Systematic Innovation

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

Our guarantee to the subscriber is that the material featured in the e-zine will not be published elsewhere for a period of at least 6 months after a new issue is released.

Readers' comments and inputs are always welcome.
Send them to **darrell.mann@systematic-innovation.com**

Design Thinking – Philosophy, Method, Tool

There's an old joke in the Six Sigma world. One of the founding fathers is on a panel at a conference. Alongside him is one of the founding fathers of the preceding Total Quality Management world. Questions are invited from the floor. "What's the difference between Six Sigma and TQM?" a confused-looking delegate asks. The Six Sigma founder expresses their long-winded but ultimately un-enlightening answer and sits down. The TQM guru stands up, smiles and says, "the consulting bills are higher." Then he sits down again. Clarity at last.

Replace Six Sigma with Design Thinking, and TQM with Edward De Bono, and we manage to swiftly bring ourselves up to date with the latest management fad. To be honest, it's a fad that's had a relatively long gestation period. The media first started getting interested in 'design' back in the mid 1990s when they were trying to understand the success of Steve Job's Apple and he repeatedly used the word. Then along comes IDEO and the Stanford D-School. And then a literal avalanche of me-too copyists. Right now there are close to 2000 'Design Thinking' related book titles to be found at your nearest online book retailer.

When there's an apparently large amount of content to plough through, the signal-to-noise ratio tends to take a swift plunge towards zero. So much so, in the case of Design Thinking that to many newcomers it becomes difficult if not impossible to work out if there's anything there worthy of note. The steak gets lost behind the sizzle.

I suspect that the majority of Design Thinking text authors wouldn't know steak if it slapped them across the face. That's the problem with jumping on bandwagons. The motivation is making a fast buck not helping readers.

Plus, within the supposed originators – i.e. the cohort of West Coast design Celebrities – there's an added desire to obfuscate the first principle picture. Mainly because the first principles don't come from them, but rather from Edward DeBono. And if that sounds odd, you just need to take a cursory look at the Celebrities to realise they're for the most part British and of just the right age to have been reading De Bono books when they were growing up.

This is not to totally denigrate what they have achieved, 'stnading on the shoulders of giants' and all that. Here's why the Six Sigma-and-TQM analogy is, I think, relevant. On a lot of levels you have to admire what the Six Sigma world did to take other peoples' first-principle thinking and take it global. DeBono merely find himself at the wrong time in history, and lacked a Steve Jobs-like figure to tell the world that Design Thinking was the secret sauce of business success. What Steve Jobs was to Design Thinking, Jack Welch was for Six Sigma. The moment he said GE saved $9B through Six Sigma, every other CEO on the planet had to respond. The moment Steve Jobs attributed Apple's success to 'design', every CEO had to respond again. Latching on to that kind of media tsunami is a smart move. The TRIZ world has been waiting for their equivalent for a long time.

While the lessons to be learned from globalizing an initial set of ideas might be interesting, its not what I'm interested in with this article. This article is about getting back to the (De Bono) first principles – the 'steak' – of Design Thinking in order to establish whether it is

merely a fad or whether it has a genuine contribution to make to the prospective users of the world.

In order to commence this process, it is often useful to think about a subject from different hierarchical perspectives. We tend to use three: Philosophy, Method and Tools. Most new initiatives tend to offer nothing at the 'philosophy level'. Statistical Process Control, to take a widely used example, is a very effective tool in certain situations, but that's all it is. Ask any SPC user what the underlying philosophy is and they'll probably look at you like you just landed from a different planet.

When we apply the philosophy test to Design Thinking, probably because of it's DeBono roots, we find that there very definite 'first principles' upon which everything else has been built. Figure 1 attempts to illustrate what these elements are, and how they sit above the Method and Tool perspectives:

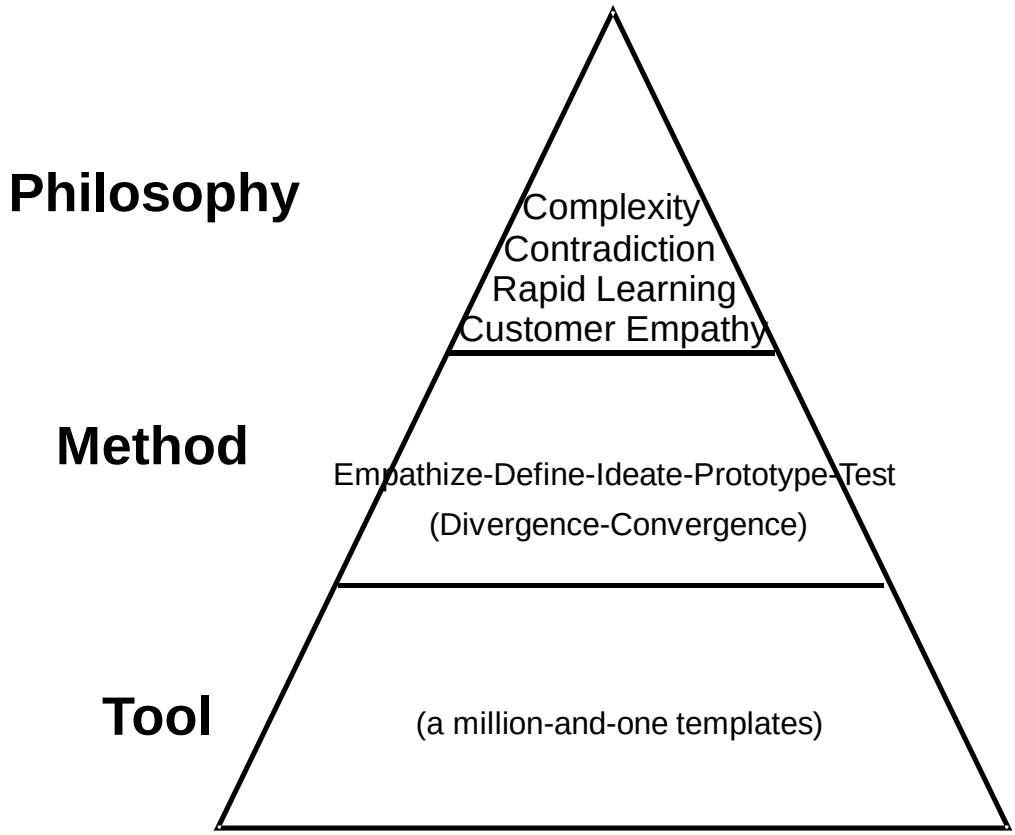

Figure 1: Design Thinking As Philosophy, Method & Toolkit

Let's start from the top…

Philosophy – Complexity
The world is complex. Two humans together are complex, often bordering on chaos. If we are to meaningfully create new solutions it is incumbent upon us to embrace and make this complexity work for us. From the first chapter of DeBono's book he makes a clear distinction between the analytical and synthesizing functions of the brain, and that change involves the latter. It's not possible to analyse your way to a better future. It is necessary to 'design' better ways, to make 'lateral jumps' and to connect things in novel ways. Synthesis is counter-intuitive because for most of our lives we exist as analysers within the complexity that surrounds us. When we deliberately set out to change, we need to switch

thinking modes. DeBono wasn't massively aware of the technicalities and syntax of Complex Adaptive Systems, but he did instinctively understand the necessity of mapping the relationships between entities, looking at situations from multiple perspectives, and understanding systems from a first principles perspective – all things that today's Complexity theoreticians and practitioners will confirm to be the best way to 'deal with' complexity. Complexity is all about shifts in behavior of systems once they cross a certain threshold, that means their future performance is nigh on impossible to predict in the future due to the awkward reality that apparently tiny differences can result in massively different outcomes. Think butterfly wing flaps and hurricanes. Complexity is all around us, it's our job to make it work for us rather than against us. Which means the end of command-and-control, and pointless searches for 'the right answer' and 'root causes'. In complex environments there is only ever the 'next answer'.

Philosophy – Contradiction
Perhaps the least visible, and certainly the least well understood of the philosophical tenets of Design Thinking. DeBono 'got it', but I suspect the majority of designers and Design Thinkers still don't. Contradictions in the DeBono version of Design Thinking is all about 'parallel thinking' and the need to avoid 'I'm right, you're wrong' thinking. Today, when designers get close to what DeBono was talking about, they talk about 'win-win' solution and 'switching from 'or' to 'and'' thinking ('the tyranny of the 'or''). Or, very likely, the need to reveal 'insight'. Anyone familiar with TRIZ, of course, knows that insight means contradiction and that the need for contradiction-elimination is the central tenet of innovations of all forms.
(If you happened to be looking for a Design Thinking person to come and 'do' some Design Thinking in your organization, asking them questions about this part of the philosophy of Design Thinking is the simplest way to work out who the good providers are and who they aren't.)

Philosophy – Rapid Learning
In many ways sitting at a level below 'complexity', the rapid learning idea is Design Thinking's response to how best to deal with a complex environment: we can't know 'the answer' and so the winner will be the person that learns how to iterate faster than the others. Here's one where the IDEO team probably earns its dollar: the best way to learn is to get something into the hands of your prospective customer as soon as possible, so they can interact with it, you can watch them, and learn from what happens in order to make a second, better iteration. And then a third, and a fourth… IDEO made it into 'standard practice, John Boyd and the OODA Cycle made it into a repeatable science.

Philosophy – Customer Empathy
The job of the Designer is to serve the needs of the customer. Everything revolves around the customer. Sometimes the customer will be able to tell you what they want, and sometimes they won't. Empathy is the need (and ability) to look and listen below the surface to reveal the unspoken, unmet needs and frustrations of the customer. Implicit within the empathy idea is the recognition that a significant aspect of 'customer need' concerns emotional needs, the bit that'' traditionally ignored or perceived to be too difficult to measure or 'design for'.
(Another good test of whether a Design Thinking consultant actually understands what 'empathy' is supposed to mean, is to quiz them about how they set about capturing and designing for a customer's emotional needs.)

So much for philosophy. It's probably already a (too-)loaded word. It involves asking 'why?' questions, and not everyone welcomes that kind of question. Which is probably why most Design Thinking texts swiftly veer towards safer 'Method' territory:

Design Thinking – Method

Copyright Law dictates that the 2000 authors that chose to pen a Design Thinking text, all invented subtly different methodologies. Hence we get lots of noise and not very much signal. The Stanford 'Method' - Empathize-Define-Ideate-Prototype-Test – is probably the most widely disseminated, and certainly the one that serves as a template for other 'methods'. Fundamentally, however, the real method goes back to DeBono again and the twin concepts of divergent and convergent thinking.

