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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Readers' comments and inputs are always welcome.
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Case Study: Predictive Policing

One of the most commonly cited science-fiction movies of recent times, usually when it comes to the 'accurate' vision it portrays of the future, is 2002's Spielberg-directed, 'Minority Report'. That the film is based on a short story by futurologist-supreme, Philip Dick, is probably another good indication of the thought provoking insights it contains. The basic premise of the film, set in the year 2054, is the ability of law enforcement agencies to anticipate a crime just before it is about to happen. "PreCrime", is about apprehending criminals based on foreknowledge. In Dick's vision of the future the foreknowledge capability is provided by three psychics called "precogs". That's probably the bit he got wrong. In the actual 21st Century, predictive policing is much more likely to be achieved through cunning use of Big Data Analytics. 'Meta-data doesn't lie'. But it does require some pretty smart algorithm design to begin to make sense of the hidden messages it might contain about what might happen in the future. This case study article isn't like most. Predictive Policing is the lofty ambition of certain law enforcement agencies, but as far as we can see no meaningful solutions exist as yet. This, then, is a case study aimed at describing how we might set about making sense of highly complex and fuzzy situations and ill-defined solution technologies. That hopefully don't involve the need for psychics.

A good place to start in such situations is a search of precisely what is already out there. A cursory look at media stories of law enforcement agency inability to predict what the media have been able to demonstrate – with amazing 202/20-hindsight! – was very predictable would appear to suggest that if there are predictive policing capabilities out there, they are not being used in the vast majority of situations. The patent databases of the world – always a good place to start some kind of a 'someone, somewhere already solved your problem' search – don't appear to highlight much by way of breakthrough solutions, either, although perhaps one wouldn't expect many inventors to publish their crime prediction recipe book for the criminal fraternity to study. All that said, in the US there is a reasonable size cluster of patents and patent applications which at least provide some clues as to the state of the art. US8,949,164, 'Event Forecasting System' for example, talks about a variety of crime contagion models that can be used to help law enforcement officials to predict a likely spreading geographic wave of burglaries given that a particular type of burglary takes place in one location. Burglars, in other words, might not know that they leave behind a target location 'fingerprint' when looking for their next victim, but in fact they do.

Beyond this, the (public domain declared) world doesn't seem to have too much insight into other patterns of criminal behavior that might exist. Which on the one hand doesn't bode well for deriving a meaningful set of solutions, but on the other implies the need to incorporate some form of 'self-learning' solution. What we're talking about here is a typical next stage in trying to solve a fuzzy, highly complex, unstructured problem: what does the Ideal Final Result look like?

Maybe something like, 'the ideal predictive policing system should make meaningful predictions of what is likely to happen in the future based on its ability to self-organise and self-learn from self-correcting input data'.

In terms of the Trends of Evolution, the predictive policing objective might also be seen as the jump to 'feed-forward' on the Controllability Trend – Figure 1:
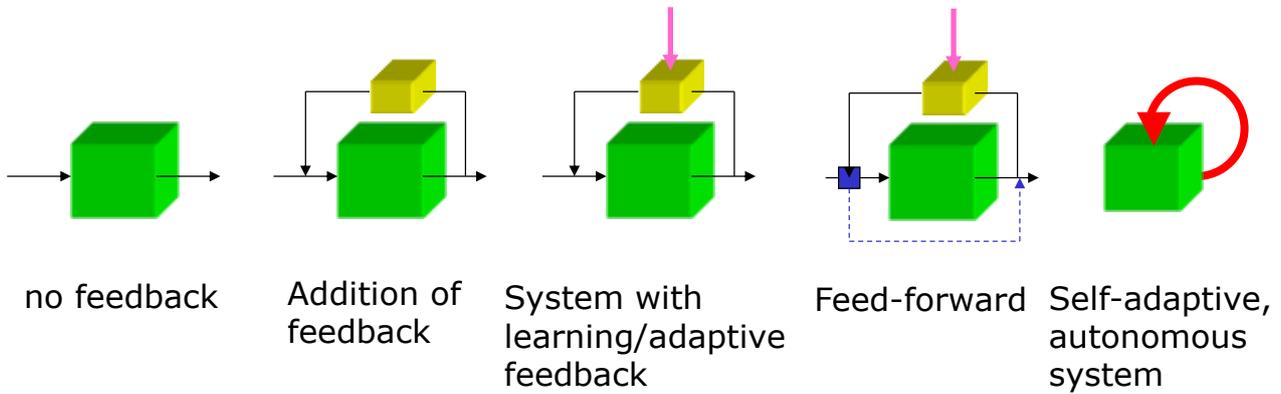
Figure 1: Controllability Trend

The trend stage immediately before 'feed forward' also offers up a clue about the capabilities that an ideal solution might need to incorporate. A knowledge search (patent database again) for learning/adaptive solution capabilities reveals a much bigger pool of available options. From Bayesian mathematics to Genetic Algorithms to Artificial Neural Networks, there are a lot of candidate 'self learning' solution options already in existence. The challenge in creating a predictive policing capability at this point thus largely boils down to one of whether there is a critical mass of available data with which to 'train' such learning algorithms?

