Systematic Innovation

e-zine

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In this month's issue:

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

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Dunbar Numbers And Discontinuous Business Trend Patterns

Since the advent of the social networking phenomenon, there has been a swell of interest in the research findings of Professor Robin Dunbar. Dunbar is an anthropologist at the University College of London. He is latterly famous for a 1992 paper on Co-Evolution Of Neo-cortex Size, Group Size And Language In Humans where he hypothesized:

... there is a cognitive limit to the number of individuals with whom any one person can maintain stable relationships, that this limit is a direct function of relative neo-cortex size, and that this in turn limits group size ... the limit imposed by neo-cortical processing capacity is simply on the number of individuals with whom a stable inter-personal relationship can be maintained.

Dunbar supported this hypothesis through studies by a number of field anthropologists. These studies measured the group size of a variety of different primates; Dunbar then correlated those group sizes to the brain sizes of the primates to produce a mathematical formula for how the two correspond. Using his formula, which is based on 36 primates, he predicted that 147.8 is the "mean group size" for humans. Which subsequently turned out to match census data on various village and tribe sizes in many cultures through history. The following Figure shows the distribution produced by Dunbar's analysis and where the now much circulated ‘Dunbar Number’ 150 originated:

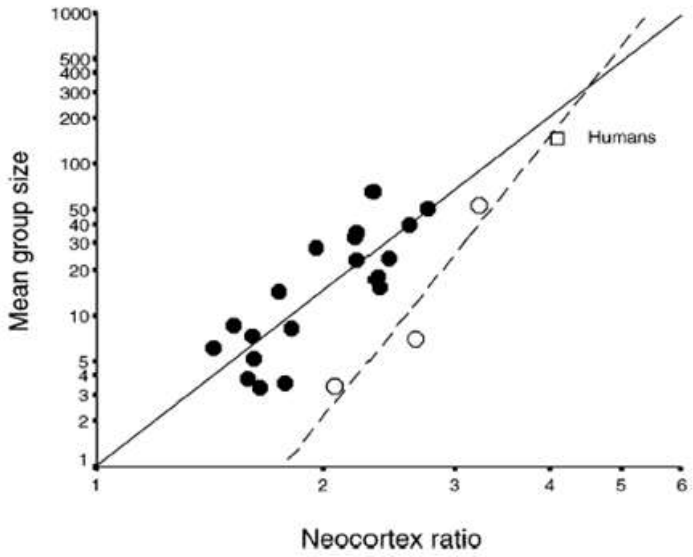


Figure 1: Origin Of Dunbar Number
Mean social group size for individual primate taxa (principally, one species per genus) plotted against relative neocortex volume (indexed as neocortex volume divided by the volume of the rest of the brain). Simian (solid symbols) and hominoid (open symbols) taxa are shown separately.
The datapoint for humans is that obtained by Dunbar.

In crude terms, what Dunbar uncovered was the idea that, above a certain size, social groups ceased to function as social groups because of physiological limits in the brain. Since the first publication of Dunbar’s work (all now encapsulated in Reference 1), there has been considerable on-line debate about the validity of the number. The general consensus of this debate is that 150 works fine when a group (such as a village or a group of Roman Centurion soldiers) is able to conduct significant levels of ‘social grooming’, but for less closely attuned groups – such as work teams – where the grooming levels and

indeed grooming opportunities are lower, the maximum number the group can sustain is somewhat lower. The emerging consensus, based on studies of work groups and social networking groups is that an affinity group maximum size of between 40 and 70 is more typical, the actual level being correlated to precisely how much 'grooming' takes place. So that a work team that socializes together as well as working together will be able to sustain a higher maximum affinity group size, and vice versa.

Irrespective of what the actual number is, it does seem that for a given group (with a given level of social grooming) there is a step change in the dynamic of the group above a certain maximum Affinity Group value.

The Systematic Innovation story is always interested in such step-change phenomenon, since they often hold open the possibility of a new trend of discontinuous evolution. And, looking beyond Dunbar's work, there does seem to be some fairly compelling evidence to suggest that there is indeed a highly reproducible pattern of social network or cohort group 'stages'. We have been internally labelling this pattern the 'Cohort Group' trend. Figure 2 shows the bare bones of what the trend currently looks like:

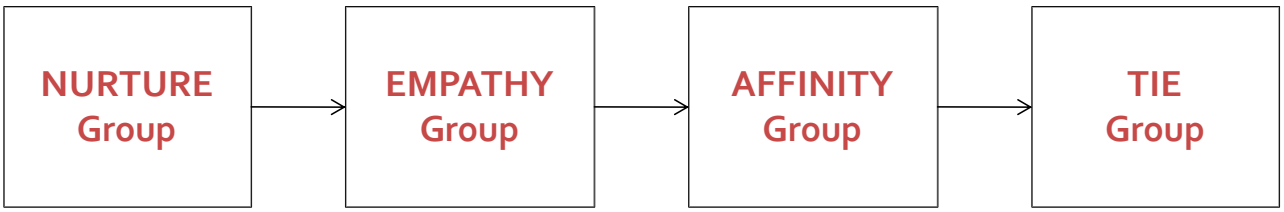


Figure 2: Cohort Group Discontinuous Trend Pattern

The basic underlying idea behind the pattern is that it applies to all of us individually, both at home and at work. When we aggregate an individual analysis into, say, work groups, it should also be able to tell us something useful about how those groups should best be organized. Let's have a look at each stage of the trend in turn:

Nurture Group (~5 people)
Your nurture group is essentially confined to your nearest and dearest family – spouse, children, etc. This is the group that will typically be associated by 'love'; they are the people we will often say we would 'die for'. The number of people we have the emotional energy to sustain inside this group is typically limited to around 5 people. Some people can sustain more; others less, but five seems to be a good average to keep in mind.

Empathy Group (~12-15 people)
Your empathy group encompasses all those people to whom you have regular and close connection. Likely as not, you will track what they are doing, and vice-versa. This is your network of 'close friends'. From a work perspective (Reference 2), your empathy group is the group you have a bond of trust with and are thus able to do creative work together. Again, the size of this group is limited by our available emotional energy and the number of hours in the day. Typically, because 'emotional energy' is a finite resource, there is some form of trade-off between the people we can accommodate within our Empathy and Nurture groups – the more people we have in the latter, the fewer we are able to sustain within the former. Again too, from a work perspective, the significance of the Empathy Group number is that the team dynamic will make a fundamental shift once the limit is reached. Typically, 12-15 is the usual Empathy Group limit. One of the key shifts that take place as teams grow beyond this limit – such as in growing SMEs – is the need to start introducing written rules and working protocols.

Dunbar, interestingly, has noted that we often acquire a number of 'junk relationships' within our Empathy group. A person addicted to TV soap operas can easily find themselves following the 'life' of one or more of the characters and thus place that fictional characters inside their empathy group, at the expense – unfortunately – of their real relationships.

Affinity Group (~40-150 people)
This third stage of the trend is the one directly relating to the Dunbar Number. The actual limit size for this group really depends on how much social grooming the members are prepared and able to engage in. In theory social networking sites like Facebook should allow us to have many hundreds of 'friends' within our Affinity Group. The reality, however, clearly indicates that, although we might well find ourselves with many hundreds of friends, the 40-150 maximum limit still applies in terms of how many of those hundreds we actively and continually seek to engage with.
From a working perspective, an organization (or team) whose size exceeds this Affinity Group limit needs to change its rules of engagement. One of the key shifts is that, beyond the limit size, people don't and can't 'know' everyone else. As such the trust dynamic changes and written rules and protocols become a necessary part of the working regime. If we look at organizations like Virgin, ABB or WLGore, we see clear evidence that they deliberately limit the size of parts of their business to accommodate the Affinity Group limit – such that any part of the organization whose business grows to need more than the limit number of people divides into multiple segments whose numbers remain within the limit.

