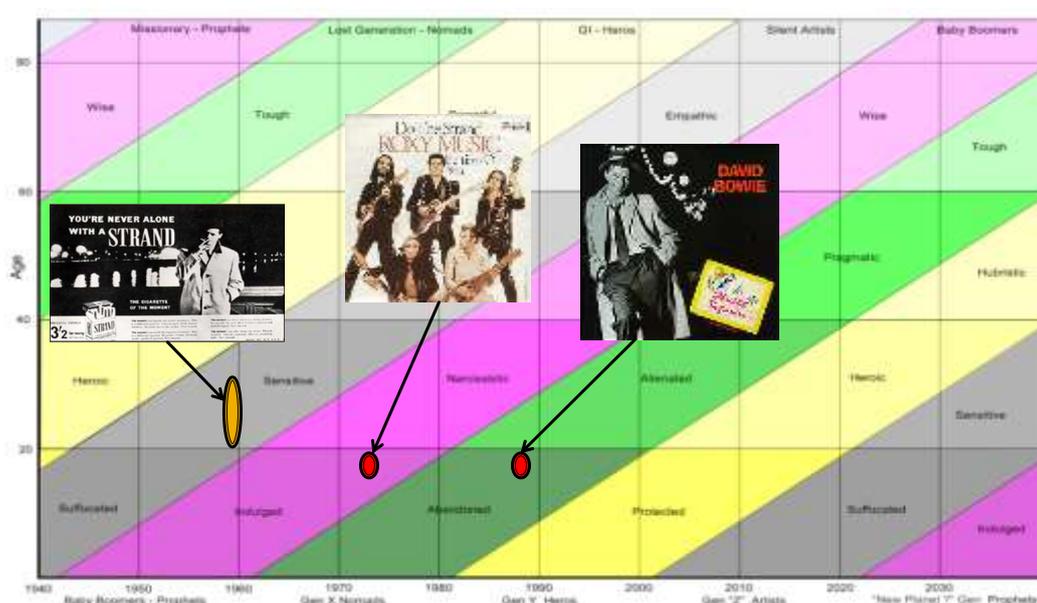
For both of these two later moments in time, the idea of 'happy loner' was always likely to work better than it did with the Artist generation. Especially the abandoned-becoming-alienated Nomads. We suspect, had cigarette advertising still been allowed, the 'you're never alone with a Strand' would've worked particularly well with the Generation X Nomads.

Another example in the long list of 'right solution; wrong time' innovation attempts we suspect.

Biology – Assassin Bug (Stenolemus bituberus)

The Australian assassin bug (Stenolemus bituberus) eats spiders. The best place to find spiders is to find their webs. The only problem then is that the sticky web is designed to work for the spider rather than the bug. So how does the assassin bug manage to not get tangled up in the sticky spider silk, and manage to catch the spider prey?

Assassin bugs hunt spiders on their webs by stalking or luring their victims before stabbing them with their long, sharp snouts. Researchers studying these aggressive arthropods have now found that they use noise to cover their tracks. The bugs wait for the wind to rustle the web, then take the opportunity to sneak up on their prey.

Stenolemus bituberus, are found in eastern and northern Australia. They live and hunt in spider webs on tree trunks or in rocky crevices.

The team, led by Dr Anne Wignall from Macquarie University in Sydney, brought juvenile assassin bugs into their laboratory. They had spiders, of several species known to be preyed on by the bugs, build their webs in special wooden frames in the laboratory. The frames allowed the scientists to vibrate the webs, creating background "noise" and observing how the bugs reacted. Dr Wignall and her team used the webs to find out exactly how the bugs avoided being spotted as they stalked their prey.

"Web-building spiders have only rudimentary eyesight, so avoiding being seen is not an issue for web-invading arthropods," the team explained in the paper. "The main sensory system of web-building spiders is based on interpreting vibrations in the web - web silk is exquisitely proficient at transmitting vibrations from potential prey and predators in the web."

'Smokescreen'
The researchers placed the bugs onto the spider webs and used a desk fan to simulate a breeze on the web. When the fan was on, "the assassin bugs stepped more often and walked in a more continuous manner", the team explained. They described this tactic as "opportunistic smokescreen behaviour".

"Generally, noise is considered a big obstacle that needs to be overcome, such as when trying to communicate or when searching for predators," Dr Wignall reported, "the exciting

thing in this study is that the assassin bugs can increase their chances of catching food by using wind noise as cover."

The breeze did not seem to trigger the assassin bug to move when it was in an unoccupied spider web. This, the team wrote, suggested that "noise-related timing of behaviour reflects decisions made as part of a predatory strategy", rather than just a response to the physical movement of the web.

Assassin bugs also have a strange way of moving, and the scientists think this bouncing gait - "gently erratically rocking in the web" - may make it more difficult for the spiders to identify the characteristic vibrations of footsteps on silk. When on a web, the bug seems to move very deliberately, pausing for up to 20 minutes between steps. It also carefully severs some threads of the web, most likely to render it less effective.

The bugs are perhaps "simulating debris moving in the wind", explained the researchers. In a previous study, published in the Proceedings of the Royal Society B, the same team discovered that the bugs lured spiders by "pretending" to be prey tangled in the web. They tapped the silk to mimic the vibrations of a trapped insect.

When the spider approaches - or when the assassin bug gets within striking distance - the predator strikes with its tube-like mouthparts, through which it injects the victim with a toxin that liquefies its insides so they can be sucked out.