A question that will typically take us to some kind of search for available resources. Which in turn will usually involve some form of '9-Windows' analysis. Or rather, in this case, an evolved version of the tool as described in Reference 1, where we are encouraged to think about as many 'moments of truth' as we think might be present in the world of crime. Figure 2 illustrates what some of these Moments of Truth might look like:
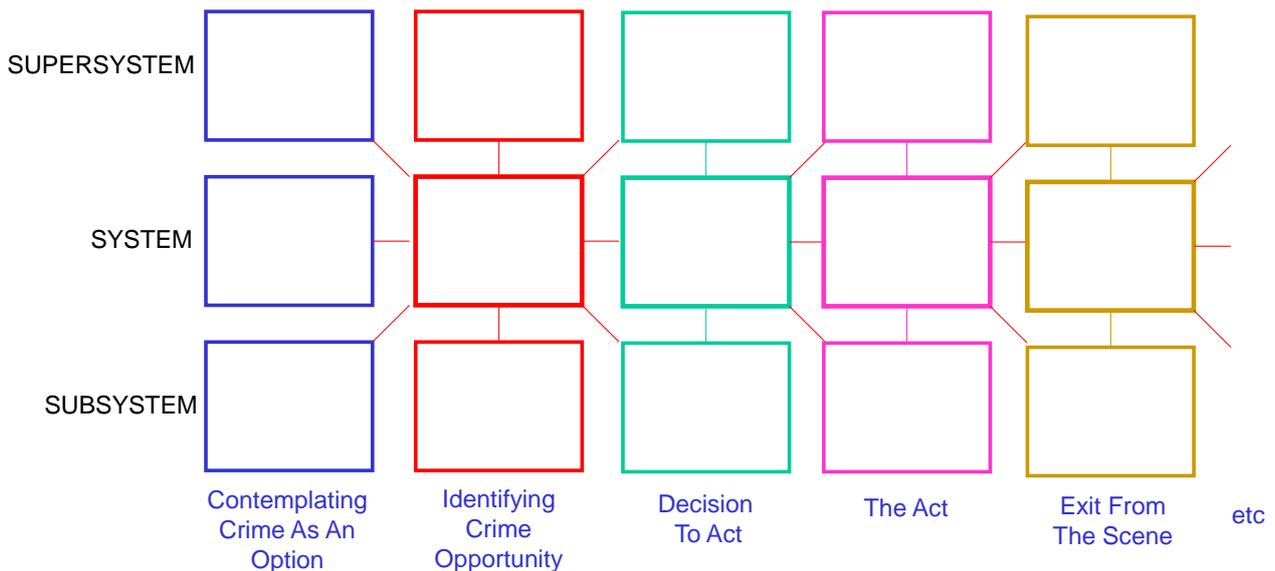

Figure 2: Moments Of Truth In 'Predictive Policing' From The Criminal's Perspective

As is the usual convention when trying to uncover a Moment of Truth, what we're looking for are discontinuous shifts from one state to another. When we – or a potential criminal – experience a Moment of Truth, something inside us has changed. We see the world differently or will behave differently as a result of that change. The Moment, for example, that a person that has never contemplated breaking the law before suddenly finds themselves having crossed a boundary that allows law-breaking as a possibility has

fundamentally become a different person. As has the person that decides to act on that possibility.

As ever also, the key to making best use of the Windows tool is the identification of resources that exist that currently are *not* being utilized. To paraphrase an overused crime cliché, it's the 'unusual suspects' we should be on the look-out for here. And specifically ones where we can identify at least a correlation with crime or an intention to commit a crime. Figure 3 illustrates some of the things that emerged when we looked inside some of the boxes:

Figure 3: Possible Untapped 'Predictive Policing' Resources

Another important part of this 9-Windows resource search at this stage of the proceedings is a search for things we don't know. Of which, even a cursory examination here reveals many items. Not least of which is whether any of the parameters we can see have a *correlation* to crime – the weather for example – are in actual fact *causally* linked. The point, ultimately, especially when we are using learning algorithms, is that the software can ultimately do a lot of the hard work for us in helping to distinguish between causation and correlation: our job is to find as much input data as we can, pump into the calculation engine and see what comes out the other side.

Meaningful predictions will ultimately only come through harnessing of a critical mass of causal parameters. At this point in time, we cannot know whether such a critical mass has been achieved. What we do know, however, is that the PanSensic capability is already allowing us to contemplate measuring things that the law enforcement agencies appear to have not examined. We cannot know for certain, for example, that scraping local newspapers and other media commentary for anger and frustration content will provide us with a causal link to propensity to commit crimes, but at least knowing we are able to make the measurement and that we can build the results into a learning algorithm software tool allows us to at least begin to answer the question. Ditto with all of the other PanSensic lenses – what does the (changing?) Spiral Dynamic level of a community tell us about the likelihood of future crime? The (JupiterMu – Reference 2) root metaphors people use? The Archetype profile? Their Myers-Briggs profile? We don't know. But we

know we can measure them. And that having got the measurements, we can use them as inputs into an Artificial Neural Network.

The point, at this stage, is not that we are anywhere close to achieving the critical mass of causally related crime prediction parameters or getting anywhere close to solving the problem, but more a structured procedure for ensuring that one day we will have. Ultimately, it's about seeing what's out there, it's about defining what 'ideal' looks like, it's about finding resources, and, perhaps most of all, it's about identifying all the things we don't know and systematically building tools and measurement instruments that, one by one, allows us to turn them into 'knowns'.

References

1) Systematic Innovation e-zine, '9-Windows – Sometimes Sufficient; Sometimes Not', Issue 54, September 2006.
2) Mann, D.L., Howarth, P., '**Jupiter$^{\mu}$:** Closing The Say/Do Gap', Systematic Innovation White Paper series, www.systematic-innovation.com

Innovation Timing: When Bad Becomes Good

Apparently the Christmas gift of choice in the US in 2014 was the selfie-stick (Figure 1). The product quite literally went viral. Almost as viral as the selfie itself. 'Show Business Kids makin' movies of themselves...' to quote the ever prophetic Steely Dan.

Figure 1: Selfie-Stick – 2014 Style

The weird thing about the phenomenon, aside from the seemingly universal narcissistic desire to take photos of yourself, is that if we spool the clock back a couple of decades the selfie-stick had already been invented (Figure 2). The only difference between then and now is that the 1995 version of the selfie-stick found its way into the first Chindogu book (Reference 1). Chindogu, for the un-initiated, being the Japanese art of 'un-useful invention'. Inventions, in other words, that were deliberately dumb.