Tie Group (~1000s people)
The outer tier of the Cohort Group trend pattern are the potentially thousands of others that we have some kind of connection to (all support the same football team, or are part of the same Generation, or political affiliation, or working within the same organisation), but to whom we have no real personal connection. Finding ourselves in a large random crowd of unknown people, our Tie groups are the ones we will find ourselves seeking out so that we at least have 'someone' to associate with. Humans are social creatures ultimately – no-one wants to be alone in a crowd – and so a tie group gives us some means of 'belonging' even if that means we don't even know the first names of the other people in the Group. Reference 2 describes tie groups as having a power law distribution – i.e. the majority of members can be a long way away from the centre of the group.

And so there we have the four basic – NEAT – stages of our trend pattern. It is our intention to include the pattern, despite its numerical uncertainty, inside our collection of discontinuous business trends. The reason for this, very simply being that we have worked with a number of organizations or work teams that have unwittingly passed from one stage of the trend to another, and have, as a consequence, experienced a number of unexpected problems – by exceeding the limits of one stage of the trend, their system had changed and they hadn't realized it. By making the trend more explicit, the hope is that in future, when we pass through each threshold we at least know a) it has happened, and b) we need to do something to manage the transition.

References

1) Dunbar, R., 'How Many Friends Does One Person Need? Dunbar's Number And Other Evolutionary Quirks', Faber & Faber, 2010.
2) Mayfield, R., 'Ecosystem Of Networks', Weblog, http://radio-weblogs.com/0114726/2003/02/12.html

TRIZ, Pirsig And Making Media Plus Matter Meaningful In The Moment

On May 12, the first day of this year's UK TRIZ Forum, we convened a session looking at the late, great Ted Matchett's Fundamental Design Method (FDM) (Reference 1). The master equation of FDM – the equation around which the whole Method pivots – is the so-called 5M equation: 'Making Media-Plus-Matter Meaningful in the Moment'. To newcomers, the equation can appear as somewhat abstract. This article attempts to build on some of the content of the 12 May session and to associate the 5M equation to one or two other hopefully less abstract connection points.

The journey can best be started by looking at Altshuller's Su-Field model definition of a minimum system – Figure 1. The 'two-substances-plus-a-field' minimum requirement for a 'system' is a universal test that applies to technical and non-technical systems alike.

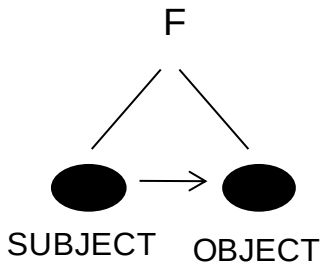


Figure 1: Typical Su-Field Model Defining 'Minimum System'

The two substances (or, as drawn, 'subject' and 'object') within this triangular model correspond directly to Matchett's 'Matter'. Just as 'substance' is probably not the most appropriate word due to its suggestion that the two entities need to be physical in nature, 'Matter' carries a similar set of connotations. What both Altshuller and Matchett meant – and it seems that there is virtually 100% overlap between the two definition – however, was a much more broad definition that encapsulates anything that is known. A substance (or 'matter'), in other words, could equally well be a peen hammer, a photon, a person or a protein molecule.

The 'field' element of Altshuller's minimum system corresponds to a source of energy that is put to use to deliver a function. The 'field' is about the action in 'subject-action-object'. In Matchett's terms, the field corresponds to the 'making' part of the 5M equation. Systems only exist to 'do' things.

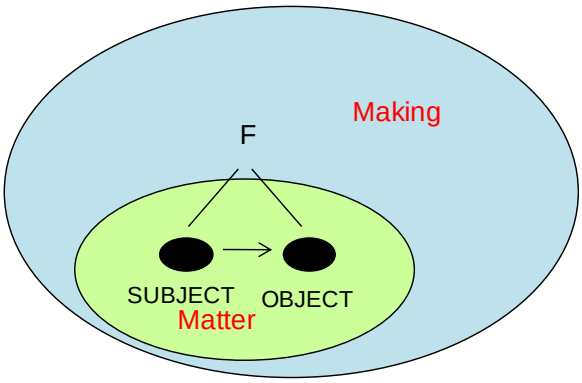


Figure 2: 'Making' and 'Matter' and the Su-Field Model

So much for TRIZ and the minimum system, the third element of the 5M to bring into the story is 'Meaning'. In Matchett's terms, meaning is the higher level reason why systems exist. This is about 'meaning' in very human terms. It is about the intangible factors that relate to why people create or acquire a system. In my mind, the easiest way to connect with Matchett's intent here is the classic J.P.Morgan quotation, 'a man makes a decision for two reasons; the good reason and the real reason'. As described in Figure 3, the good reason is the tangible function delivered by the system, whereas the real reason is the intangible, 'meaning'-related reason. As in 'I took a taxi to get me to the airport on time (the good reason) versus 'I deserved to travel in style because I've worked hard all day' (the real reason).

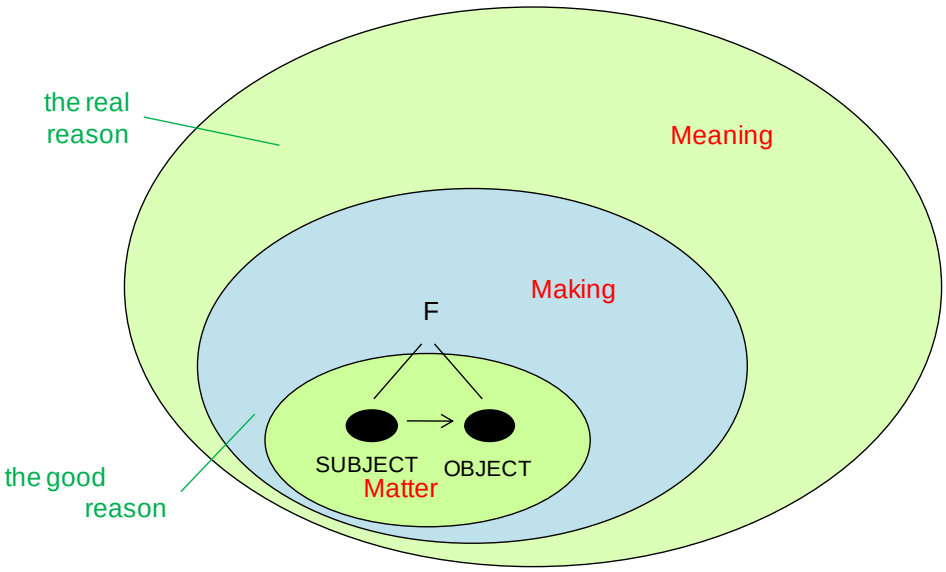


Figure 3: Matter, Making and Meaning and Tangible/Intangible Worlds

If that sounds a little bit too glib, then another way of interpreting Matchett's 'meaning' is to look at Robert Pirsig's definition of Quality in the classic text Zen and the Art of Motorcycle Maintenance (Reference 2) – Figure 4.