Scrape beneath the surface of any of the Design Thinking texts to find a chronological sequence of activities and you will invariably find this:

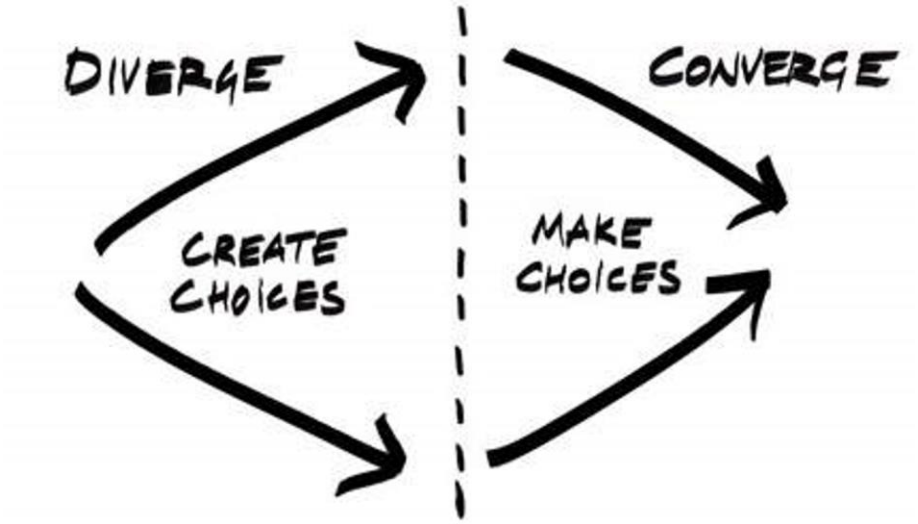

Figure 2: Convergence-Divergence Cycles In Design Thinking

Unlike 'traditional' or 'analytical' thinking which is all about converging on 'the answer' as soon as possible, Design Thinking forces us to recognize that convergence needs to be preceded by a divergent activity that's all about exploring options and choices. Not only that, but, working on a problem requires at least two of these divergent-convergent cycles – as shown in Figure 3:

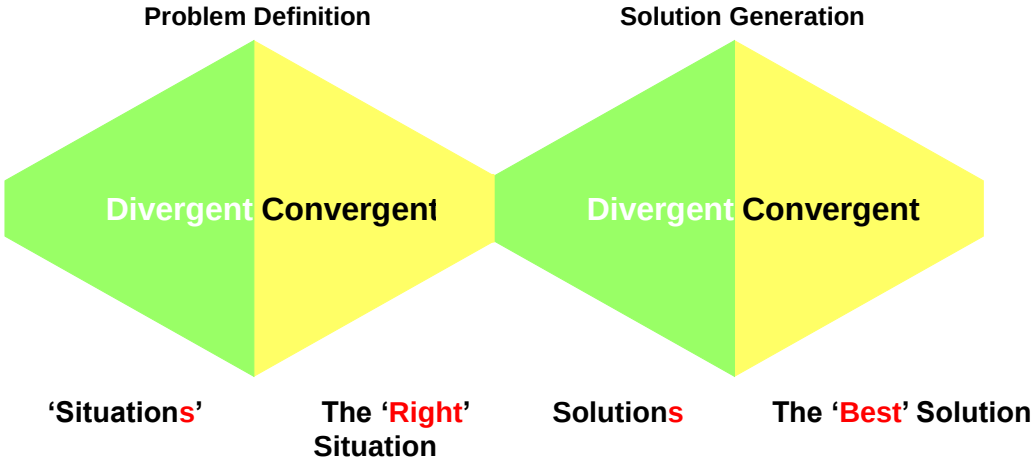

Figure 3: Minimum Viable 'Divergent-Convergent' Design Thinking Method

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The first of these cycles is all about definition and the second is all about solution. In reality, if we accept the Complexity and Rapid Learning elements of the Design Thinking philosophy, we quickly come to realise that this twin di-con cycle is merely to get us to the end of the first iteration of our eventual 'finished' solution. A 'real' Design Thinking project will in all probability go through a dozen or more of these cycles. The good news in that recognition is that the basic method remains the same on each cycle…

Design Thinking – Tools

…the important word there being 'method'. The specific tools used to do each of the divergent or convergent tasks may be different for each iteration of the overall cycle. And that's where I believe Design Thinking falls down badly at the moment. When we try and do a search for 'Design Thinking Tools', the well is pretty much dry. Maybe that's because Design Thinkers know that the 'right' tool for the job at hand can change significantly between one iteration and the next. But, in reality, I don't think most Design Thinking providers actually do understand that. Or maybe it's a problem of Copyright Law again – no-one in the publishing industry wants to admit that the tools developed by others are better than ours. And so what we end up with – in all of the 2000 texts – is a series of template sheets. 'Fill this in and you're well on your way to design success'. There are a million different templates. The large majority of them falling into the usual 'if the only tool you have is a hammer, every problem looks like a nail' trap. Relative to the divergent and convergent tools available in other domains, Design Thinking has almost nothing of substance to offer. Far better to do what we've been endorsing for the last fifteen plus years, and that is to make your own Design Thinking toolkit:

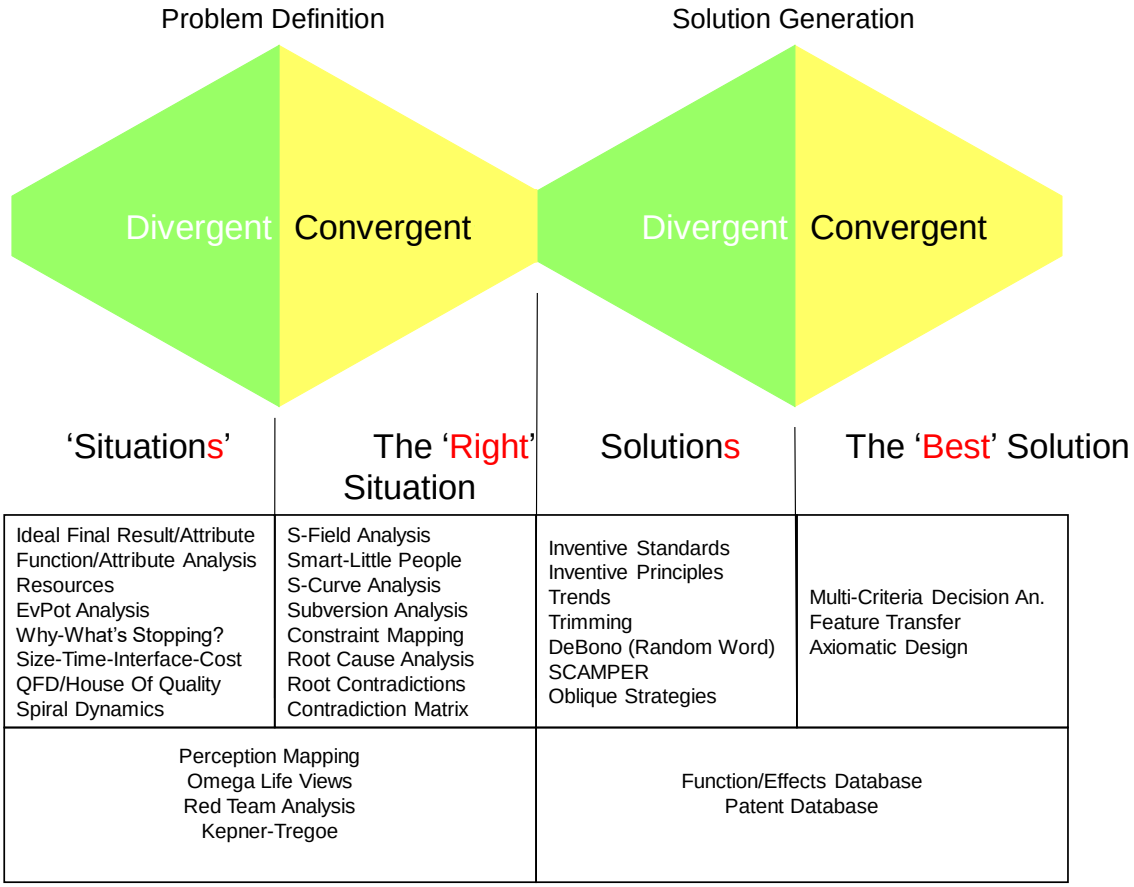
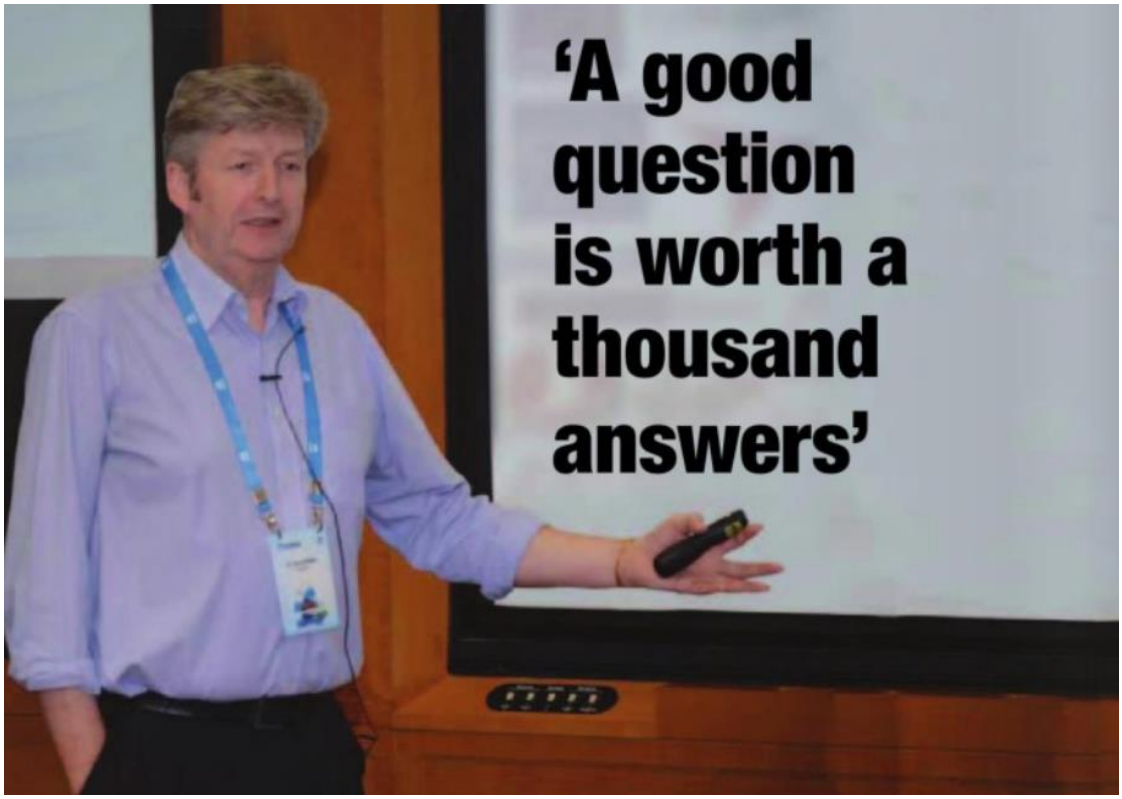


Figure 4: Make Your Own Design Thinking Toolkit

Right now, 98% of innovation attempts end in failure. When we look at innovation attempts that declared use of Design Thinking, the failure rate stays stubbornly at 98%. Which is another way of saying the Design Thinking is not delivering right now. In Hype Cycle terms, it's still riding high on the Peak Of Inflated Expectations. The Trough Of Dis-Illusion is still to come. But then, unlike mere fads, thanks to its Philosophical underpinnings and overall Method, we can confidently predict it will exist in some form long into the future, as it climbs up the Slope Of Enlightenment. The trick right now is to get on board and start thinking your way through the noise to get to the signal.