Figure 2: Selfie-Stick – 1995 Style

So what changed? How did a deliberately stupid invention end up taking over the world? What changed?

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We often use Chindogu as an illustration of the dynamic that sits at the centre of emotional 'wow' reactions (Reference 2). In this model, 'wow' occurs in three phases. The first phase is that we notice things that are different; the second is that we classify whatever it is we just noticed in terms of what *job* it does; and finally we make a value calculation (perceived- benefits-divided-by-cost-and-harm), and if the new thing appears to deliver higher value than the thing we currently use to deliver the function, then the 'wow' reaction is invoked. Chindogu deliberately seeks to get the third stage of this model wrong, such that the 'wow' we experience is the polar opposite of the one that we would wish for if we were attempting to create a breakthrough innovation.

It is this third stage we need to look at in order to see if there is a rational explanation for the shift in fortunes of the selfie-stick.

Or, almost. In order to calculate value, we need to understand what job the selfie-stick performs, and what we used to do previously when that job had to be performed.

The principal tangible job of a selfie-stick is to allow a person to take a photo of themselves. The way we used to do the job before the selfie-stick arrived was that we used to ask someone else – a passerby usually – to take the photo for us. A solution that, on the face of it appears to be a lot more effective in its use of available resources. Tangibly, the selfie-stick seems like a lower value, inferior solution to the passerby alternative – we have to buy the stick, we have to carry it around with us, and we always end up with the same basic photo, probably with our hand in an unnatural 'holding selfie-stick position.

We have to examine the intangibles to see if there has been a meaningful shift in the overall value equation. Which these days usually means examining the ABC-M universal intangibles (Reference 3). And in this case, examining any changes between the ABC-M levels between the passerby and the selfie-stick. Figure 3 summarises what we think those differences might be:

	Passerby Positives	Passerby Negatives	Self-Stick Positives	Selfie-Stick Negatives
Autonomy	'I have a better camera than you'	They might run off with my camera. I can't ask them to retake the photo.	I'm totally in control of the photo. And I have a better camera (and selfie-stick) than you	
Belonging	Start a conversation with a stranger	It's polite to intrude on peoples' time for one quick snap, but ask for multiple photos and the passerby will quickly become annoyed.	Now everyone in the tribe can be in the photo. We can take as many pictures as we like.	Other people think I'm a narcissist
Competence		They feel embarrassed when they don't know how to use my camera. They probably won't take a good photo (and I'll waste expensive film)	It's intuitively obvious.	
Meaning			More photos of me living my meaningful life.	

Figure 3: ABC-M Shift Between Passerby And Selfie-Stick

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Looked at through this lens, it doesn't seem nearly so surprising that the selfie-stick really has become a 'better' solution than it was in 1995. The key shift here seems to centre around the emergence of the digital camera as a replacement for film cameras. With a film camera, the photographer had a limited number of photos they could take before the roll of film ran out, and each photo – good or bad – was going to cost a very tangible and significant amount of money to go and get processed. Digital cameras meant an effectively infinite number of snaps could be taken, each one at zero cost. The lack of tangible impediment to taking photos meant that people started taking lots more of them. Which meant the passerby-politeness intangible became a bigger and bigger negative. To the point where now when we see someone with a selfie-stick, while we might think the owner is a vain oaf, we don't think it's a Chindogu joke anymore.

And In The Future?
So does this mean that we should all go out and buy shares in selfie-stick manufacturing companies? Is the selfie-stick a good long term bet?

In all likelihood the answer has to be a no. In no small part because of the negative 'Belonging' intangible, but more likely because sooner or later – probably sooner – some smart person at Canon or Samsung is going to write a piece of software that allows my camera to take a distant picture of me even though I'm still holding the camera. I want the function of the selfie-stick, in other words, but I don't want the selfie stick. The answer, as is often the case with these kinds of situation is a spot of A-Level geometry and a few lines of software code.

References

1) Kawakami, K., '101 Un-Useless Japanese Inventions', HarperCollins, First Edition Printing, 1995.
2) Systematic Innovation E-Zine, 'Deconstructing 'Wow', Issue 81, December 2008.
3) Systematic Inovation E-Zine, 'Universal Intangibles', Issue 140, November 2013.

Not So Funny – Inventive Principle 41

A few years ago it seemed like the whole TRIZ community scoffed at us when we suggested 'Change Function' was a good candidate for Inventive Principle 41. We ignored them anyway when we assembled the solution generation part of the TRenDNA book, but we always had the vague thought that Viagra and Post-Its hardly counted as sufficient proof that 'Change Function' existed as an actually breakthrough strategy. Now, finally, we have a much more impressive portfolio of Change Function examples. Engineers of the world, we salute you…
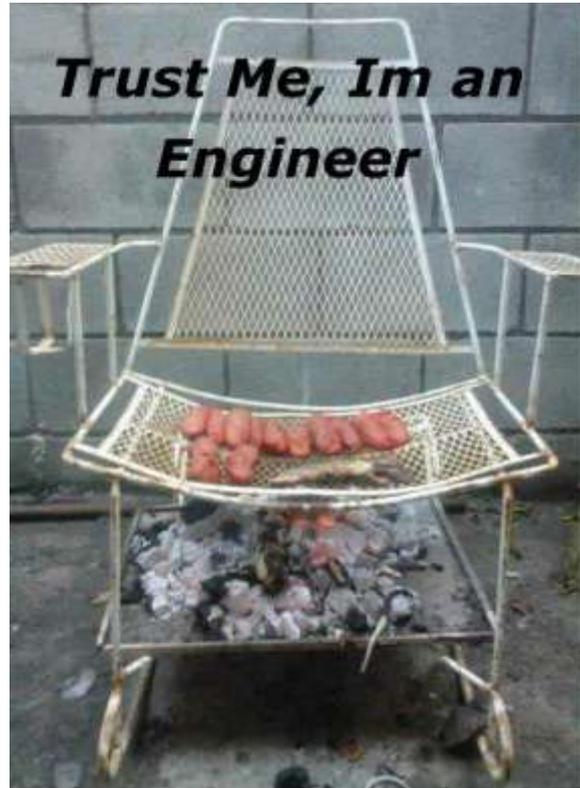
(this one is probably also a good illustration of Principle 17)