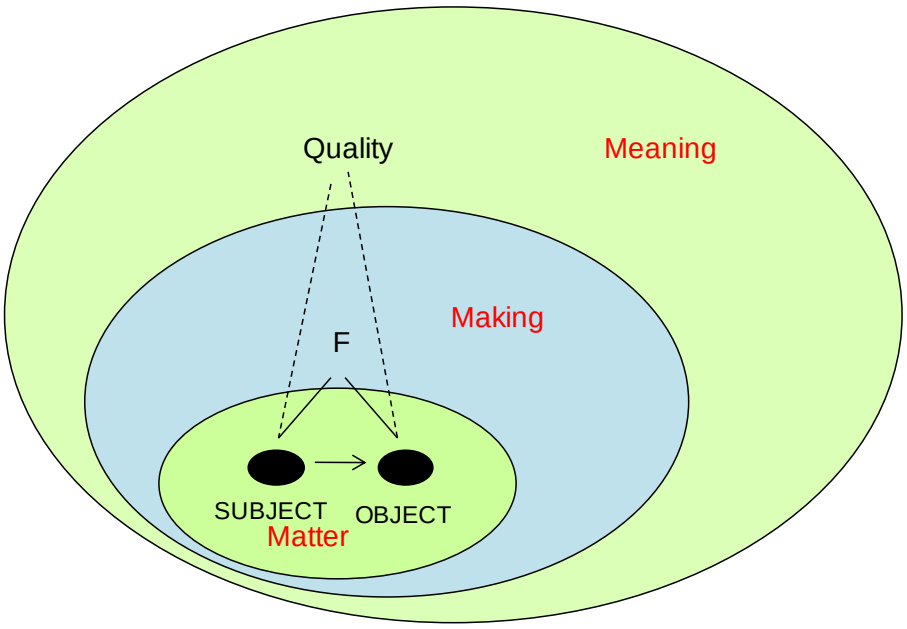


Figure 4: Matter, Making and Meaning and Tangible/Intangible Worlds

One of the implications of this picture is that there is a potentially intriguing extension to the Su-Field model. According to Matchett (and Morgan and Pirsig come to that), all systems exist not just to deliver a useful function, but also to deliver meaning (or 'Quality' in Pirsig's terms). For those familiar with Tao principles, another useful analogy for 'meaning' can be found in the Tao of Design (Reference 3), from which comes this quotation:

"In design meaning and purpose,
the tangible and the intangible
come together enacting the One of everything.
They then separate
enacting the parts of everything.
Separate meaning and purpose
and design will not be understood.
Design is something more."

As suggested within the Figure, what this perhaps suggests is that a more complete Su-Field model would require not just a field but also a meaning or Quality. Or, put another way, a minimum system actually has four rather than three essential elements. More on this in a future article. Meanwhile, we still need to complete two more stage of our 5M journey:

Next up on this front comes the fourth M, 'Media'. This is perhaps the most abstract of all five of the elements of the equation. Not helped by the fact that the word 'media' has quite strong associations these days to the news/information industry, much stronger in fact than was the case when Matchett formulated the equation. Even Matchett fails in many ways to convey the true spirit of his intent. The best we've been able to do is relate 'Media' to the unknown (ether) that surrounds us. Those readers familiar with the Johari Window (Figure 5) will best connect 'media' to the bottom right of the four windows:

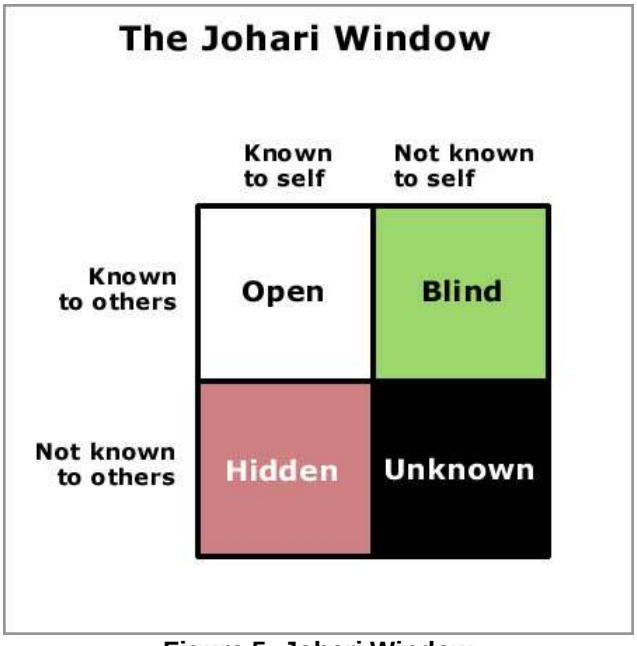


Figure 5: Johari Window

It is, in the Johari sense, all the stuff that's out there that we don't know about yet. For those with a nose for the more concrete, technology author Brian Arthur came pretty close to Matchett's intent in his book, The Nature Of Technology (Reference 4), when he beautifully explained the two possible sources of technical innovation: 1) novel combinations of the known, and, 2) discovery of phenomena that were there all along but

we hadn't seen before. When x-rays or microwaves were discovered, they came from Matchett's Media – they were always there, we just didn't know about them. Figure 6 adds the fourth, Media, M to our set of concentric rings:

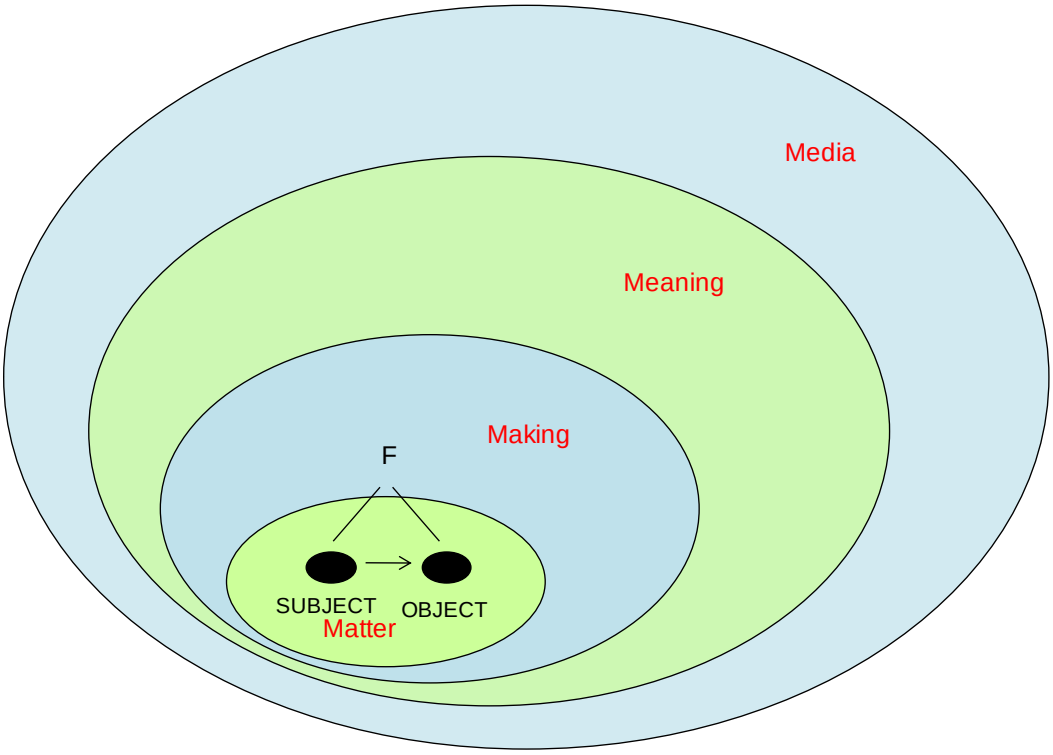


Figure 6: Matter, Making, Meaning and Media

Figure 6 leaves us missing just one more M; Matchett's 'in the Moment'. Or, as Matchett often described it in the overall equation, 'making media-plus-matter meaningful in time ∂t'. Again we can very easily found ourselves here in some quite abstract territory. Matchett said, when trying to explain what in the Moment meant:

"'Making media plus matter meaningful in time ∂t' became my normal method of operation, so normal that it is quite difficult to describe it to you. I can barely remember days when I solved problems and met challenges in any other way. This should be the experience of everyone who learns this process. And there is a huge security in knowing that media will always be available for any and every purpose that the circumstances of one's life leads one into."

The obtuse implication of 'in the Moment' is that we should be able to solve any problem 'instantaneously'. The reality is that what the 5M equation is looking for us to do is train our instincts so that we can determine and examine all of the relevant information and Media for any given situation. Perhaps a more pragmatic connection here comes from modern-day guru Malcolm Gladwell and one of the main messages of his book, Blink (Reference 5). Those that have read the book will no doubt remember the opening story of the art expert who's instinct told him that a painting he was asked to examine was a forgery long before he was able to tangibly prove that this was the case. Here was a man with very finely tuned instincts and very much working in Matchett's 'time ∂t'.