(this article is an expanded version of an interview conducted for Tata Review in December 2016. The official version can be found at the online Tata Review website: http://bitcast-a.v1.o1.bom1.bitgravity.com/tatas/ebook/tata-review-jan-2017/mobile/index.html#p=96)

"A Good Question Is Worth A Thousand Answers"



Darrell Mann speaks at a speedy clip and the pace fits right in with the message he is keen to spread on the fast-changing nature of innovation. 'Systematic innovation' is Mr Mann's sacred mantra and the United Kingdom-based company he heads is — appropriately enough, it seems — called Systematic Innovation.

Being chief executive of a company with operations across the world, including in the United States, South Korea, Japan, Australia and India, is one part of what Mr Mann does. He is a visiting professor at universities in the United Kingdom and Malaysia and a prolific writer, penning in excess of 600 innovation-related papers and the bestselling 'Hands-On Systematic Innovation' series of books.

An engineer by education, Mr Mann spent 15 years with Rolls-Royce in various research positions leaving the company in 1996 to set out on his own. He has over nearly two decades helped a clutch of the world's top companies craft stronger innovation programmes and has participated in the creation of more than 500 inventions.

Mr Mann speaks here with *Philip Chacko* about innovation and its discontents, and the tools and mindset required for creativity to blossom in business. Excerpts:

You are an engineer by training. When and how did innovation become your chosen field?
The interest in innovation has been there since I was a small child. Looking back, it seems strange because I was reading Edward de Bono books at 10. I had some work experience at 16 in an engineering company, where I got to meet different people and question why things were done in a certain way. This questioning nature quite naturally prompted my migration to the research and development and innovation side of business. I always wanted things to be better than they were.

Could you tell us a bit about your background and your career?
My becoming an engineer was cause for complete puzzlement in my family. There is no trace in my parents to explain why I chose the profession I did. Both of them left school at 16. They had no further education but they definitely bettered themselves through their lives. They did it the hard way and they encouraged me to go for further education. I was the first person in my family to get a degree and, in fact, the first person in the family to leave the region (I grew up in the northern part of the United Kingdom).

What exactly is systematic innovation and how does it ensure that innovation programmes deliver tangible results?
Early in my Rolls-Royce career, we came across this Russian methodology called TRIZ [a problem-solving tool derived from the study of patterns of invention in global patents, developed by the Soviet inventor and science-fiction writer Genrich Altshuller and his colleagues]. The way Rolls-Royce educates its employees, you have to challenge everything. As soon as we saw TRIZ, we said this cannot possibly be true, and we spent three years trying to prove it couldn't be true. We failed, and that's when we recognised there was definite value in the method.

The scepticism was due to the nature of creative people and creative industries. The way they perceive it, creativity comes naturally; there cannot be a method that can produce creativity. There was that attitude at Rolls-Royce, but once we came through our three-year journey we realised that no matter how creative we thought we were, we were following the same patterns. We took TRIZ and made it more robust and resilient, and ready to be taken to different industries.

The Russian research on TRIZ, which began in 1946, helped decipher a lot of issues concerning innovation. The research was a good start for us, but we needed to take the methodology to a whole new level. We got a lot of funding and we put together a team to analyse patents. The team was based in Bengaluru [in India] and we gathered together the knowhow required for the analyses. Coming to Bengaluru was an easy decision for us; the timing and the costs were right and, importantly, the necessary patent-analysis skills existed here in India.

You were quoted in 2013 as saying that 98 percent of all innovation projects fail. Does that number hold good today?
It does; it's very consistent. We've got a research team analysing innovation attempts — business as much as technical — from wherever we find them. The causes of the failure shift from industry to industry but the 98-percent failure rate is consistent. When we named our company Systematic Innovation, we said our job in life is to decode the difference between the 98 percent and the 2 percent. We figure out what this 2 percent did right and we get, as much as is possible, our clients to follow that formula.

With systematic innovation you are in a new world and it makes a lot of people uncomfortable. For example, the management community has had 40 years of living a life

dominated by operational excellence. For most managers, their entire careers have been about operational excellence. But operational excellence and innovation are very different; you are taking in different languages. With innovation you have to make sure you are working on the right problem. An enormously large proportion of innovation projects fail on day one because the people involved are working on the wrong problem.

Is there a pattern in these failures?
I think there is. There are three core types of failures. The first is tackling the wrong problem. The second is chasing after the wrong solution; a quarter of projects find the right problem but then they deliver the wrong solution. This happens because people tend to go with what they know rather than what is best for the customer. The third kind of failure, and this afflicts some 40 percent of all projects, is about the inability of the organisation to execute the solution. Here they have found the right problem and delivered the right solution, but this solution and the insights gained have not, at the end of the story, pulled in the money. In such instances it is the slavish devotion to operational excellence that, I think, causes the problem.

You also cite poor communications and organisational hierarchies as reasons for innovation failures. How do you get on top of these issues?
We see plenty of silo walls inside companies and a whole lot of innovation programmes require you to work on both sides of the silo. Ever so often we are involved in teams where we need to involve multiple parts of the organisation or — in the Tata case — multiple parts of the conglomerate. Unless you climb over the silo wall and get the two parties to recognise it's in their common interest to work together, the innovation attempt is almost always going to break down.

With innovation, is it that the bigger you are, the more difficult it is to succeed?
I believe so. When you're a small company, you don't have much to lose, and so it's easy to take chances and try different things. When you've become a big company, on the other hand, suddenly you have a lot to lose. And margins to maintain. The DNA of the organisation shifts. If you consider the industries that are learning how to innovate well, they either outsource the innovation activities or they foster smaller enterprises to go about the task. The pharmaceutical industry, for instance, does that really well. In the aerospace industry, where I started my career, everything you do has to be safe. But you also have to innovate, which means trying new things, failing and learning from the failures. Resolving that conflict requires physical separation of the two functions within the organisation.

You speak about instinct in innovation and about the efficiency required to pull it off. How do you find the balance?
It's good to use the word instinct. The instincts of most people are poorly attuned to innovation. This is partly due of the operational excellence culture and partly because, historically, the rate of change on the planet has been slow enough to make all change look linear. The way our brain looks at change, it's going to happen linearly but, of course, innovation is very non-linear.

We spend lots of time in our research team calculating the pulse rate of industries and how often disruptions take place. Overwhelmingly, we see these disruptions happening faster and faster. What this means is that the linear assumption people make is less and less valid. We help companies understand that the assumptions we make are increasingly dangerous.

One of the challenges in the automotive sector right now, for example, is that it has a relatively slow pulse rate as an industry. So you have a customer saying, “I don’t care so much about the car as the communications systems in the car.” Now, the pulse rate of the communication systems is several times faster than that of the automotive sector itself, and that explains the frustration of customers. Many car companies are struggling with this because the pulse rate of the customer communication need is significantly faster of the pulse rate of the industry.

Coming to the balance between efficiency and instinct, there is no doubt that operational excellence dominates the world because that’s what makes money for the business. I sympathise with organisations that struggle find the balance between operational excellence and innovation. A lot of managers come from an operational excellence background; that’s what has made them successful. When they venture into the innovation world they see a bunch of aliens, guys who have no idea how to make money.

Does it make sense, then, to hand managerial responsibilities to the research person?
That sometimes opens up a whole new set of dangers. Inventors and the innovation community are great at starting stuff — and usually hopeless at finishing them. They get bored with all the detailing necessary to turn an idea into money, and tend to be much more interested in the next problem to go work on. I think it’s possible to train starters to also be finishers, but by our reckoning, about 1% of people end up being comfortable in both roles. That problem often becomes the bottleneck inside organisations trying to innovate more.

You mention South Korea as a country that has pushed the innovation envelope. What can India and Indian companies learn from South Korea about the pursuit of innovation?
Samsung is the best example in this context. The systematic innovation tools have been taught to 20,000 people across their organisation. They’re currently generating over 200 patents a week. This intellectual property engine and the innovation engine that comes after it are well established inside the business. Samsung has moved from playing catch up to becoming a pioneer.

The South Korean perception is that they are not particularly creative. This makes them much more open to a systematic way of doing things. The reality is there is no difference in the creativity; that’s just perception. What the South Koreans have proved over the last decade is that if you take a group of smart people and you give them the right tools, they will change the world.

The big advantage that India has, and more than anywhere on the planet, is this thirst for knowledge. If the country can combine this thirst with a systematic approach to innovation, there’s an incredible amount of potential that can be realised. India does really well in the quality of intellectual property developed — I would place it in the world’s top ten on this count and ahead of China — but this has to be matched with quantity. That’s where it has to perform now.

Are certain people, companies and countries culturally more in step with innovation than others? Or can anyone get good at innovation with the proper tools and training?
It’s definitely trainable and I confess I’m biased on this because we are in the business of teaching an innovation method. Having said that, I find it easier to teach the method in Asia than in Europe. The problem in Europe is that a lot of people — especially in the

United Kingdom, which is probably an extreme example — think they are extremely creative. There's little actual evidence of that but the fact that people arrive with such a mindset means that they are already half closed. In Asia, on the other hand, there's extraordinary openness to, maybe not believe you, but at least listen to what you have to say

The United States right now has gone so far down the operational excellence road that people are just unprepared to take the time to really think about the problem. At problem-solving sessions with Americans, everyone urges me to go faster, faster, faster and I say, "We haven't even found the right problem yet." So they will sprint to the solution and, maybe six months later, the realisation dawns that they have spent all that time solving the wrong problem.

Why is America then still No 1 in business innovation?
I don't think it is No 1. Innovation in my definition means 'successful step-change'. By that definition, a lot of high profile American figures are great idea generators, but not so great at turning their ideas into money. When it comes to quality of solutions and their execution, according to our research findings, Denmark, Switzerland and Sweden, in particular, are ahead of the United States. The American pioneering spirit has disappeared, I think, but it's worth saying at the same time that Silicon Valley and places like San Antonio in Texas have pockets of exceptional innovation capability. When it comes to fertile ground for innovation, it's more about regions and ecosystems now that nation states.

Education systems in many countries tend to emphasise rote learning and this dampens the creative spirit in children. How can attitudes be changed here?
There is an imbalance in nearly every education system in the world, with the focus on left brain rote learning. I've seen attempts by governments to redress this and they invariably fail. That's because the teaching community believes the way they teach is the right and proper way. It's threatening to the education community when it is told that what is being taught is increasingly irrelevant. A good question is worth a thousand answers but the education system is still in the 1,000-answers business. This is a huge ship to turn around.

India produces a multitude of engineers every year, but that has not quite benefitted the country as much as it should have. This is unlike what has happened in China.
India always comes across to me as very humble when it comes to its achievements, and some of what has been happening in the country, to me as the outside observer, has been incredible. The difference between China and India is the difference between a top-down society and a democracy. When China sets its mind on something happening, it will happen. In India they'll debate it for 10 years and then make a decision.

I think the Chinese top-down command-and-control system works in a short term. The faster and more interdependent the world becomes, however, the more dangerous command-and-control becomes. For me the safe long-term bet is India, first for the knowledge that exists in the country and for making the consensus approach fundamental to the way things are done.