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And my current favourite:

Patent of the Month - Fire Extinguishing System

Our patent of the month this month is one we've spent an awful long time watching. In the end it's taken close to an incredible eight years to wind its way through the US patent office, but, finally, on 3 February, it received patent number US8,944,173. Congratulations to a pair of inventors at the University of Leeds in the UK. Probably for their patience more than anything else. When a patent application takes such a long time to make it through the Examiner's scrutiny, it's usually a sign of a weak invention. In this case, however, I'd have to say that to me this is a solution that is anything but weak. Perhaps the real problem has been that the invention disclosure has tried to stretch the core idea too far. Although the patent is granted as a 'fire extinguishing system', the disclosure still talks about ink-jet printers, internal combustion engine fuel sprays and medical devices like nebulizers. All of which have an element of the same basic problem:

The present invention relates to a method and apparatus for ejecting target mass. In particular, but not exclusively, the present invention provides a method and apparatus for a fast mass ejection device able to eject liquid and/or liquid vapour quickly and over relatively long distances from an ejection chamber in which a quantity of liquid is stored. Still more particularly, but not exclusively, the present invention relates to a fire extinguisher and method for extinguishing fire.

There is a need in a number of industries for mass ejection devices. That is to say, devices which will send out a spray of liquid and liquid vapour at a fixed or variable rate and over a desired distance. Preferably there is a need for a spray of liquid and liquid vapour to occur at a fast rate and over a great distance. In such systems the term "throw" is often referred to as a characteristic of a spray. The throw of material is defined as the distance traveled divided by the length of a chamber from which the spray is ejected...

…By way of an example of a problem specific to an application of mass ejection systems, reference is made to a fire extinguisher. A conventional fire extinguisher, whether handheld device or fixed sprinkler system, will eject water by a high pressured water forced through a nozzle. The problem with this method for suppressing and extinguishing fires is that generally large amounts of water are required, and the large amounts of water can be very damaging to the environment in which the fire has broken out. Also there is a requirement to provide extinguishment rapidly when a decision is made. Also deployment of the extinguisher should be directed either generally or in one or more specific directions.

The basic conflict here is between the desire to 'mass eject' (Amount of Substance) a material versus the problem of 'throw', or, how far we're able to project that material. i.e. the more material I have to throw, the more difficult it is to throw it a long way (Length). Here's how we might best map that problem onto the Contradiction Matrix:

And here's how the inventors have resolved the problem:

1. Apparatus for extinguishing a fire, comprising: an ejection chamber to hold a portion of a selected extinguishing liquid; an inlet valve arranged to selectively open to transfer extinguishing liquid into said ejection chamber and then to selectively close to seal the portion of the selected liquid in the ejection chamber; an exit valve arranged to selectively open to eject extinguishing liquid from the chamber through the exit valve in a *vapor explosion process**, then through a neck region when a parameter associated with said ejection chamber satisfies a predetermined condition such that opening of the exit valve causes liquid in the ejection chamber to boil rapidly within the ejection chamber, the neck region being narrower in cross-sectional diameter than the ejection chamber; at least one pressure or temperature sensor that generates one or more signals for determining pressure in the ejection chamber; and an electronic controller for electronically controlling the inlet valve and exit valve to selectively open and close based on the pressure in the ejection chamber determined from the one or more signals received from the at least one pressure or temperature sensor; wherein extinguishing liquid and/or extinguishing liquid vapor are ejected from the ejection chamber via the exit valve, and wherein said exit valve is arranged to open when a temperature of the liquid in the ejection chamber is above a boiling point temperature associated with said liquid at a downstream position from the exit valve, and wherein the parameter is the temperature of the liquid in the ejection chamber and the predetermined condition is the temperature of the liquid being above said boiling point temperature.*

Which all makes for a really good illustration of Principle 36, Phase Transition. Sometimes the Matrix still manages to surprise me. Principle 36 is one of the least frequently observed of the 40 Principles, and not one of the ones that I would normally even think about linking to a 'length' problem… turns out the Matrix knows best…

…In the same way that nature does too. The reason we've been watching the application is that the Leeds inventors took their inspiration from the Bombardier beetle's extraordinary 'throw' solution. Take a look at our old TRIZ Journal article for more details.