Again we can connect to the work of Robert Pirsig and his follow-up book (Reference 6), the main subject of which was 'Dynamic Quality'. Dynamic Quality, it turns out is also very closely analogous to 'in time ∂t'.

Taken all together, we might now produce a final version of Matchett's master 5M equation as drawn according to the map of concentric circles. Figure 7 shows this map with 'in the Moment' as the outer ring:

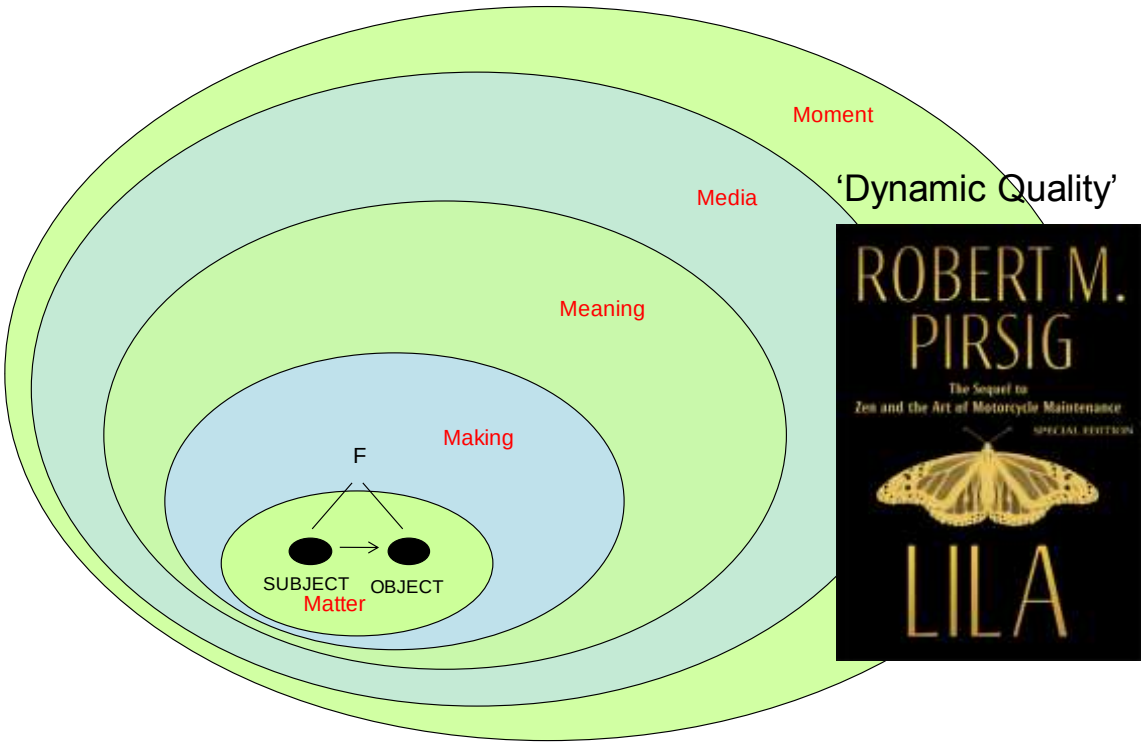


Figure 7: The 5M Equation: Matter, Making, Meaning Media and In The Moment

All in all, it seems to me that Matchett's model is the first one to unify the thinking of many other minds. The fact that he did this without apparently being aware of any of them – or at least the ones mentioned here – makes his achievement all the more astonishing.

I think we're all of us still at the early stages of knowing how best to deploy and make practical use of the equation. The trouble with almost any reduction of massive amounts of complexity is that it can very easily come across as trite and simplistic, whereas the intent was intended to be the opposite. Hopefully things will become a lot clearer when we publish Matchett's follow-on book, The Road To True Professionalism' (Reference 7) in July. In the meantime, if you get no further than the third ring and take nothing more tangible than the idea of a 4-element Su-Field model away from what is written here, we've probably achieved enough for this month.

References

1) Matchett, E., 'Fundamental Design Method: An Introduction', IFR Press edition, 2009.
2) Pirsig, R.M., 'Zen And The Art Of Motorcycle Maintenance: An Enquiry Into Values', Vintage New Edition, 1991.
3) Garant, C., 'The Tao Of Design', Humanics New Age, 1998.
4) Arthur, W.B., 'The Nature Of Technology: What It Is And How It Evolves', Allen Lane, 2009.
5) Gladwell, M., 'Blink: The Power Of Thinking Without Thinking', Penguin, 2006.
6) Pirsig, R.M., 'Lila: An Enquiry Into Morals', Black Swan New Edition, 1992.
7) Matchett, E., 'The Road To True Professionalism', IFR Press edition, 2010.

Not So Funny – 'This Is Broken'

Mark Hurst's 'This is broken' website (http://www.goodexperience.com/tib/archives/product_design/) is a really nice resource for anyone looking for examples of not-so-good design practice. Here are a few of our favourites:

First up a clothes airer from UK retailer, (s)Habitat:

Not sure why else you'd put clothes on an airer unless it was because they were damp and you wanted to dry them. A fairly tight niche of a product, then: an airer for dry clothes. Almost as good as this exciting packaging for Fig Newtons:

A great opportunity for 'open-other-end' roulette; you only get to find out you selected the wrong end after selecting the wrong end. Cunning!

The packaging industry in general doesn't come out of the site looking too smart. Packaging, it seems is too often the annoying after-thought after all the real hard work has been finished. Next up, I've got a sneaking admiration for the packaging for this pair of scissors… which appears to need, err, a pair of scissors to get open. Now I know a left a pair of those laying around somewhere….

Good to know they thought to register the design – wouldn't want anyone stealing that idea! Finally, we head to Arizona for what must be one of the most useful souvenirs of all time. Who wouldn't want their very own cactus-shaped pencil?

If anyone can work out how to use the eraser, please send thoughts on a postcard. Consider that your TRIZ challenge of the month.

Patent of the Month – Colour Enhancing Compositions

Colour is one of the most important aspects of printing inks and paints. Printing inks are used for generating images and text on a variety of consumer and industrial goods. A primary function of the image and text is to identify and differentiate the printed object. The value of image and text can be directly related to the quality of the image including its colour. One of the primary purposes of paints is also to provide a specific colour to the underlying substrate. The value of a paint can also be directly related to its ability to provide a specific colour.

Nearly all printing inks and paints contain three basic ingredients, a colourant, a binder and a carrier fluid. The colourant may be a pigment or a dye. The binder is used to fix colourant on a substrate and to impart end use properties such as water and chemical resistance. The carrier fluid may be water, an organic solvent or a mixture of water and organic solvent. Printing inks and paints often contain other additives to impart specific properties. For example, surfactants may be used to improve wetting of the substrate, bases such as amines may be used to control the pH of the ink and extender pigments may be used to impart bulk to a paint.

The colour of a printing ink and paint is primarily derived from the pigments or dyes used as colourants. Colour strength is a measure of the ability to impart colour. In the case of inks and paints, colour strength is mostly a function of the amount of pigment or dye contained in the ink or paint. There is a need to formulate inks and paints which have adequate colour strength with the minimum amount of pigment or dye. One reason for reducing the amount of pigment or dye is that these ingredients are costly. Other reasons for reducing the amount of pigment or dye contained in inks and coatings are due to environmental hazards associated with these ingredients. Recycling of printed materials such as newspaper, magazines, brochures, packaging materials, and the like is done to reduce the amount of waste sent to land fills. During the process of recycling, printed materials are subject to various processes including removal of inks. Removal of coloured species such as pigments and dyes is necessary as the value of recycled material is also related to its colour. For example, recycled paper with no colour can find greater use and therefore can have higher value than coloured recycle paper. A reduction in the amount of pigments or dyes present in printing inks would be beneficial to obtaining recycled materials with no colour.