As far as the quality of engineers emerging from the Indian education system goes, I think this is continuing journey. The society we live in now, it is the learner that wins, and it matters who can learn the fastest. In that context, India is significantly ahead of other parts of the world.

You are a votary of design thinking in innovation. Where does this fit in the innovation matrix and how important is design to the fruitful expression of creativity in business?

Design thinking is a mindset and it's the polar opposite of operational excellence. Design thinking forces managers and leaders to look beyond operational excellence to rethinking their business. Operational thinking is about working out the problem and getting to the solution as quickly as possible. Design thinking says, "Consider your options." It forces managers think divergently. Operational excellence thinking perceives that divergence as waste. Design Thinking is experiencing a wave of popularity right now because there hasn't been enough divergent thinking inside businesses. Whether the wave continues in the long term will depend on how well the Design Thinking mindset approach is combined with other complementary tools, because the big drawback right now with the Design Thinking providers is that the tools, as they exist, are very weak.

It's relatively easy for a small company to be agile and innovative and to embrace concepts such as design thinking. As soon as you become a big company, operational excellence thinking takes over. An example is Facebook, which, I think, is very vulnerable. They have innovated once or twice in their early days and now they have swung massively too far in the direction of operational excellence.

As for Apple, it too has a perfect storm heading its way. They have got a lot to lose because they're a big company. When Steve Jobs was around he loved being the rebel, the pirate. The Apple of today is so huge it cannot be a pirate; it has so much to lose. Now he's gone and many of the designers who admired him have also gone. What you are left with is a company increasingly dominated by managers rather than leaders. People that are in the answers business rather than the questions business.

Worst Of 2016 Awards

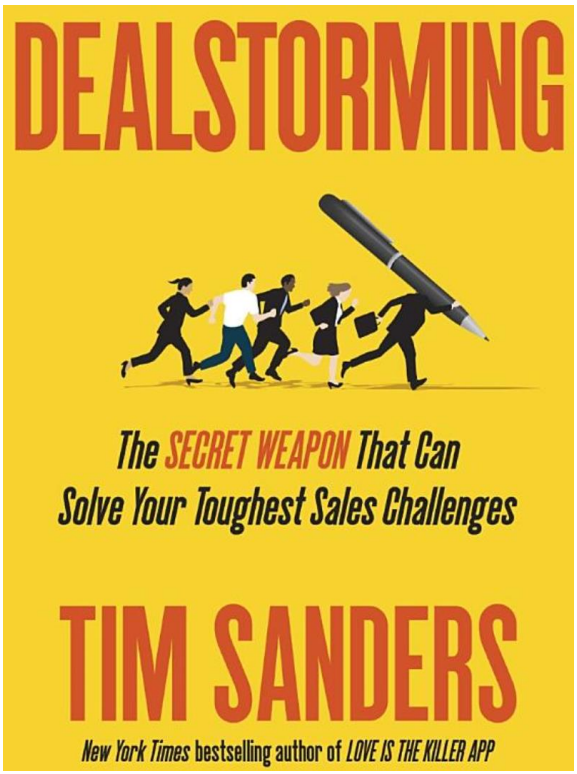
They say crisis periods in history provoke some of the greatest innovations. The evidence of the creative minds of 2016, however, also seems to suggest that crisis can also trigger a lot of rubbish. A bumper year of rubbish in fact as it turns out…

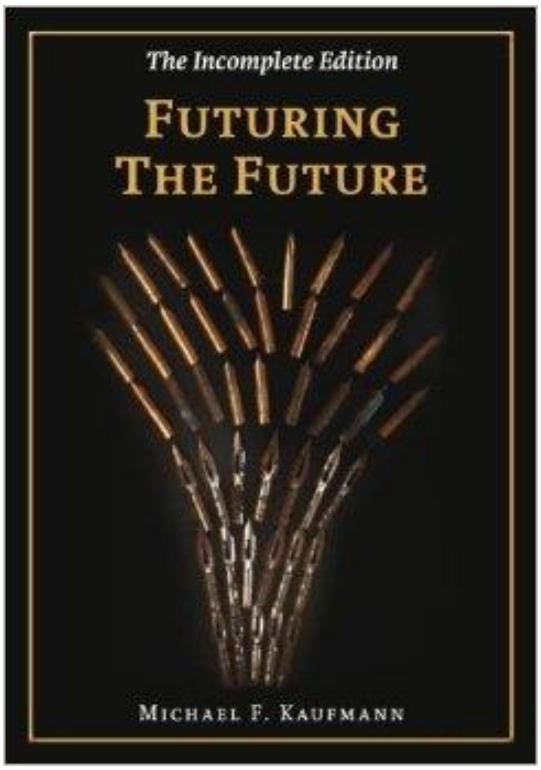
Joint 'It-Can't-Be-KLM-Again Suck'y-Airline Of The Year' and 'All-Conversations-May-Be-Recorded-For-Training-Purposes Customer Service' Awards – no contest this year. And nothing to do with planes. Not even Delta could compete with my four-month journey with British Telecom in the first third of 2016. There's probably a book to be written on the subject. A tale of secret trap-doors and magic words. Like a lot of call-centre-based operations, there is some kind of hierarchy. The first level of the BT hierarchy is basically the idiot-filter. Callers are asked a series of basic questions pertaining to their IQ and ability to describe the colour of the light on their Broadband box. If you don't say 'blue', you are told to stand on one leg and intone 'izzy-wizzy-let's-get-busy' for a few minutes until you change your mind. 'Is it blue yet?' No, it isn't blue yet. Pass this test and you get to advance to Level 2. Level 2 call-centre means that they admit there might be a problem with your broadband. Because this potentially means BT admitting something has gone wrong on their side, you have to wait at least a week to reach this level. And if you're not polite, you will go back to Level 1 until you learn how to behave. Level 2 then involves the same colour-blind test as Level 1, but now a series of additional instructions that involve them manipulating the broadband box in strange ways, which become even stranger if you deem to imply that maybe the fault is upstream of the box because your phone doesn't work either. Hmm, they say, let me look into that and call you back. And there's another hour gone while you walk up the road until you can find a mobile signal to call BT back again. Back at Level 1 obviously. By now things are getting quite Kafka-esque. Except most of the staff seem to be on your side. They know the system sucks and they're mere pawns in the Level 1, Level 2, Level 3 hierarchy game. Yes, there is a Level 3. But you're not allowed to speak to a Level 3 person until you have shed actual tears, collected them in a test-tube and posted them to BT for authenticity analysis. Sounding like we were the only people that had ever passed that test, the Level 3 person seemed to take pity on us. 'I have an idea,' she tells us, 'I'll report that the line is down, and that way they'll send an engineer to come and look at the problem.' This sounds like progress. Even more so when, within two days, an engineer phones up to say he's going to come and inspect the downed line tomorrow. Then, the following day he phones up again to say, 'there is no line down, so I've reported the problem is fixed.' I thank him for his efforts and steel myself for another call to Level 1.

I ask to speak to a manager this time. He listens. 'I see,' he eventually says, although I'm not sure he means it, 'my best suggestion is that you write a letter to the CEO'. I ask him to repeat what he's just said. 'His name is Gavin Patterson,' he says.

Later, when I've left the house again so I can use the Internet, I find him. This is his photo. Next to him is his predecessor Ian Livingston, holding a wooden spoon in 2008 for the company's appalling customer service. I look to see if I can see the same spoon framed on Gavin Patterson's office wall in the background of his photo. But I can't. All I can see is a smug dick who doesn't care.

The Depeche Mode Everything-Counts-In-Large-Amounts Literature Award – the ebook phenomenon shows no signs that the deluded would-be authors of the world are giving up on it. It's just too easy for anyone to say anything these days. There is no truth. And, in the case of ebooks, no kind of curation at all. They're allowed to be rubbish. Books published through established publishers, on the other hand, are supposed to have been through some kind of editorial scrutiny. Occasionally a few slip through the net. Our two joint winners this year are Dealstorming and 'Futuring The Future: A Futurology Novel' (it's about the future you know). They definitely slipped through something.





Dealstorming first. What better way to start the review than with the opening paragraph of Mr Sanders masterly tome:

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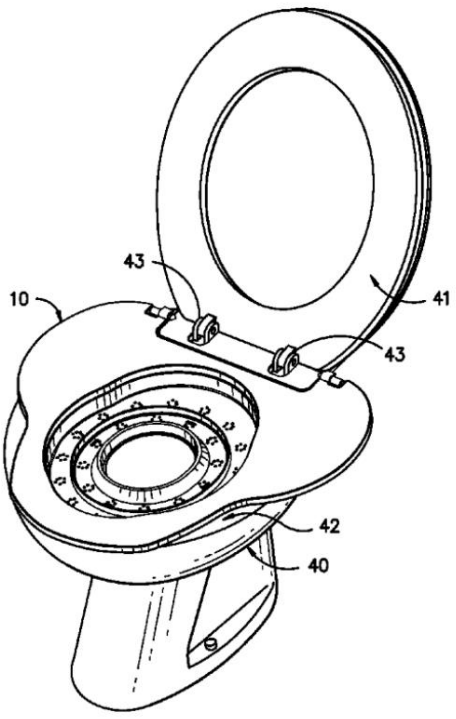
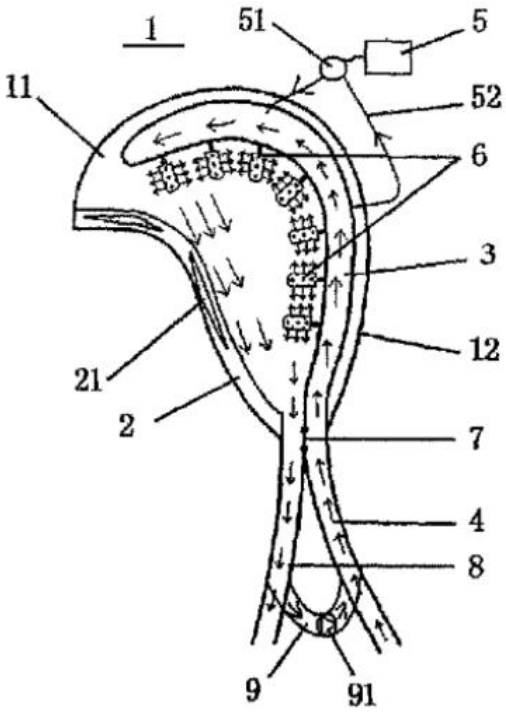
> At that moment, two concepts collided in the front of my mind. To solve the tough, must-win sale, Stan was telling us to combine two distinct practices that had long been thought of as separate arenas, especially in sales: *deal making* and *brainstorming*. The former was a linear process requiring discipline; the latter was a freewheeling process that promoted lateral thinking. I thought, *He's right. If we put these two approaches together, we can crack some tough cases.* I remember leaning over and whispering to my coworker: "Cool beans. *Deal-storming!*"

So let me get this right. This sounds complicated. Dealstorming is about combining deal-making and brain-storming. That's kind of like genius. Cool beans indeed. Except for one tiny detail. The whole exercise is utterly – utterly – nonsensical.