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Best of the Month – Seventeen Contradictions And The End Of Capitalism
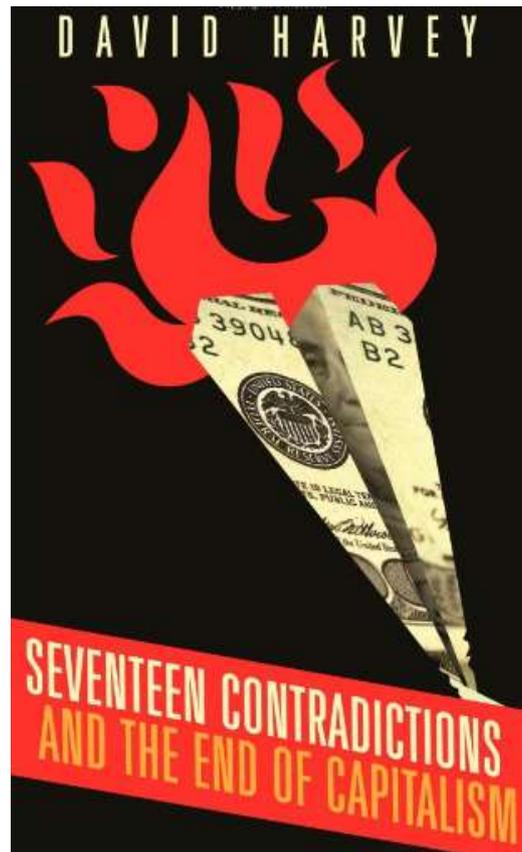
Contradictions – and an author that actually understands their importance – and economic bad news. What more could anyone want from a book? Not me anyway. Especially since we've been doing some work to try and unravel the mystery of the still-to-come-to-a-head 'real' global Crisis. Having now read through David Harvey's impressive big-picture tome, I'd have to say that there's a pretty good chance that one of his three contradiction clusters ('Foundational', 'Moving' and 'Dangerous') and seventeen candidates is going to be the one that tips us all off the edge of a cliff.

To modern Western society, capitalism is the air we breathe, and most people rarely think to question it, for good or for ill. But knowing what makes capitalism work–and what makes it fail–is crucial to understanding its long-term health, and the vast implications for the global economy that go along with it.

In *Seventeen Contradictions and the End of Capitalism*, the eminent scholar David Harvey, author of *A Brief History of Neoliberalism*, examines the internal contradictions within the flow of capital that have precipitated recent crises. The drive, for example, to accumulate capital beyond the means of investing it, the imperative to use the cheapest methods of production that leads to consumers with no means of consumption, and the compulsion to exploit nature to the point of extinction. These are the tensions which, Harvey proposes, underpin the persistence of mass unemployment, the downward spirals of Europe and Japan, and the unstable lurches forward of China and India.

He contends that while the contradictions have made capitalism flexible and resilient, they also contain the seeds of systemic catastrophe… in TRIZ terms, 'there's always going to

be the next contradiction'. Many of the contradictions are manageable, but some are at the same time potentially fatal: the stress on endless compound growth, the necessity to exploit nature to its limits, and tendency toward universal alienation. Capitalism has always managed to extend the outer limits through "spatial fixes," expanding the geography of the system to cover nations and people formerly outside of its range. Whether it can continue to expand is an open question, but Harvey thinks it unlikely in the medium term future: the limits cannot extend much further, and the recent financial crisis is a harbinger of this.

David Harvey has long been recognized as one of the world's most acute critical analysts of the global capitalist system and the injustices that flow from it. In this book, he returns to the foundations of all of his work, dissecting and interrogating the fundamental illogic of our economic system, as well as giving us a look at how human societies are likely to evolve in a post-capitalist world. Scary stuff. I heartily recommend it to anyone with a strong stomach and a will to make a difference even though everything seems depressingly outside your sphere of influence.

Or, failing that lofty aspiration, maybe think of the book as a great opportunity to practice mapping 17 contradictions onto the Contradiction Matrix. Which, come to think of it, isn't such a bad idea for a future article.

Wow In Music – Zadok The Priest
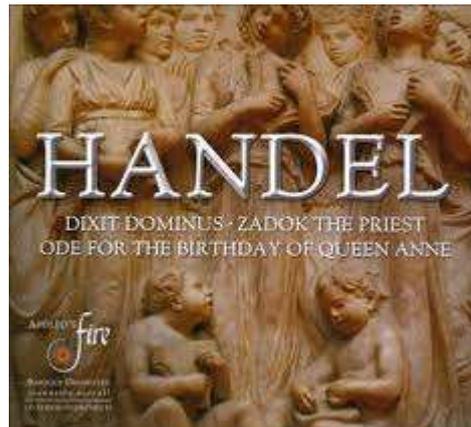
One of Handel's four Coronation Anthems (the others being The King Shall Rejoice, My Heart is Inditing, and Let thy Hand be Strengthened), Zadok the Priest was originally commissioned by King George I for the coronation of his successor, King George II in 11 October 1727 and has been used in the coronation of all British monarchs since then. Worthy of stately affairs, and resulting from the composer's ability to match the music to the occasion, this masterpiece is often described as magnificent, majestic, and glorious. Interestingly, football fans also know it as the UEFA Champions League Anthem after an arrangement by English composer Tony Britten.

Of unclear antecedents, Zadok was "priest of David and Solomon and the progenitor of the high priests of the temple" (Olyan, 1982). The words, adapted from the first chapter of the first Book of Kings and derived from the biblical account of the anointing of Solomon, have been used since the coronation of King Edgar the Peaceful in 973:

Zadok, the Priest, and Nathan, the Prophet, anointed Solomon King; and all the people rejoic'd, and said:
God save the King, long live the King, may the King live for ever!
Amen! Hallelujah!

The music, with little harmonic surprises, is in D major (mainly) due to the fact that it allowed the composer to exploit the sound of the trumpets, generally played in this key at the time (Music Teachers, 2001). The initial section, a traditional Baroque ritornello in 4/4 based on strings, oboes and bassoons, is typical of the period without any particular feature that would differentiate it from what the listener would expect. After that, however, prepared by a short crescendo, bar 23 (around 1:22 min) introduces the choir, trumpets and drums to a magnificent and unexpected (Principle 38) appearance. Intensity goes from a pale 'pp' to a powerful 'f' solemnly announcing: the king is anointed, rejoice all people. Soon after that (bar 31, around 1:50 min), with yet another (Principle 19) change, the introduction of the 3/4 time division reinforces the sense of ecstasy. Looking back, a totally new meaning is given to the initial section: the repeated ascending arpeggios were there to announce that something bigger was to come. A contradictory sentiment is suggested: wasn't that obvious? how come I wasn't expecting that?