Another reason for reducing the amount of colourant in inks is related to the need to use recycled paper and paperboard in a number of applications. The use of recycled paper is made in order to conserve natural resources and to reduce cost. However, additional processing is required in order to achieve a print quality on recycled paper which is comparable to that on fresh stock. Some of the additional processing is needed in order to bleach the recycled stock. White paper is desired for better print quality. However, a colour composition which is able to hide the colour of recycled paper would eliminate the need for bleaching and other processing of recycled paper.

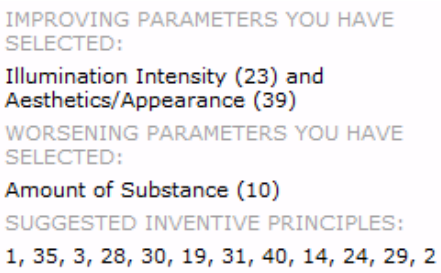
One approach to producing coloured inks and coatings without the use of colouring agents, such as pigments, has been to include sub-micron particles, and specifically microspheres, as scatters in the ink or coating. It is known in the theory of light scattering that size of the scattering sites has an influence on the wavelength of the light that is scattered. This phenomenon is seen when the size of the scattering site approaches the wavelength of the incident light. Under such circumstances smaller scattering sites preferentially scatter shorter wavelengths and larger scattering sites preferentially scatter longer wavelengths.

Hollow microspheres have been made in order to control the hue of white or non-pigmented ink-jet inks. For example, U.S. Pat. No. 4,880,465 (Loria et al) teaches a non-pigmented ink suitable for use in ink jet printing. The ink comprises a resin component, hollow microspheres, and a suitable carrier vehicle. The hollow microspheres each contain a central void region filled with a liquid capable of diffusing through the walls of said microsphere and have an inside diameter from about 0.1 to about 0.5 micron and an outside diameter from about 0.4 to about 1 micron. Loria et al further teach that upon drying the ink formulated with these microspheres forms a coating laden with microvoids which effectively scatter light to produce an opaque image. It is also taught that

the microspheres which do not contain the microvoid are not suitable.

European Patent No. EP 1344804 (Finley et al) teach a non-pigmented ink composition suitable for use in ink jet printing comprising a carrier liquid and a multi-modal blend of polymer particles, wherein each mode has a particle size of between 0.2 to 1.5 micron, at least one mode is a hollow microsphere polymer and at least two modes differ in particle size by at least 0.1 micron. Finely et al teach that the blending of two or more hollow microsphere components having very different cavity sizes or shapes makes it possible to accurately select any desired hue characteristic of a white ink, from a bluish hue to a pure white.

So describes the background to our patent of the month this month. US7,717,992 'Colour Enhancing Compositions' was granted to inventors at BASF on 18 May. The basic conflict solved by the invention is the desire to improve the colour of a paint or ink while at the same time wishing to reduce the amount of colourant used during the manufacture. Here's what that conflict looks like when mapped onto the Contradiction Matrix:



Here's what the inventors tell us about how their invention resolves the conflict:

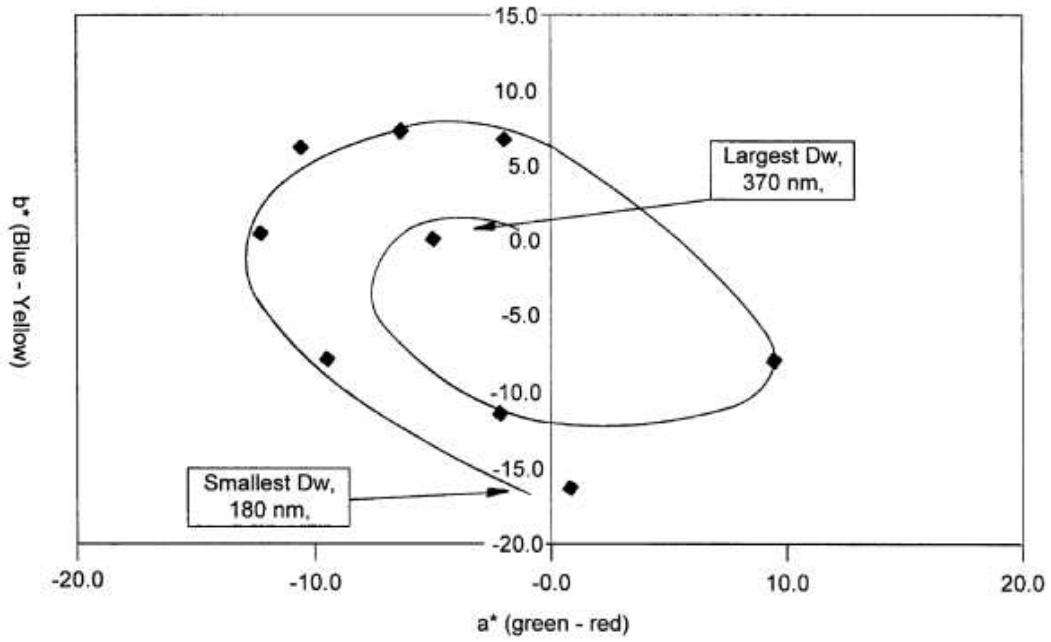
The present invention provides colour enhancing compositions based on chromatically selective scattering particles (CSSPs) with a narrow particle size distribution and an absorber of visible light. In some embodiments the CSSPs may be solid or hollow polymeric particles or inorganic particles and the absorber may be a pigment or dye.

Using the color enhancing compositions provided herein, ink formulations may be fine-tuned to deliver a color image, tone, or printing with specific shades and hues, for a given set of application conditions. In certain embodiments the amount and sizes of the CSSPs in the compositions may be tailored to alter the colour of an ink, paint or coating in a controlled manner.

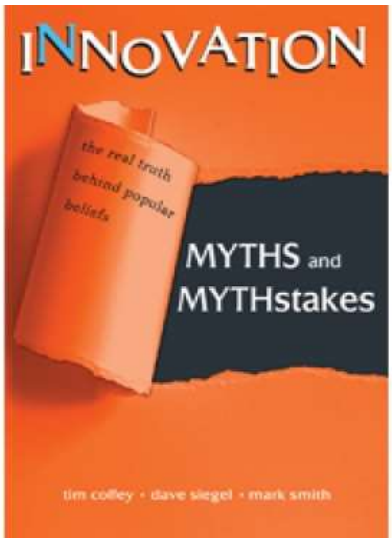
One aspect of this invention provides a color enhancing composition comprising CSSPs with a particle size distribution (PSD) of less than about 1.1 and an absorber of visible light, where PSD=(weight average diameter of the CSSPs (Dw))/(number average diameter of the CSSPs (Dn)). In certain embodiments the Dw of the CSSPs is between about 170 and 360 nanometers (nm). Within this size range, sub-ranges may be selected to order to enhance a particular color. In certain embodiments, the ratio of .lamda.max/Dw, where .lamda.max is the wavelength maximum in the visible light transmission or reflectance spectrum of the absorber, is between 1.8 and 2.2.

Principally, in other words, the inventors have hit upon a critical (PSD) ratio that gives the appropriate light reflection/absorption characteristics. As such, this makes it a Principle 35 solution. Also useful to note is the combination (Principle 40) of scattering and absorbing particle, the ability to tune colour according to different ratios and sizes of particles (Principle 3), and the potential for use of hollow particles (Principle 31).

All in all, changing colour by changing the ratio of particles sounds like a pretty neat trick – making lots of different colours with basically the same constituent parts.



Best of the Month – Innovation: Myths & Mythstakes



US authors (or is it their publishers?) often have an annoying habit of creating tooth-grindingly awful punning titles. Usually such titles serve as a highly appropriate health warning about the contents. This month, however, the acutely awful title of our best of the month disguises the fact that the contents are actually pretty good. Nay compelling.