Which is an attribute Michael F Kaufmann can only dream of. Futuring The Future: A Futurology Novel is the most surreally barmy thing I've ever read since, well, forever really. There are no words to do it justice. The editorial blurb on the back of the back declares, it to be a book I will never forget. I suspect that will be the only future prediction contained in the book that that ends up coming true. I'm still having nightmares a month after reading the first chapter (available – without health warning – at Amazon's 'Look Inside' link). I'm saving the other chapters.

The Necessity-Is-Not-Always-The-Mother Invention Award – 2016 was another record breaking year for patents. We have two joint runners-up first. Let's have a look at them:





The one of the left is probably the easier one to understand. It's a toilet, right? Obviously not an ordinary toilet… that's already been invented. The problem with toilets, at least according to the Strohdach Twins of Lucerne Valley, California who had US9,232,766 granted to them on January 12, is that they don't work for cats.

Here's the big idea:
An improved cat toilet seat comprising a circular sitting member having an inner rim and a center orifice therethrough; platform portions formed on and extending outwardly from opposite sides of said sitting member, wherein each said platform portion is adapted such that a cat can more easily and comfortably jump upon, sit, and become balanced thereon; a tray portion attached to said inner rim of said sitting member and including a series of concentric annular tray members formed having progressively smaller sizes, wherein said tray members can be successively detached from one another and removed in succession from the smallest to the largest tray member in order to vary the size of said center orifice; a connector panel member pivotally connected to a back portion of said sitting member and adapted to removably attach to an existing toilet member; and wherein said sitting member is formed having a cross-section that is adapted to allow said cat toilet seat to lay stably upon a rim of said existing toilet member and be removably and pivotally attached to said existing toilet member underneath a toilet seat of said toilet member without interfering with the required movements of said toilet seat.
No, I know, this still doesn't work for cats. Or, now, for humans either. Pretty good for pot-plants though.

It's co-winning partner on the right of the picture is perhaps a little more difficult one to decipher. Here's a clue:
Although the prior art of washing hair is called an automatic hair washing machine, it still applies the traditional ways of lying supine or bending over a person to wash his hair, and the person has to go to a fixed consumption location such as the barber's shop to wash his hair. The disadvantages of the existent shampoo devices are:
(1) large volume;
(2) only applied in predefined areas;
(3) limiting the free movable space of the washed person;
(4) wasting the time of shampooing and the time on road;
(5) low efficiency;
(6) costly;
(7) failing to meet the requirements of special groups of people.
In order to solve the above problems, the present invention provides an automatic hair washing machine, for washing a user without lying supine him to facilitate the aged, the disabled such as the people seated on a wheel chair, the people that could not bend over, and the special groups of people, for massaging his head and relieving his nervous emotion, for facilitating free walking in a certain range, and for simultaneously working, brush his teeth, washing clothes, reading books, and surging in internet during automatic hair washing.

So says US9462,867, granted to Chinese inventor Siping Li on October 11. I've thought about this a lot. I don't think this solution is going to relieve my nervous emotion. I think it will be pretty good, however, at dripping shampoo into my eyes. And it will only take twenty times longer than washing my hair in the shower. Cunning.

The winner, however, this year is a quite literal gamechanger. The level of genius contained in the background description section of the patent offers up an early clue. It's well worth reading the whole thing in full…

History of the Snowman/Woman

The history of the snow man or snow woman is unknown. But, I have to say this. Whoever the first person was to think to form snow into a human figure was a genius. For untold years thereafter, children and adults alike have been thrilled and received joy in making and watching others make snowmen, err women. You know what I mean.

At any rate, what is remarkable is that no one has ever thought of, or at least reduced to practice, a way to make snow people easy and fun. I have done an abbreviated patent search and there is nothing relating to the subject of creating a snowman. Unbelievable since it is so much fun and

considering the effort involved. But, if no one has thought of it, well, no one has thought of it.

Making a snow man is hard work. As an old pro, I know what a pain in the back it is to roll a snow boulder around a yard. As the snow boulder grows, it gets exponentially difficult. So if you want to make a real big snow man, like me, you wind up breaking your back.

If you're like me, you enjoy building snow men . . . big. The bigger the better. One problem is there isn't always someone around to help. It is very difficult by yourself. Over the years, I have developed different tricks to assist my self-style of building snow people. My favorite trick is to use the long end of a shovel as a lever to rotate the boulder when it is really big. With this trick, you can keep rolling the boulder a precious few feet and get the boulder really big.

Another trick I have considered is to start rolling the snow ball on top of a hill or on a slope and work downward as the boulder gets bigger. Even though this works relatively well, it's still hard work to get the boulder to be really big. Besides this, you may wind up with an uncontrollable rolling snow avalanche.

But building a bigger boulder belies an even greater mischief. That is, getting the torso on top. Of course, you would want the torso to be proportional to the oversized boulder you have already created, so the torso has to be fairly large as well. Now, the boulder is pretty heavy. Compacted snow is virtually like ice! And you have to lift the darn thing a good four feet. Now this is really back breaking.

Not to mention that now you have to put the head on top. All of this is pretty difficult even for an adult (or big kid) like myself. What is more, I really cannot build a bigger snow man than about my height. The boulder is just too heavy. Just consider how a kid, who would love to build a big snow man/woman, would have no chance without adult help.

I have tinkered with the concept of building a ramp in order to roll the torso boulder on top of the base boulder. I have tried to make a wooden ramp, but the wood proved to be too flimsy to hold the heavy weight. I then considered building the ramp out of snow. But the boulder is just too darn heavy and squashes the snow down. And building such a ramp requires a lot of time, and snow, which you don't always have.

You never realized there were so many hurdles in building a snow man did you? Well, here is another. Getting the snow man/woman in the precise perfect place. Let's say you want the snow man right in front of the house door. Well, gravity has a lot to say about that. If your house, like most houses are built up to provide drainage, it becomes a serious physical effort, as well as logistical challenge, to roll the boulder to the right spot.

Another thing has always bothered me when I have built snow people. You can never make a perfect snow man. The snow balls are never, and I mean never, perfectly round. They are always lop-sided and look sort of goofy.

There is a construction problem, as well, related to the non-uniformity of the snow balls. Namely, it is difficult, particularly with large snow men, to balance another snow ball or boulder on top without it toppling over. To make matters worse, the third ball or boulder on top is made even more difficult to balance on a bust that is already tipsy.

Another problem in the art is that there is often not enough snow. With the first snow fall of the winter, ushers into each of us elatement and joy of running outside and playing in the snow. Unfortunately, all of this enthusiasm is lost on a lack of snow. The first snow fall usually never sticks. We can also drag in global warming here as a culprit for seemingly declining snow levels. But this patent attorney won't reach that far. The point is, wouldn't it be great if we could build a snow man of decent size with relatively less or little snow fall.

Last but not least, one must consider that the snow person is subjected to warmer temperatures and will melt. It will settle as the weight of its own snow compacts in on itself and deform, possible falling over. Adornments placed on the snow man will tend to loosen and fall out. Happy smiles

fade into frowns. Eyes get droopy. Wind will blow away hats, scarves and other accoutrements. Finally, there is terminality. You have to do all of that back breaking work again if a warm snap comes and melts your snow man.

Of course, all of the problems of making snow men/women is part of what makes it fun. Getting a whole group of people around and working together; being outside in the snow for hours; and, yes, having a doofy lop-sided snow man does have some charm. And even if you don't have enough snow, who cares anyway.

That may be true. But we are living in the 21st century now. We have created the Internet. China is getting ready to send a person to the moon. And we invented silly putty, perhaps one of the all-time greatest inventions a big kid ever invented. Can't somebody build a better snow man?

So then the flash of genius strikes me. What if? What if someone could make a snow boulder that was light weight. So light, it could be easily handled so that it could be made really big and still be easily moved, or even carried, even by a youngster. A snow boulder light enough to be easily placed on top of another boulder. Or light enough even to be easily positioned in that perfect place in your yard?

What if someone could make a snow boulder that was perfectly symmetrical, so that it could easily balance on top of another similar boulder. A symmetrical boulder that could form a perfect looking snow man? How cool would that look in front of your house during the holidays?

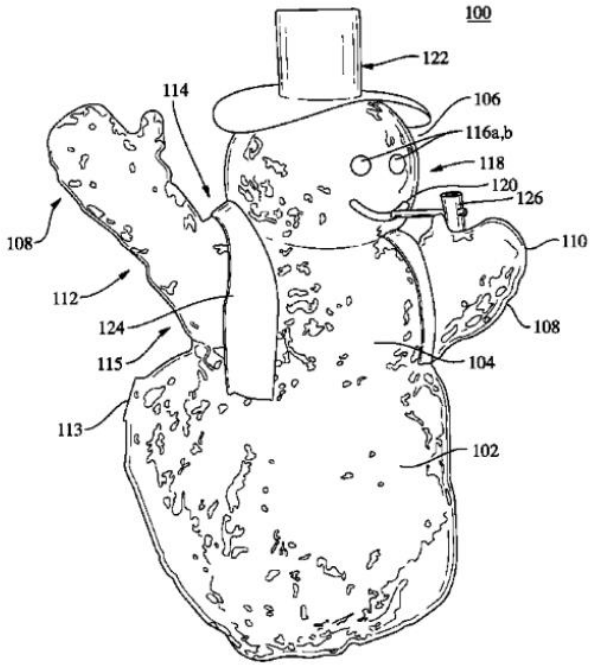
What if someone could make a snow boulder that is perfect every time. A snow man that could be replicated so that it looks the same each time, each year. Or rebuilt from the old snow man/woman in a matter of moments.

What if someone could make that out of a light weight, abundant material that is cheap and is practically used in all toys?

What if a really big snow man could be built utilizing the bare minimum of snow? What if?

Today is that day.

Enter US9,448,002, granted to Marc Ignacio Asperas of Melville, New York on September 20. Just in time for winter. Here's what it looks like:



And here's the big idea:

An apparatus for building a snow person, the apparatus comprising: a ball forming an inside structure of the snow person, the ball having an inner and outer surface; wherein the ball is a unitary work piece that is free and unconnected to other work pieces, wherein the ball is composed of a rigid material that resists an impinging force, including a pressure exerted on the surface of the ball when rolled on the ground against a snow surface; an adhesion surface disposed on the outer surface of the ball, the adhesion surface provided with nodules that extend away from the outer surface of the ball to adhere snow while the ball is rolled; light units integrated into the ball and having light emitting portions that extend away from the outer surface of the ball; wherein a light output of the light units is selected to transmit light through a layer of snow; and connections between the light units situated within the ball connecting the light units together.
Nothing else to say, except, 'how do I get my hands on one?'
I have a quite literal tear in my eye. And not just from the automatic hair-washer.

The Slow-Fast-Moving-Consumer-Goods Design Excellence Award – it was sorely tempting to give this Award to Apple three times over this last year – AppleWatch2, iPhone7 and (good grief) AirPods make for an unholy trinity of 'meh'. About as un-wow as it comes. Fortunately for the last few designers remaining within the Apple empire, the rest of the world was forgetting the basics at a much more rapid rate. And so we end up with three joint winners.