In Zadok the Priest, wow is achieved by transformation, from a long process of expectation and suspense produced by repetitive musical patterns, to an unpredicted moment of climax - all that in the space of less than two minutes. The story ends in the

fourth section (bar 63, around 2:38 min), a return to the 4/4 time signature, choir and instruments announcing: God save the King, long live the King! The coronation of wow.

References
- Olyan, S. (1982). "Zadok's origins and the tribal politics of David." Journal of Biblical Literature: 177-193.
- Westminster Abbey - Coronation Service guide and reading list". http://www.westminster-abbey.org
- Music Teachers Online Journal (2001). AQA Advanced Level Notes - George Frederick Handel: Coronation Anthem: The King Shall Rejoice. http://www.musicteachers.co.uk/

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Investments – Circadian Clock Reset Button
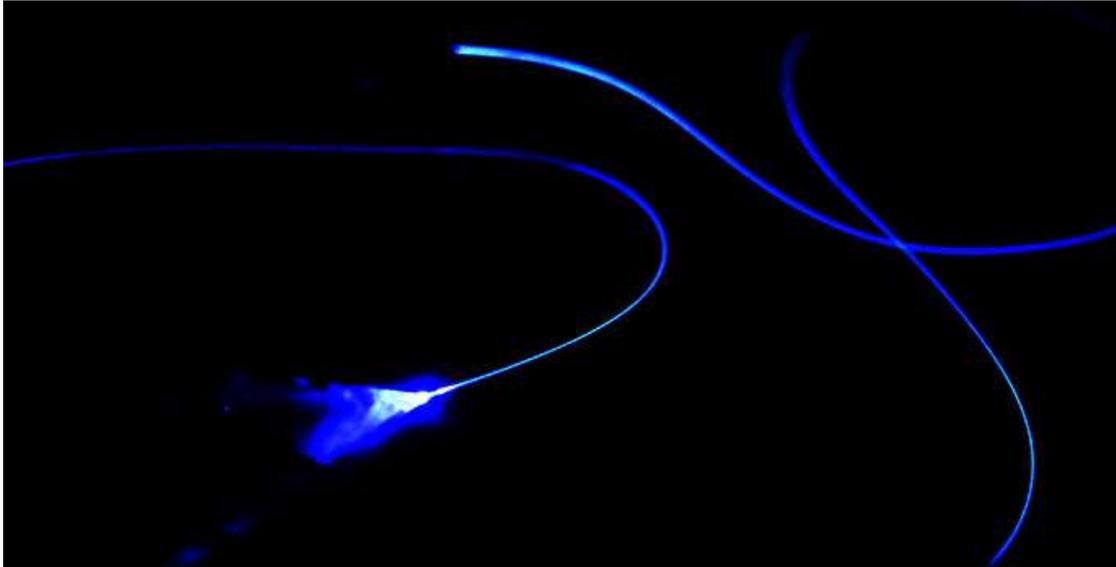
The discovery of a new reset button for the brain's master biological clock could eventually lead to new treatments for conditions like seasonal affective disorder, reduce the adverse health effects of working the night shift and possibly even cure jet lag.

The finding was reported in the Feb. 2 issue of the journal *Nature Neuroscience*.

"We found we can change an animal's sleep/wake rhythms by artificially stimulating the neurons in the master biological clock, which is located in an area of the brain called the suprachiasmatic nucleus (SCN), with a laser and an optical fiber," said Douglas McMahon, Stevenson Professor of Biological Sciences at Vanderbilt University who directed the study.

Until now, neuroscientists had thought that the firing rate of SCN neurons was strictly an output of the biological clock's activity. They did not think altering the level of neuronal activity could affect how the clock operates. But the Vanderbilt researchers have shown that stimulating and suppressing the SCN's neurons in a fashion that emulates their day and night activity levels can force the clock to reset.

The study was done using mice. Neuroscientists have found that mice possess a biological clock nearly identical to that of humans with the exception that it is tuned for a nocturnal lifestyle.

The researchers used a new technique called optogenetics to manipulate the firing rate of the SCN neurons. The technique inserts genes that express optically sensitive proteins into target cells in order to make the cells respond to light.

"This puts clock neurons under our control for the first time," said doctoral student Jeff Jones, who conducted the study with fellow doctoral student Michael Tackenberg.

The project involved genetically engineering two strains of mice. The neurons in the brain of one strain contained an optically sensitive protein that triggers neuronal activity when exposed to light. The neurons in the brain of the other had a similar protein that suppressed neuronal activity when exposed to light.

"Of course, this exact approach isn't ready for human use yet," said Tackenberg. "But others are making progress toward eventually using optogenetics as therapy." This would involve an experimental technique that uses viruses to insert new genes into cells, which is considered a promising potential treatment for a number of diseases. This could be used to implant optically sensitive proteins in SCN neurons that could be activated by an implanted LED.

Tackenberg is currently testing whether strains of mice that suffer from seasonal affective disorder respond to this new approach.

"The fact that the SCN firing rate is a key component of circadian rhythmicity, rather than solely an output as we had thought, shows that we still have a lot to learn about how our biological clocks work," McMahon observed.

Strangely, there don't seem to be any patent applications published yet. So maybe the investment opportunity rests with the person who works out a way to write a suitably bulletproof invention disclosure?

Read more here:
Jeff R Jones, Michael C Tackenberg, Douglas G McMahon. **Manipulating circadian clock neuron firing rate resets molecular circadian rhythms and behavior**. *Nature Neuroscience*, 2015; DOI: 10.1038/nn.3937

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Generational Cycles – Binge Drinking

About seven years ago we did a small piece of work with a youth charity in the UK. They were worried about binge drinking teenagers. Whatever we do to stop it, they told us, it doesn't seem to make any difference, what can we do? My advice was to sit back and wait a few years because in all probability the problem would solve itself. Pendulums can only swing so far in one direction before the inevitably stop and begin heading back in the other direction. Better yet, we said, be prepared to launch an initiative in a few years' time and claim all the credit when it magically seems to be working.