Tim Coffey, Dave Siegel (a vary affable and knowledgeable product-naming guru we met at a conference in Malaysia at the end of last year) and Mark Smith's 2009 tome is not easily available in the UK right now (probably the title!), but readers elsewhere should definitely think about tracking down a copy. The book is essentially divided into 27 different innovation myths, each one (or nearly – there are one or two that jar given some of the findings of TRIZ) building around some form of twist on prevailing common-sense. For example:

Myth # 10: Brainstorming works -- Not in a million years!
Myth # 6: The Consumer is King -- Balderdash!
Myth # 14: A Great Idea Speaks for Itself -- You're dreaming!
Myth # 19: Facts Convince People to Buy -- Nonsense!
Myth # 13: Great Ideas Will Make You Rich -- Guess again!
Myth # 26: You Have To Please Your Audience -- Not true!
Myth **#** 17: There's No Such Thing As Too Much Innovation – err, yes there is

Crammed full of neat stories (some undoubtedly – hopefully! – apocryphal), this is about as readable as business text books get. For that reason alone, anyone contemplating any kind of innovation culture inside their organization might like to consider ordering a batch of these books for all those people who 'never read business books'.

The main trick with it is to sort the wheat from the (occasional) chaff. But, hey, reading someone who has a polar opposite view to your common sense can never be a bad thing, irrespective of whoever turns out to be right or wrong.

Conference Report – UK TRIZ Forum#2

The build up to May 13 started out feeling a lot like last year's UK TRIZ Forum – with everyone deciding to come at the last minute. After we'd been forced to decide on running the event in the limited space of our UK office in Clevedon. As a consequence, we end up turning people away and just over 20 people found themselves crammed into not-quite-enough space. Nevertheless, the event seems to have been a fairly big hit, with several return visitors noticing a buzz about the event that wasn't present last year. Maybe it was because there gathering is now becoming a community? Or maybe it was because there were no Russians in the room this time telling everyone what TRIZ is and is not, and what can and can't be done? Either way, the day seemed to have a nice spectrum of content. Still not enough real case studies, but then again, no-one coming along to present papers along the lines of 'wouldn't it be nice if someone did this' either.

Unlike last year, too, this year's event was run over a day and a half. The afternoon of the 12th being an introduction to Ted Matchett's Fundamental Design Method (see the second article earlier in the ezine for more details). At this event, the dozen or so attendees were treated to a highly thought provoking session lead by one of Ted's friends and colleagues, and renowned author in his own right, Anthony Blake. Anthony managed to simultaneously get everyone out of their comfort zone ('because that's what Ted would have done') and to start looking at the idea of creative problem solving from a very different perspective.

Day 2, then, followed more traditional lines, with 11 papers being presented:

UK TRIZ Forum #2

Clevedon/Bristol 12/13 May 2010

"You don't understand anything until you learn it more than one way."

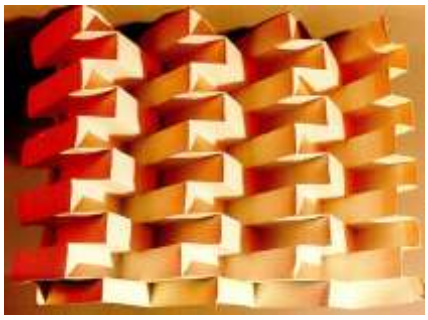
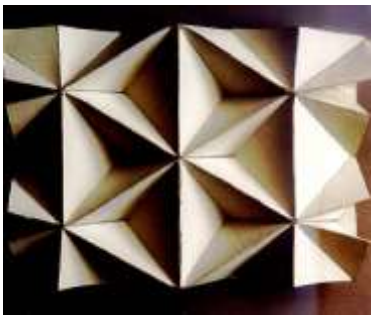
The UK is generating a lot of TRIZ content but it rarely gets presented in the UK. On May 13, we continue putting the situation right by holding the 2nd UK TRIZ practitioner and researcher forum event:

0830 - 0900	Registration & Coffee	
0900-1030	Darrell Mann	Evolution & Deployment Of TRIZ: A Global Survey
	Mir Abubakr Shahdad	AEGIS: Intelligent Mutation Design Support Software Capability Development
	Tomasz Liskiewicz	Case Studies In TRIZ: Fretting Failure In Automotive Electrical Components
	Conall O'Cathain	Case Studies: TRIZ and DSM for Complex Problems
1030-1100	Coffee	
1100-1230	Paul Filmore, Glen Crust	Breakthrough Innovation: Breaking the Habit of Incremental Improvement
	Costas Papaikonomou	Sweating Assets And Low CapEx Innovation
	Paul Frobisher	Improving Innovation using TRIZ
	John Cooke	Open Innovation Contradictions
1230-1330	Buffet lunch	
1330-1500	Darrell Mann	IP Valuation – From Art To Science
	Viktoria Zinner	TrenDNA: Understanding Populations – Differences Between the UK/US and Germany
	Adrian Cole	Creativity and Innovation Learning Online?
1500-1530	Tea break	
1530-1630	Panel Session	(Self-)Organising The Future Of TRIZ
1640	Close	

Difficult as ever to pick out individual highlights, the only thing we can sensibly say at this point is that if you're interested in TRIZ and reading this, you probably need to get hold of a copy of the CD containing the presentations (contact hannah@systematic-innovation.com for details).

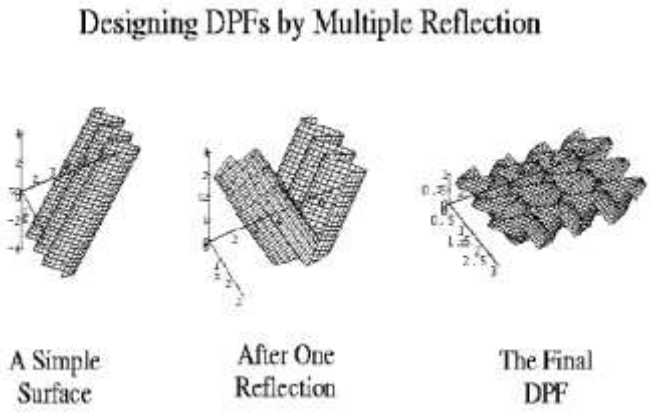
Probably as good an indication of quality as anything was the fact that the house was still full of people in deep discussion over an hour past the scheduled finish time. Part of that discussion involved, a) whether we should do this again next year (consensus = 'yes'), and b) how do we get more people involved. Regarding b), it looks like we may have a critical mass of people willing to put together a webinar session – probably therefore opened up to the rest of the world – featuring short, punchy case studies and short, punchy updates on methods development. Basic idea: short and punchy is in; allowing people to tune in for just the bits they want without having to travel to faraway Clevedon, is also in. If we can get speakers to commit more than 24hours in advance, we're probably in for another good time to be had by all. Probably in November or December.

Investments – Folded Structures

Doubly periodic folded (DPF) sheet is stronger than corrugated construction and has potential applications in aerospace for structures, cars for impact absorption and lighter weight and more effective packaging.

The technology is the invention of Dr. Daniel Kling, proprietor of the Folded Structures Company in New Jersey in the USA, which has recently received two NASA grants to develop the technology for use in aerospace. This has enabled the refinement of automated software to generate folding patterns and finite element test and optimize the resulting structures, and also to permit the purchase and adaptation of composite manufacturing equipment to produce parts for test and evaluation. The folding patterns now exist in many variations, although the most immediate large scale commercial application for them would appear to be weight saving packaging.



Says Dr Kling: "I am a former sculptor. Somebody one day gave me a chunk of a door. I looked at the material used for the core and decided I could do better." He particularly noted that structural foams in general are not very efficient compared with structures where all parts are designed to perform load-carrying tasks. Rather than create more optimal constructions by traditional sculpting and model making methods, he immediately set about devising a software algorithm to automatically generate folding patterns.