First up, the Apple management will be much relieved to know that in addition to commercializing exploding batteries, their rising stat rivals, Samsung, can also turn their hand to dumb new product ideas. Enter the 'Welt'. A new low in terms of giving a product a name that doesn't quite have the same meaning that you hoped it would (insert image of 1960s schoolboy corporal punishment here).

Beyond the really ill-judged name comes an even worse idea. Samsung describes it as "a smart wearable healthcare belt that looks like a normal belt". It's capable of measuring the wearer's waist size, counting the number of steps they take, and recording the amount of time spent sitting down. Thanks for that.

At least we can say that the solution represents a jump along the Mono-Bi-Poly trend. Not a good one, obviously, but, hey, it's good to say positive things. Here's another Mono-Bi-Poly 'winner'. This time a new function added to the product that has already had every function already integrated. Here's the Jupiter IO 3.

Ooh look, it's a smartphone with an integrated e-cigarette vaping tool. It comes with two batteries – one for the phone, and another to power your narcotics puffer. Jupiter and Vaporcade combined to somehow get the product through FCC approval as of late last year, and a 4G model of the smart-vaper (or vape-phone?) is supposedly due out later this year. Both companies need to go sit on the naughty-step and have a serious think.

As do the Kickstarter-try-outs at 'HeadPal'. Okay, probably unfair to use Kickstarter as a source of bad product ideas. The whole point of the system is to create a self-organising eco-system in which the bad stuff quietly disappears when nobody stumps up any investment cash. At least that's the theory. I don't know what magical words the HeadPal guys spun into their pitch, but it must've worked wonders to counteract the prototype photo:

Well, if nothing else, the picture speaks a thousand words. Nine-hundred and ninety nine of them being 'stupid'.

Oh, wait, hold on a second. Apple have heard that we're not giving them the Award and have made a last ditch bid for glory. Well, actually, it's a product they outsourced to TwelveSouth. It's the 'New Mac Soy Candle'. $24 worth of scented candle that will remind you of what it's like to open that white box every day (or at least for 45 to 55 hours).

Laugh? Apple, you win. By a furlong. Corporate Hubris rules okay. Or not.

Let's All Jump Off A Cliff Advertising Suicide Award: - someone in the Advertising world has done some market research that appears to suggest that 'surreal' is the best way to hook consumers. And now it seems, if advertisers want to win the prestigious 'best campaign (despite no impact on sales)' awards that the industry likes to pat itself on the back with, it's nigh on compulsory to include some weird talking point in your ad. The sure firs winner of the meaninglessly-surreal-big-bucks award from this e-zine's perspective has to be Pepsi and Mountain Dew with their #PuppyMonkeyBaby slot at the Super Bowl. Here's a still image, but you really need to go watch the 30 second slot to see just how much amphetamine an Ad Exec can consume during a shift:

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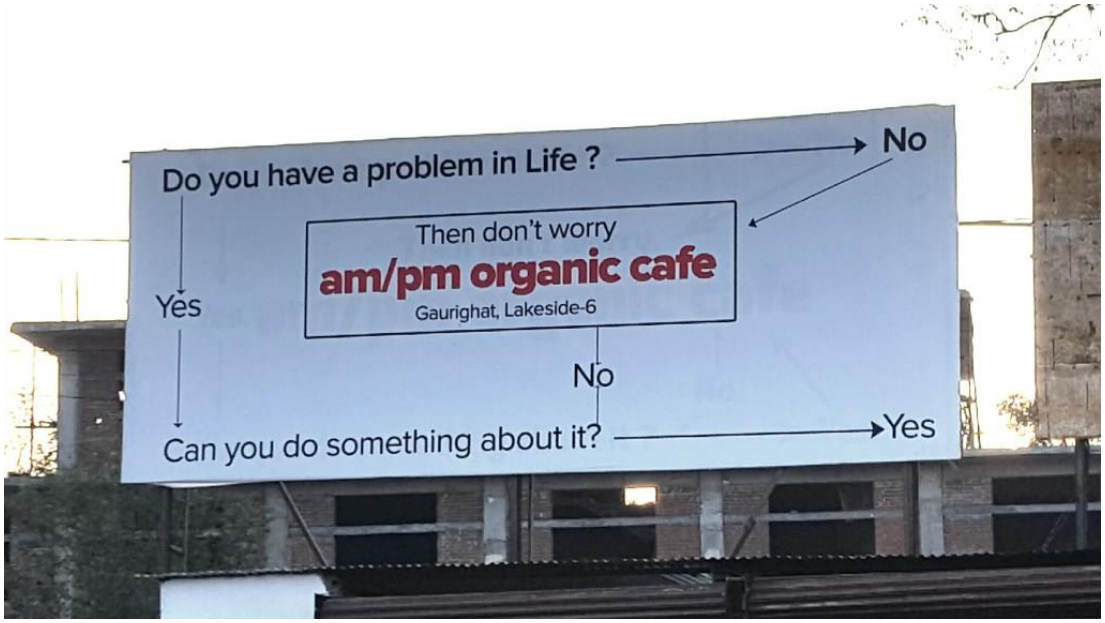
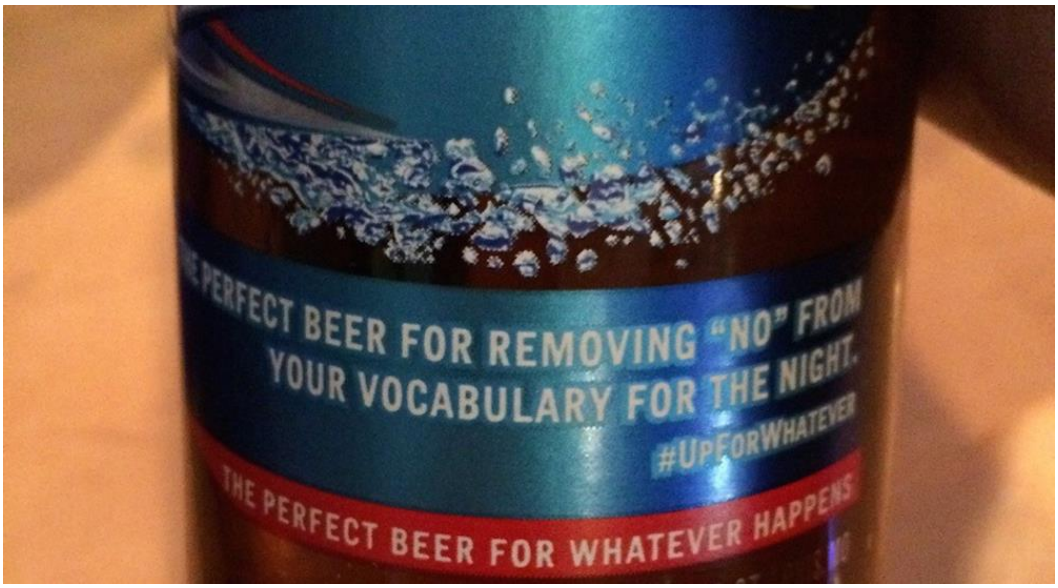
Impact on sales: -10%. Impact on nightmare stress medication +25%.
Slightly less budget, but then again, the audience is somewhat smaller. Here's a poster campaign for the am/pm organic café in Nepal. Flow-charts are all the rage too. Enter the surreal flow-chart…



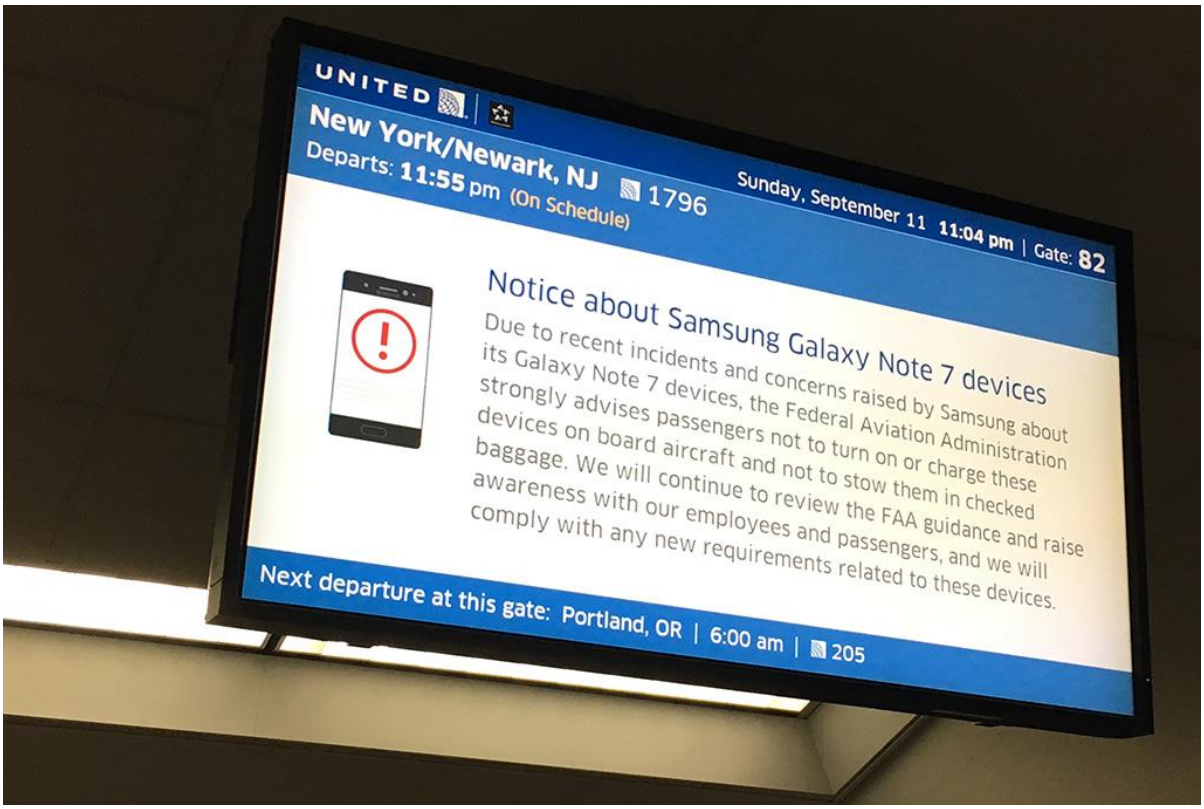
Slightly bigger budget, and Australia next. What's the best way to demonstrate the 'it floats' USP of your latest smartphone? Hmm. Wait a minute, I've got an idea… no, wait, , yes, err… just remind me again why floating is good…

So close, and yet so far.
This one, on the other hand, shamefully from Budweiser, who really ought to know better by now…



Seriously?
Can we not go back to the frog chorus thing? At least that ticked the surreal box.

Okay, so all these campaigns sucked, but they don't quite deserve the Award. That needs to go to Samsung… anything Apple can do they can do better. And, in true TRIZ fashion, they managed to do it 'free, perfect and now'. Well, 'free' anyway. Free billboards at every check-in kiosk, on every screen, at every airport on the planet…



Just a pity they didn't get the logo or a photo of the actual product. Product placement, guys, product placement. Rule #1. So close, and yet so far.