Dr Stimson Wilcox from Binghampton University in New York, one of the co-authors of the article said: "It's very exciting thing to see a predator using vibrations to dupe their prey in this way. "The use of vibrations to hunt is a fairly new phenomenon [to science]," he said, "this suggests that it's probably quite widespread."

Dr Wignall added: "We're now starting to find more evidence for species using vibrations during hunting." But, she said, there was "still a lot to uncover about how the assassin bugs use these strategies". "We'd like to know how much the species of spider influences their strategy, and how the spider's perceive the stimuli that the assassin bugs are generating."

Meanwhile, here's what the assassin bug story looks like from a contradiction resolution perspective:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Productivity (44)

WORSENING PARAMETERS YOU HAVE SELECTED:

Compatibility/Connectivity (33) and Safety/Vulnerability (38)

SUGGESTED INVENTIVE PRINCIPLES:

10, 1, 24, 2, 39, 13, 28, 18, 31

The bug, in other words, is trying to obtain food ('productivity'), and what makes it difficult in this case is the sticky web… which is not so easy to map on to the Matrix, but safety and 'compatibility' (i.e. the propensity for the bug to stick to the web) seem like fair connections.

In terms of the 'answers' provided by the Matrix, there would appear to be a pretty good connection to the solution evolved in the assassin bug. Namely, first-up, and most encouragingly, the presence of Principle 18, 'Vibration' connects us very directly to the mimic behaviour. Then there is also Principle 10, Prior Action – where the pre-severing of

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some web threads offers a nice illustration – Principle 24, Intermediary (i.e. simulating the vibration of a breeze), and possibly also a justified inclusion of Principle 13, The Other Way Around – for the overarching idea of attacking the prey spider in precisely the place it expects to be in control.

Aren't evolutionary arms races wonderful?

And, if you need more convincing, here's a video you might also like to take a look at: http://www.youtube.com/watch?v=SU6NoWZAXQw

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Short Thort

"You want to make us able to live with the void.
Not lie ourselves into good-naturedness, trust,
ordinary middling human considerations,
but to question as has never been questioned before, relentlessly,
with iron determination, into evil, through evil, past evil,
accepting no abject comfort.
The most absolute, the most piercing questions."
Saul Bellow, *Herzog*
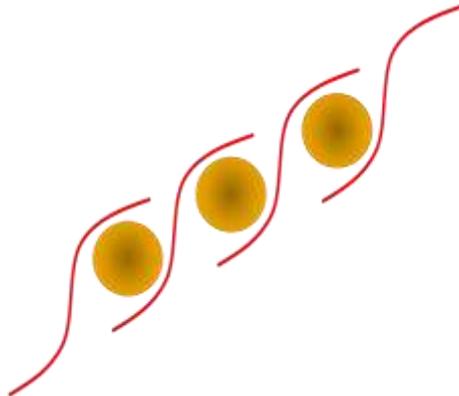
"In so far as one denies what is,
one is possessed by what is not,
the compulsions, the fantasies, the terrors
that flock to fill the void."
Ursula K. LeGuin

News

Hero's (Start-Up) Journey
Difficult to imagine us starting yet another new book, with so many 'almost finished' ones sitting on the shelf, but this one started quickly, came with some free resource, and has already had several years worth of testing, so it looks like it has found itself at the top of the list for publication. And so we are happy to announce the next in the ICMM series – the Hero's (Start-Up) Journey is primarily focused on providing entrepreneurs with the critical insights needed to set up and build a successful new business. In essence it is about the journey from ICMM Level 0 to Level 1. Details on the website shortly.

TrenDNA Workshop – India
It looks like we will be giving a TrenDNA workshop in Bangalore during October. We're already scheduled to be doing a 'Basic' SI session at IIT in Mumbai on 18 and 19 October. The precise dates of the Bangalore session are not totally fixed, but will definitely be in the 11-17 October window.

MYTRIZ
Just when we thought we were excluded by the Classical TRIZ/MATRIZ mafia, we find ourselves in receipt of a keynote invitation for the big TRIZ conference being held in Malaysia this year. The event will take place in Penang on 7 and 8 November. We've

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promised to present 'something new' (to provide contrast to the 'usual' classical TRIZ roundabout). Not sure what it will be yet, but we can feel something big in the air.

AMIRA (Canada)
It looks like we will be running a repeat version of the SI Certification programme we ran with the mining industry Research Association in Australia at the beginning of this year. Only this time we'll be doing it in Canada. In November. And then February. Because we love cold weather.

SI Bulgaria
We are happy to announce a collaboration agreement with '42-Ideas' – an innovation consulting company based in Sofia. The aim will be to help deliver breakthrough solutions to industry-based clients in Bulgaria.

Spiral Dynamics Social Media Scraping Tool
Staying with the theme of collaboration, we recently formed a strategic alliance with Akumen, a UK-based complex-qualitative-intangibles, sense-making research organization. The collaboration will centre around new algorithms that will assist in the automated assessment of Spiral Dynamic thinking styles across social groups. The first prototype capability should be proven by next month; we're currently on the look-out for beta test clients. If you think you might be interested, drop Darrell a line.

New Projects
This month's new projects from around the Network:
> FMCG – 'Rembrandt's' Open Innovation study
> Mining – Problem-Solving workshop series
> Medical Devices – ApolloSigma IP study
> Software – Strategic study
> Automotive – workshop series
> FMCG – IP bullet-proofing study
> FMCG – 'Voice Of System' future technology study
> Government – Fostering Innovation strategy study

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