Called 'Foldstar', the software is fully functional, but is not at the present time being offered commercially to the rest of the engineering world, although it is planned to do this later (see http://www.foldedstructures.com). Dr Kling has revealed that the software generated a, "Triangular wave described by four parameters", and that it was possible to use it to generate curved structures by, "By designing the patterns with a small offset" in a manner very similar to structures found in the natural world. At the present time, Dr Kling has multiple patent applications passing through the US patent office:

1	20100006210	FOLDING METHODS, STRUCTURES AND APPARATUSES
2	20090291817	Technology for continuous folding of sheet materials
3	20090029838	Patterning Technology for Folded Sheet Structures
4	20070273077	Folding Method and Apparatus
5	20070023987	Folding methods, structures and apparatuses
6	20060148632	Technology for continuous folding of sheet materials
7	20050267616	Patterning technology for folded sheet structures
8	20050113235	Technology for continuous folding of sheet materials
9	20020094926	Patterning technology for folded sheet structures

Dr Kling has also revealed that he is able to design and manufacture multi-laminate components using a batch press with a "die with articulated components", as well as having a roll press to produce folded material continuously. As such the technology has already demonstrated superior strength/weight performance in a number of different roles:

- Civil Infrastructure: Floor decks, bridge decks, road barriers, pre-assembled walls.
- Protection Against Blast: WeidlingerAssociates'expertise in design of walls and structures, waste containers in public places.
- Packaging:Boxes with shock absorbing properties.
- Aerospace and Automotives: Stiffeners, door panels, other structural panels.

All in all, Dr Kling's work reminds us – a lesson nature has learned many times – that folding is a potentially very potent 'free' resource available to just about any physical structure. For more details, check out:
http://www.mech.northwestern.edu/fac/cao/nsfworkshop/presentations/ns4_elsayed.pdf

Generational Cycles – FCUK™

Oh, how the mighty fall! And – we humbly suggest – how predictably.

One of the biggest UK advertising success stories of the last decade has been fashion retailer French Connection's 'FCUK™' campaign. The highly controversial campaign was conceived (accidentally!) by TBWA agency director, Trevor Beattie, in 1997 when he noticed the abbreviation on an internal French Connection fax. He still has the napkin with the original idea - hailed as one of his personal triumphs - scribbled on it, framed on his office wall.

French Connection found that the ensuing controversy suited its brand goals – basically young teens keen to offend their parents – and the strength of the concept has ensured the company has run two hefty campaigns under the fcuk banner every year since.

The majority of these ads have used an fcuk innuendo as their central theme and, although in 2001 the UK Advertising Standards Agency (ASA) banned French Connection from using it in a sentence where it could be interpreted as "fuck", the advertising has pushed this ruling to the limit now on numerous occasions. In 2001, the company ran poster ads promoting its fcukinkybugger website (which were later banned) and, in 2004, ads publicising a tie-up with Boots used the line: "Fcuk vanity."

"It's an amazing and extraordinary campaign that has taken French Connection to an entirely different dimension. From being a not particularly top-of-mind store, it has become part of British culture," Ben Priest, the executive creative director at Rainey Kelly Campbell Roalfe/Y&R, says.

"It's not a classic ad campaign; it didn't stick to the rules - as a fashion campaign, it should, by rights, have featured a model in the shop's clothes. Instead, it has created a whole language and attitude," he continues.

The ads have not gone down so well with the regulators - since the campaign's inception, the ASA has received close to 1000 complaints about French Connection's print and poster ads. Two times during the campaign, things became so bad the ASA ordered an almost unprecedented pre-vetting of all of the company's posters.

However, this wrangling with the regulators did not have any negative effect on the brand - in fact, quite the opposite. Priest says it's almost become part of its strategy. "The controversy makes it cool and edgy and because of its target it can afford to take risks to get talked about," he says.

The complaints didn't had an impact on sales either and, in 1998, the year after the campaign launched, French Connection recorded a 32 per cent jump in year-end profits and a 13 per cent increase in turnover. In 1999, turnover and profits were up more than 25 per cent. Between 1999 and 2003, sales doubled and profits trebled.

But then, here's comes a press release from 2006:

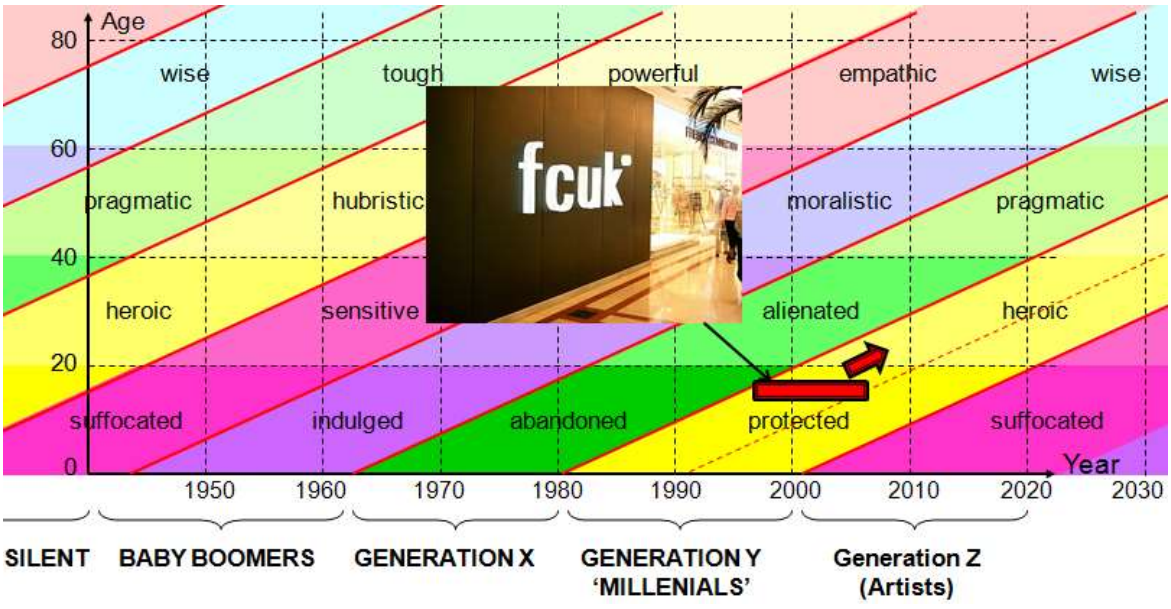
Baugur, which owns 14 per cent of shares in struggling retailer French Connection, has criticised the company's performance. A spokesman said: 'The results are disappointing. It was the first time the company has made a loss in 14 years but what's worrying is that both the wholesale and retail division performed badly.' Baugur is in prime position to buy the chain should its founder Stephen Marks sell his 42 per cent stake in the firm. Marks does not want to sell until he has turned around the firm, which last week posted a six-month loss of £3.6m on decreasing turnover of £111.2m compared with a profit of more than £5m in the same period last year. A spokesperson for French Connection said a turnaround was defined by ensuring the company was profitable.

French Connection sales soared on the back of the ubiquitous FCUK banner but the public has tired of this. Its clothes are considered well-designed but expensive for the mid-market, which has become increasingly competitive and price-driven. The company, founded by Marks in 1972, had issued five warnings to investors in 18 months, saying that profits would be lower than expected. It ditched its advertising agency, Beattie McGuinness Bungay, earlier in the summer after a poorly received brand relaunch campaign that featured a lesbian kiss.

And then another one from March 2009:

Another day, another dismal showing from a high street retailer. This time it's French Connection, which made a £17.4m pre-tax loss in the year to January 31 (it made a £3.1m profit last time around). The fashion chain blamed the US for its wretched results, suggesting that the spending slowdown had been much more pronounced on the other side of the Atlantic – US retail sales were down 3% for the year, despite a series of price promotions that took a big bite out of profit margins. And with its once-edgy FCUK brand now looking a bit past its best, it's hard to envisage a recovery in 2009 as the recession deepens…

Now in the heart of 2010, it still seems that the company has failed to accept that the idea they thought would last forever has finally come off the tracks. Really, they only needed to look at the story through the lens of a generational cycles map to get to the heart of the problem. Here's what that map might've looked like:



First up, what's interesting about this picture is how 1997 coincided with the start of a new generation of teens reaching the fashion-buying age. Whether luck or by judgment, the first FCUK campaign arrived at a key time in generational history.