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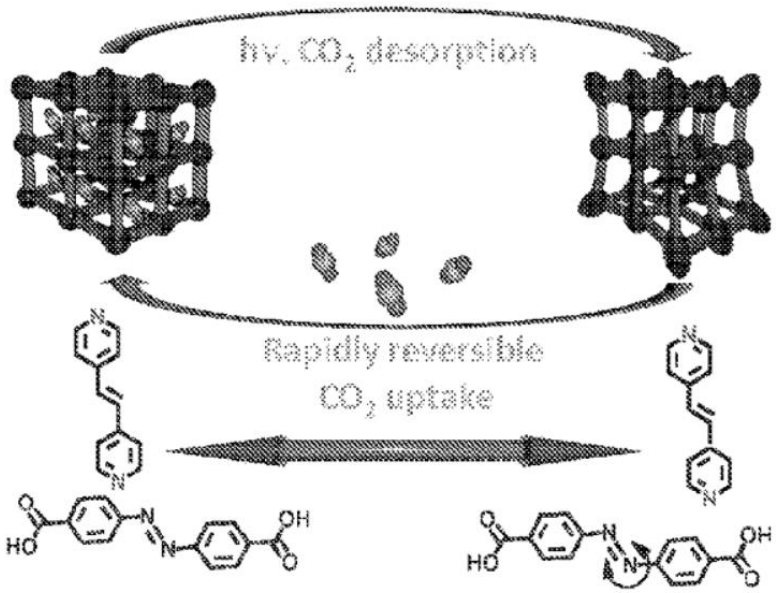
Patent of the Month - Gas Separation Process



Patent of the month this month takes us on a trip to Australia, and specifically a trio of inventors working at CSIRO. US9,533,282 was granted to the inventors on the 3rd of January. Here's what they have to say about the problem being addressed:

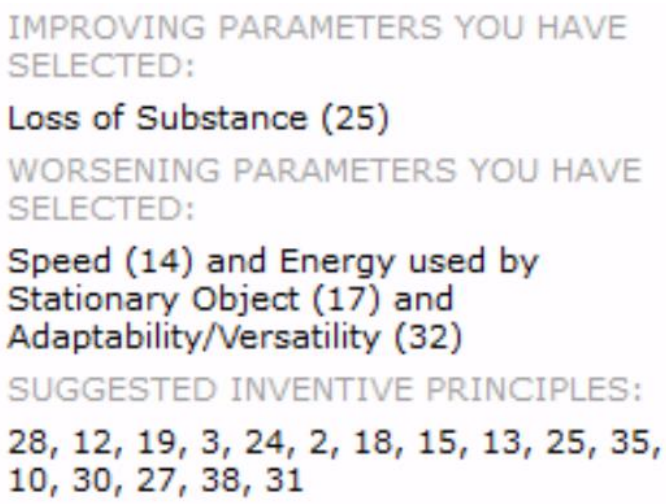
In order for post-combustion carbon dioxide capture technology to realize widespread viability, the energy cost of this technology must be drastically reduced. Current adsorbent technologies that rely on pressure, temperature or vacuum swing adsorption consume as much as 40% of the power plant's production capacity, most of which is associated with the liberation of the CO.sub.2 from the capture medium. Ultimately this penalty, or parasitic energy load, must be brought closer to the thermodynamic minimum of about 4% to avoid prohibitive cost increases. Given that the triggers for release of adsorbed carbon dioxide are so energy intensive and are based on energy from the power plant, there is strong motivation to develop new, low energy release triggers, utilising renewable energy sources. In conjunction with this, adsorbents with maximum performance can further reduce the cost compared to the conventional energy intensive CO.sub.2 gas separation process.

A range of different types of materials have been considered for use in separation materials for the separation of selected gases, and notably CO.sub.2 from a gas stream. Materials include porous organic polymers and metal-Organic Frameworks (MOFs), amongst others. MOFs are an important class of 3D crystalline porous materials comprised of metal centres and organic ligands, joined periodically to establish a crystalline porous array. The large internal surface areas can be used to adsorb large quantities of gases, such as hydrogen, methane and carbon dioxide.

Methods for the incorporation of light responsive groups within MOFs include use of pendant groups pointing into the pores, and filling of pores with light responsive guest molecules. The responsive groups within these materials may then change their conformation when exposed to filtered light which results in a change in adsorption capacity (in static conditions). Whilst these initial results are exciting, there are inherent limitations in the approaches reported to date. Firstly there is a requirement for specific wavelengths of light to trigger the conformational change. Second, the mode of regeneration in materials studied to date has involved mechanisms that take considerable time to achieve removal of the adsorbed species. Some mechanisms require the application of considerable energy in the form of heat.

An adsorbent that can respond to a broad light spectrum similar to solar radiation, and/or possess relatively fast photo-switching that directly releases CO.sub.2 would offer enhanced, lower energy routes to light-triggered CO.sub.2 release.

Basically a triple conflict between the desire to increase adsorption and narrowness of light spectrum, speed and amount of energy. Here's what happens when we enter all three into the Contradiction Matrix:



And here's how the invention solves the problem:

According to the present invention, there is provided a process for the separation of a first gas species from a gas stream using a gas separation material comprising a metal organic framework that is reversibly switchable [Principle 15] *between a first confirmation that allows the first gas species to be captured in the metal organic framework, and a second conformation that allows the release of the captured first gas species on the use of light* [Principle 28] *as the switching stimulus, the process comprising: contacting a gas stream containing the first gas species with the gas separation material comprising the metal organic framework in the first conformation to capture the first gas species, releasing the separated first gas species from the gas separation material by switching the conformation of the metal organic framework to the second conformation, and switching the metal organic framework to the first conformation to regenerate the gas separation material* [Principle 19].

Light, and in particular concentrated sunlight, is an extremely attractive stimulus for triggering CO.sub.2 release. For the first time, it has been found that metal organic frameworks of a suitable type that (i) are capable of capturing or adsorbing gases such as CO.sub.2, (ii) strongly absorb sunlight which provides a stimulus for reversibly and rapidly changing their conformation, and (iii) adsorb gas or release the adsorbed gas through this conformational change…

…According to some embodiments, the conformation that is achieved on application of light is a conformation that is under tension, and removal of the light results in spontaneous reversal to the structure of the other conformation. This is an important characteristic of preferred embodiments, as this allows for the rapid reversible change in conformation to be achieved on removal of the light stimulus [Principle 12]*…*

…Metal organic frameworks are a well known class of chemical compounds. Metal organic frameworks comprise metal atoms (or metal centres) and organic ligands [Principle 3] *that bridge between the metal atoms to establish a crystalline porous array. One of the ligands that was selected for use in developing the studied metal organic framework is based on azobenzene. Azobenzene and its derivatives are photochromic molecules* [Principle 35] *that can undergo clean and efficient reversible photoisomerisation about the azo bond to cis- and trans-state upon visible and UV light irradiation respectively.*

All in all, the invention seems to offer up a very elegant illustration of how the Matrix points inventors in the right direction. Even I was impressed to see the – somewhat rare – presence of Principle 12 in the list of Matrix recommendations. No doubt far more importantly, however, is the impressiveness of the solution. Carbon dioxide capture is one of mankind's biggest problems right now and, given the might of CSIRO to get things moving, I suspect this patent offers up an intriguing light at the end of the environmental tunnel. Next up… the productionisation-scalability patent…

Best of the Month – Ryan Adams' 'Stacks' Method

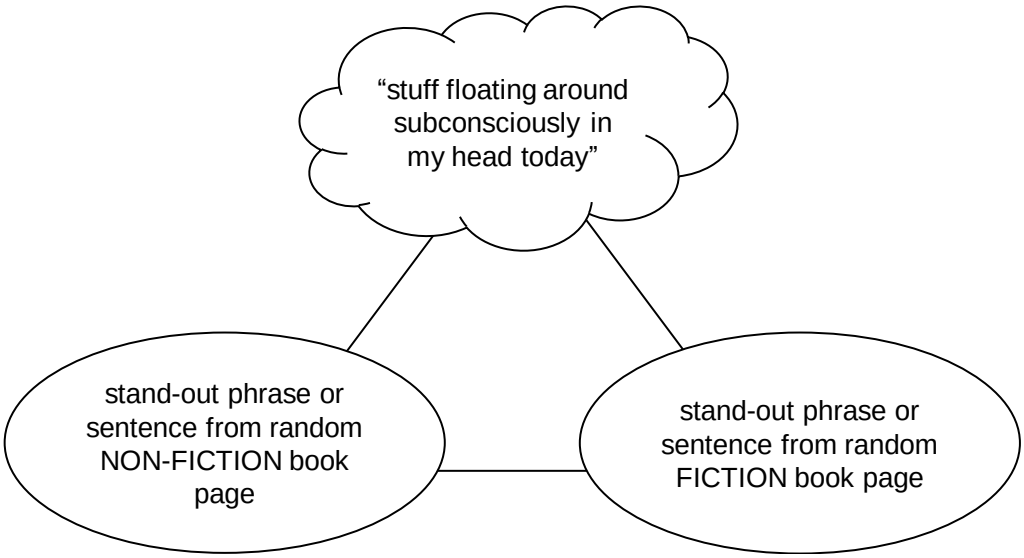
The holiday season allowed a spot of down-time to catch up on the latest battery of books and TV programmes that had accumulated over the course of 2016. Not much to say about the books at the end of the day, but one of the TV programmes gave us a clear winner for the 'Best of the Month' feature this month.

The programme in question was the last of a series of hour-long interviews with song-writers. Singer-songwriter, Ryan Adams, is one of the most prolific of the last twenty years, producing more than an album a year since his debut in the year 2000. This in an era when most artists seem locked to a schedule three or more times slower. If that's not enough, he's also managed to find the time to put out a couple of books of poems and short stories.

The 'Great Songwriters' interview features a ten-minute sequence in which Adams reveals some of the tricks behind his prodigious output. Or rather the sequence shows Adams' creative process in live action. We get to see and hear him compose what sounded like a pretty good lyric from a literally blank piece of paper in his Remington type-writer.

Adams called the method 'stacks'. It involves two piles of randomly chosen books. One of fiction, the other more inclined towards non-fiction and reference. One book from each pile is opened at a random page, which Adams then proceeded to scan in search of a line or phrase that stood out to him. The resulting two random lines are then conjoined by a third element, Adams' state of mind. Or, 'stuff floating around sub-consciously in my head today', to put it in his words.

As I was sat there listening and watching the lyric appear out of the ether, I was reminded of the S-Field model of TRIZ. Which, when I thought about it afterwards seemed to make a lot of sense – a song (or a lyric) is a 'system' in that it is desired to deliver a useful function – a change of emotion or insight for a listener. Here's how I later drew the idea up:



I then decided to give it a go, thinking about a possible innovation blog article rather than a song. It sort of worked, in that I got a decent Tweet out of the model. Attempt two got me what later turned into an actual article. Attempt three got me a poem. Attempt four gave me a thought that later resulted in what I think is an improvement on Adams' method (expect an article on that some time in the future). It was starting to feel like a production line. I think you might find the same thing if you try it.

First-up, though, you need to watch the master in action. If you find yourself with an hour to spare, I suggest you watch the whole interview. If you want to cut to the chase and see Stacks in action, check out the YouTube slice of the interview here: https://www.youtube.com/watch?v=RFlKBfu893w

Borderline genius.