Unfortunately for the charity, they didn't follow that advice. Part of the reason for us so cynically giving it was that politicians and the media in the UK don't appear to have very much understanding at all about cause and effect. Particularly if there are more than a few months between one and the other. So, hey, why not take advantage of that fact?

The news in February that binge drinking amongst the under 25s had dropped significantly in the last 12 months and that the number of tee-total teens had shot up to something like 40% in some parts of the country (London – always ahead of the curve trend-wise) spurred a flurry of healthcare specialists, police and social workers to pontificate about how it was all due to their fine work.

Sorry to disappoint all of them, but there is no causal evidence whatever to indicate that anything any of these people has done has contributed to the shift in behavior. I think we all know that when it comes to alcohol, smoking and other things parents tend to disapprove of, teens tend to do the opposite of what older people tell them. It's all a fundamental part of growing up, breaking away from parental control and becoming an adult. Fundamentally during this period, we listen to our peers. And when our peers start telling us that something is uncool, guess what, we start doing less of it. The only causal link between the decline in teen binge drinking and anything at all is that quite simply the youngsters that have been hitting their teens in the last couple of years have been very highly protected through their youth, so they've had the negative attributes of alcohol drummed into them since they or their school mates first saw their hedonistic mums and dads fall down drunk.

As described in our Generation Z mini-book last year, the first of the post-9/11 babies hit their teens last year. If the alcohol industry is worried about the decline in consumption

among youngsters that has now hit the headlines, just wait another couple of years and watch the figure really drop off the edge of a cliff. It's a generation thing. And nothing they can do about it. Nothing they should even try to do about it, except maybe make everything very healthy and probably remove the alcohol. Here's the picture that hints why:
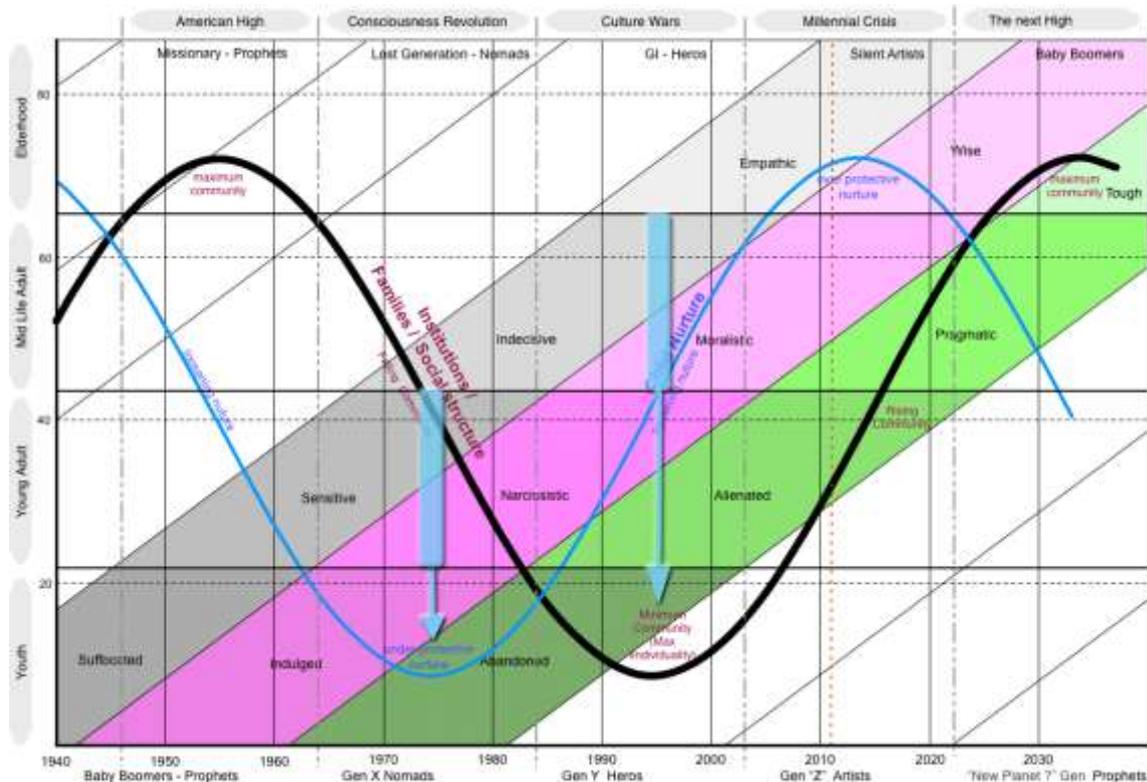
The good news for the alcohol manufacturers is that the 'nurture' curve has now peaked. In around another 40 years, it will start to turn the other way again. If you own shares in alcohol manufacture companies, you'd better be in for the long haul. Or else lobby for a sharp shift in company product strategy at the next AGM. Alcohol has become the opposite of cool due to nothing more or less than a generational pendulum swing. It's not a prediction, it's just the way it is.
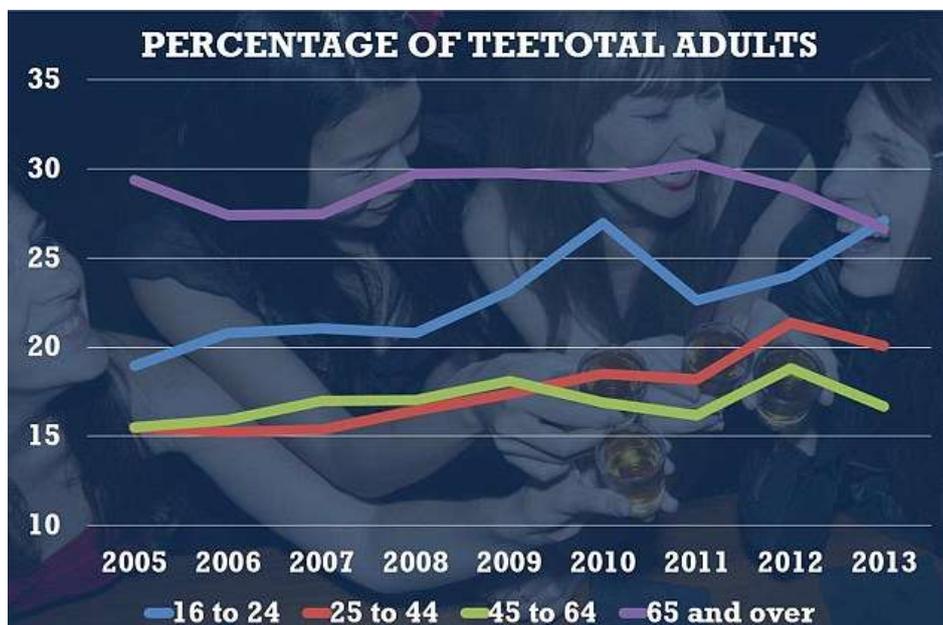
Biology – Mexican Free-Tailed Bat