Generation Y teens, like all those before them, reach a point in their lives where they want to do exactly what their parents don't want them to. Wearing a t-shirt emblazoned with quasi-naughty-words was a great way of annoying the older (moralistic) Boomer parents, and probably even better, was highly likely to be tolerated by (alienated) Gen X parents, who didn't give a stuff anyway, and probably loved the idea of annoying *their* moralistic parents by allowing their kids to walk around with said rude words written on to their clothing.

But then, all good things must come to an end, and fashion, like its close cousin popular music, runs in half-generation cycles. Come 2007, in other words, and the company should've had a pretty good idea that the end was nigh. Alas, like so many that come to rely on the goose laying more golden eggs, no-one is brave enough to put a stop to proceedings, and so we end up with an increasingly depressing, increasingly desperate (e.g. lesbians kissing) series of attempts to revive the same basic idea.

The message from a generational look at the fcuk story: give it up guys, the time of the anagram swear-word slogan is over. Mr Beattie, you need to take that napkin off the wall and start scrawling on a new one. Or, more probably, get one of your now-grown-up Generation Y staff to do it.

Biology – Schooling Fish

Schooling fish must count as one of the most hypnotic sights on the planet. One of the most obvious reasons for swimming in close formation with other fish is protection. Slightly less obvious is the fact that by swimming close together, each individual fish minimises the amount of energy it needs to expend in moving with the shoal from one place to another. According to recently reported research by John Dabiri, a fluid dynamics expert from the California Institute of Technology, it seems that many fish species have adopted strategies which further help to minimise the use of energy. Far from being a random collection of fish, Dabiri observed two intriguing features about shoals:

1) the vortices left behind individual fish sometimes rotate clockwise, and sometimes counter-clockwise.

2) the fish and their vortices were arranged in a staircase pattern relative to one another such that a fish swimming behind another fish benefits by being either slightly higher or lower so that it gets to make best advantage of the vortices shed by the leading fish.

In evolving these strategies, schooling fish have successfully challenged a classic fluid dynamic conflict – how to minimise energy usage when the system (fish in this case) has a certain size (and therefore resistance to motion through the fluid. Here's what that conflict looks like when mapped onto the Contradiction Matrix:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Energy used by Moving Object (16)

WORSENING PARAMETERS YOU HAVE SELECTED:

Area of Moving Object (5) and Volume of Moving Object (7)

SUGGESTED INVENTIVE PRINCIPLES:

25, 15, 13, 19, 35, 4, 18, 3, 29, 2, 14, 17

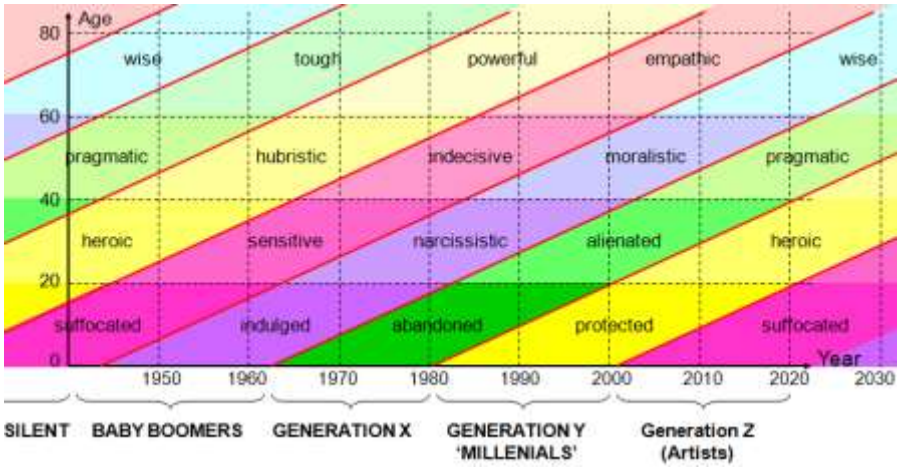
Interesting to note that both of the strategies used by the fish are found in the list of Principles used by human inventors, namely Principles 15 and 13 (Dynamics and Other

Way Around) – i.e. the use of clockwise and counter-clockwise vortices, and Principle 17 (Another Dimension) – i.e. the ‘staircase’ pattern. Although not observed by Dr Dabiri, we also strongly suspect that the fish also make use of Principles 18/19 in that adjacent fish will use the variation in vortices due to the oscillatory motion of the lead fish to further minimise the energy they have to use.

In many ways, schooling fish have evolved similar strategies to those found in V-formation flying geese – where this at the back of the formation gain advantage from ‘resources’ created for them by those at the front. It would interesting to know – although again we can probably guess – that, as with geese, fish too will take it in turns to be the one at the front of the formation.

Meanwhile, Dr Dabiri’s interest in the fish schooling strategies is whether the alternating vortices and staircase patterns have any relevance in wind-farm design. Curiously, in true information-goes-full-circle manner, had he looked at certain wind turbine patents, he would have realised that the benefits of using alternating and staggered vortex shedding have already been observed by some in the field. Which, if we can be immodest for a moment, is most likely why the Matrix picked the strategies up. Either way, though, it’s good to know that everyone is now on the same page.

Short Thort



An important idea behind the generational archetype characteristic changes as presented in our year-versus-age maps is that of exaggerating the differences.

No 'protected' Generation Y person suddenly flips a switch on their 20th birthday to suddenly become 'heroic'.

The point is that, because so much of the innovation story is about the identification and resolution of contradictions, it is only by exaggerating differences that the conflicts become properly visible.

News

India TRIZ Conference

The first official TRIZ conference in India takes place in Bangalore from 28-30 July. With a following wind and some cunning travel itinerary trickery, we should be there to present a keynote address.

China TRIZ Conference

The First Beijing International Workshop on Intellectual Capital, Creative Industry and TRIZ takes place on 18 and 19 September at the Beijing Research Centre for Science of Science. Again, with some fortunate planning, we will be there too to present a keynote address. There must be something in the air.

The Road To True Professionalism

We are happy to announce that we have been given permission to re-print the second in the series of Edward Matchett books. The Road To True Professionalism is the result of Ted's work, commissioned by the UK government in the 1960s, to uncover the DNA of 'genius'. Stirring, thought-provoking stuff. The book should be available from early July. Details on the Products page of the website.

Journeys Of Nothing…
Also relating to Ted Matchett, we are happy to announce that, having now found the original artwork for Ted's book 'Journeys of Nothing In The Land of Everything', we will be re-printing a limited edition run of this lost classic book. The book will be a precise facsimile of the original hard-cover edition, and should be published around the same time as The Road To True Professionalism. In the meantime, Brenda Matchett (Ted's partner) has available about 10 copies of the original edition of the book. If anyone is interested in acquiring a genuine collector's item, the first 10 people to contact Hannah, will have first refusal on these super-rare items.

UK TRIZ Forum#2
The event held in Clevedon on May 13 was a big success (see review earlier in this ezine). A CD containing the day's presentations is available for the miserly sum of 20GBP for those people who weren't able to attend in person. Interested parties should contact Hannah in the office – hannah@systematic-innovation.com.

TRIZCON
The aborted April TRIZCON event in the US is now re-scheduled for 7-8 October. In theory our paper contribution on 'Collateral Beauty' is still included in the programme and will be presented.

Korea
Following our cooperation agreement with Korean consulting organization, KMAC, we will be running two one-day 'Business TRIZ' introductory sessions on 1 and 2 July. More details on the Experience page of the website.

Breakthrough Advertising Campaign Design
Our new one-day workshop aimed at marketers gets its first outing in Austria on June 14. That session is already sold out (!). We're planning to run equivalent events in the UK and Australia in September and October. Details on the Experience page.

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

- FMCG – Evolution Potential analysis
- Automotive – strategic study
- Construction – problem solving project
- Manufacture – SI certification workshops
- Medical Devices – strategic study
- ICT – problem solving workshops