You're a bat and you're hungry. So are all your other bat friends. And it doesn't look like there's so many moths to eat tonight. So what do you do to make sure you're the bat who eats before everyone else?

Here's what the Contradiction Matrix might have to say about the problem:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Loss of Substance (25)

WORSENING PARAMETERS YOU HAVE SELECTED:

Other Harmful Effects Acting on System (40)

SUGGESTED INVENTIVE PRINCIPLES:

35, 30, 40, 24, 1, 12, 28, 22, 32

Your Mexican free-tailed bat friends turn out to have found a very cunning solution to the problem. They make short waaoowaaoo sounds that sabotage each other's sonar-guided aim in duels over the right to gulp a flying moth out of the night sky. The echolocation jamming solution represents a pretty good illustration of several of the Inventive Principles, but 24, Intermediary; 1, Segmentation; and 22, Blessing In Disguise look like the three strongest candidates.

Tadarida brasiliensis, like other aerial hunting bats, locates its prey by making little calls and listening for any echoes bouncing off a moth. Aaron Corcoran of Wake Forest University in Winston-Salem, N.C., was recording other bat sounds when he picked up the strange wavering siren-like calls in sequences that suggested that free-taileds might be jamming each other. By standing on a scaffold with a spotlight to watch wild free-tailed bats hunt, and also by playing recorded jamming calls, he found that well-timed calls can foil up to 85.9 percent of attempts to capture a moth. This marks the first example of an echo-locating animal routinely jamming its own kind, Corcoran says. He and William Conner, also at Wake Forest, describe the jamming in the Nov. 7 *Science*.

Watch a series of Corcoran's videos showing how the jamming effect works here:
https://www.sciencenews.org/article/bats-jam-each-other-echolocation-battles-food

Interestingly, the jamming solution also appears to have been evolved by the Grote's tiger moth (*Bertholdia trigona*), which has learned to emit ultra high frquency clicking sounds to jam the sonar of the big brown bat (*Eptesicus fuscus*) on the Arizona-New Mexico border. Now that's what I call an arms race. Or all time classic example of 'someone, somewhere already solved your problem'. Irrespective of whether the tiger moth or the free-tailed bat got there first.

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Short Thort

Dots

"Reality does not easily give up meaning; it's the innovator's job to clobber it into submission. You're meant not only to tame it but to extract substance, to identify cause and axiomatic effect. You subsist on the tactical omissions, the hollow words, the oddly unconnected dots."
Stacy Schiff

"Most people haven't had very diverse experiences. So they don't have enough dots to connect, and they end up with very linear solutions without a broad perspective on the problem."

"You can't connect the dots looking forward; you can only connect them looking backwards. So you have to trust that the dots will somehow connect in your future."
Steve Jobs

For every million dots, expect three to be useful.
One of which your instincts told you to ignore.

News

Hong Kong I
Darrell will be visiting Hong Kong from 17 to 20 March to give a trio of keynote addresses and three mini-workshop seminars. The main event will be the ComputerWorld CIO Leadership Forum on the 19th, where he will be talking on the subject 'The new digital business challenges for CIOs and fellow CXO leaders'. Expect a fair amount of PanSensic content. See the website for the timing and location of each of the activities.

Hong Kong II
Directly after his round of workshops in Taiwan, Darrell will be back in Hong Kong for a pair of one-day workshops on 27 and 28 April. One on patent design around and the other on Systematic Innovation for IT. More details on the website shortly.

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Greece
We are happy to announce the signing of a cooperation agreement with Research and Innovation Strategy Experts (RISE) in Athens, following a successful pilot workshop in December. The intention is to run more workshops and act as a 'back-office' for innovation consulting projects in Greece.

ETRIA Conference
As soon as we heard this year's big European TRIZ conference was going to be taking place in Berlin, it became an easy event to add to the year's calendar. A couple of abstracts have already been submitted to the organisers, so hopefully at least one will be accepted for the conference proper in October (26-29th to be precise).

New Projects
This month's new projects from around the Network:
    Transport – ICMM Journey design study
    Power – Technology transfer solution finding project
    Education – SI workshop series
    FMCG – strategic study
    FMCG – PanSensic Frustration-Mapping project
    Automotive – Technical problem resolution study
    Automotive – workshop series
    Construction – PanSensic study
    Marine – Evolution Potential/IP-strengthening study
    Music – business concept innovation project

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