Wow In Music – Kiss

By 1986, when Prince recorded this month's Classic Track, “Kiss,” he was among the most popular and critically lauded artists in America. He hadn't confused and outraged the press and public with the infamous name change yet, and his career arc had been, first, a slow, steady rise, and then, following the film and album Purple Rain, a rocket shot to the top. The Minneapolis-based singer/songwriter/multi-instrumentalist/producer was a true crossover artist, blending rock and R&B in bold, inventive ways and attracting both black and white audiences in nearly equal numbers; no easy feat. Though he was influenced by everyone from Marvin Gaye to Stevie Wonder to Jimi Hendrix to The Beatles, his style was utterly original and distinctive — even before he became massively popular through hits such as “Little Red Corvette” and “1999” (in 1983), his music was starting to influence other musicians; he was certainly among the most imitated artists of the '80s. Then and now, Prince was unpredictable and eclectic, with soft gospel touches on one song, followed by another dominated by the hardest dance grooves imaginable. His first Number One hit, the moody “When Doves Cry” (from Purple Rain in 1984), couldn't have been more different from his follow-up Number One (also from Purple Rain), the rockin' “Let's Go Crazy.” Then there was the psychedelic pop of “Raspberry Beret” in 1985. He's always confounded expectations by juxtaposing acoustic tracks with electronic tracks and mixing styles in unusual ways; everything was (and is) fair game for him. He's never been successfully pigeonholed as anything, except perhaps eccentric.

“Kiss” was part of the stylistically diverse, art-rock album Parade, which also served as the soundtrack to Prince's second film Under a Cherry Moon. And, while the album as a whole sprawls in a multitude of directions, “Kiss” is firmly rooted in the funk milieu that Prince used as a foundation to launch himself out of the anonymity of the back streets of North Minneapolis in the mid- to late '70s. And speaking of foundations, “Kiss” managed to achieve radio hit status and dance club immortality without benefit (Principle 2) of a bass part! More on that in a minute.

In 1986, Prince was working at Sunset Sound in Los Angeles. Engineer David Z, a staffer at Prince's Paisley Park Studios in Minneapolis, remembers getting a call from Prince, asking him to come out for a weekend of work. “I packed three days' worth of clothes and went,” recalls Z. “When I got there, I went in and saw Prince in Studio C, and he told me I would be working in Studio B to produce a new group he had signed [to his Paisley Park label] called Maserati.

“Kiss” was originally intended for Maserati and came into the studio in the form of one verse and a chorus, on a cassette tape, written, sung and played on an acoustic guitar by Prince, who assured Z that the rest of the song would be forthcoming. It wasn't an auspicious start. “The song sounded like a folk song that Stephen Stills might have done,” Z recalls. “I didn't quite know what to do with it and neither did the group.”

Z began in his usual manner by creating a beat on a Linn 9000 drum machine. “The groove began to get complex, especially the hi-hat pattern,” he says. “I ran the hat through a delay unit (Principle 10), set about 150 milliseconds, printed that to tape and printed the original hat to another track and then alternated between ‘source’ and ‘blend’ on the delay unit (Principle 15), recording those passes. It created a pretty cool rhythm that was constantly changing in tone and complexity but was still steady. Then I played some guitar chords and gated them through a Kepex unit and used that to trigger various combinations of the hi-hat tracks. That gave us the basic rhythm groove for the song.”

Session bassist Mark Brown laid down a bass part, and one of the members of Maserati recorded a piano part that Z says he copped from an old Bo Diddley song called “Hey, Man.” The group's singer put down a lead vocal track an octave lower than Prince's original tenor, and some background vocal parts were invented, based on some ideas Z says he remembered from Brenda Lee's “Sweet Nothings.” “This is what we had at the end of the first couple of days,” Z says with a sigh. “We were trying to build a song out of nothing, piece by piece. It was just a collection of ideas built around the idea of a song that wasn't finished yet. We didn't know where it was going. We were getting a little frustrated, we were exhausted, so we all went home for the night.”

That, however, would prove to be enough. At least for Prince. When Z returned to the studio the next day, he found Prince waiting for him. Sometime that morning, The Artist had apparently come into the studio, asked an assistant to put the track up and then recorded his own vocal and electric guitar part. Z was stunned.

“I asked him what was going on. He said to me, ‘This is too good for you guys. I'm taking it back.’” From that moment on, “Kiss” became a Prince record. Z remained with him in the studio as Prince took what sparse elements there already were on the track and made it even more minimalist. “He said, ‘We don't need this,’ and pulled the bass off,” Z says. The low end was filled up instead by using a classic Prince trick: running the kick drum through an AMS 16 reverb unit's reverse tube program (Principle 13). “It fills up the bottom so much you really don't miss the bass part, especially if you only use it on the first downbeat,(Principle 3)” says Z. The hi-hat track was similarly dispatched (Principle 2 again), leaving only nine tracks of instruments and vocals on the record, which certainly made it easier to mix. Z recalls, only half jokingly, that the mix, which was done on an API console, took about five minutes.

Prince's vocals had been recorded using a Sennheiser 441 microphone. According to Z, Prince's preference for that particular mic stems from a conversation he had with singer

Stevie Nicks, who had suggested it to him. “There's a roll-off on that microphone that actually ends up boosting the high end, spiking it around 3 kHz,” Z explains. “It also has good directionality; Prince liked to sing in the control room, so he would set it up on a stand right by the console. When he wanted to sing, he would just put on headphones. He also liked doing his own punches, too.”

The track was left as ambiently dry as it was elementally sparse. In the mix, Z says the starkness of the track actually made him a little uneasy. “I reached over and snuck in a little bit of the piano back in,” he says. A small amount of tape delay was also put on the guitar track. “Otherwise, the mix was just a matter of Prince pulling back and turning off faders. It's more than the bass that you're not hearing on that track.”

Z says he recalls being alternately fascinated and excited by this turn of events. Maserati was to be his first full production for Prince's company. (Z had recorded parts of records for Prince in the past, as well as having recorded his original demos in Minneapolis and being the engineer at the live benefit recording that ultimately became Purple Rain.) In the course of an evening, while he had been sleeping, he was now Prince's co-producer for at least one track. In addition, the deletion of the bass was stirring. It added an element of danger, a frisson to the record-making process.

In fact, it did produce some drama before it was released. Z says the feedback that came to him from Prince's record label, Warners, was palpably negative. “The A&R guy said it sounded like a demo,” Z remembers. “No bass, no reverb. I was devastated. But Prince had been selling big numbers, and he had a kind of power that few artists at that time did, probably more than any artist ever will again. He told Warners that that's the single they were getting, that that's the one they were putting out. He basically forced Warners to put it out.” Lucky Warners. The record went to Number One in the spring of 1986, and solidified Prince's stature as The Artist To Be Reckoned With.

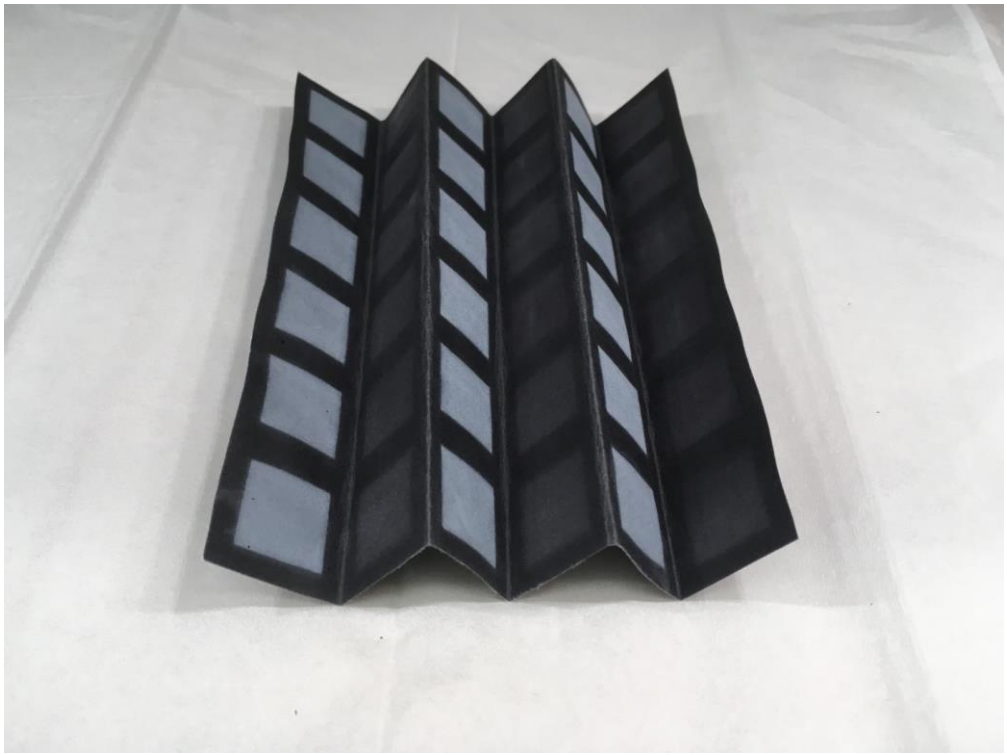
The beauty of “Kiss” is not just in what's not heard, but what's simply implied. “The power of that track is its ability to pull people in,” observes David Z. “The listener has to provide a lot of what's missing. You have to use imagination to listen to that record. It really makes the listener part of the process.”

Prince had experimented with pulling the bass on other songs, such as “When Doves Cry” from the Purple Rain album. As Z suggests, removing the bass and leaving the lyrics naked with percussion and a few other instruments transforms the song into what he likens to Beat poetry. It also provides a new perspective on the role of bass in contemporary music, by not allowing its presence to be taken for granted.

But most telling of all the aesthetic confrontations that “Kiss” provoked was how it functioned as a point of contention between an artist and a corporate entity. “You could really see the resistance of the corporate power of a major record label to something that was so different from what they were expecting,” says Z. “That record was up against the paranoia of radio and the power of corporate record labels. That time, the record and the artist won. These days, neither one would have had a chance in hell.”

"Kiss" is, I think, a great tune. Like a lot of Prince tunes, brilliant in its Principle 2 minimalism.

Investments – Bacteria-Powered Battery



Researchers at Binghamton University in New York have created a “bacteria-powered battery on a single sheet of paper.” The project is aimed at creating batteries for disposable microelectronics that can run for weeks using a little bacteria-rich liquid.

“The manufacturing technique reduces fabrication time and cost, and the design could revolutionize the use of bio-batteries as a power source in remote, dangerous and resource-limited areas,” write the researchers.

The team members used a piece of chromatography paper and a ribbon of silver nitrate under a layer of wax. The anode was made of “a conductive polymer on the other half of the paper” and a reservoir held bacteria-rich liquid. The cellular respiration powered the battery.

You’re not going to power your car with these but you will be able to squeeze out a little juice. The batteries expel “31.51 microwatts at 125.53 microamps with six batteries in three parallel series and 44.85 microwatts at 105.89 microamps in a 6×6 configuration.” The researchers believe these batteries can run glucose sensors, detect pathogens, or keep small electronics alive for days without traditional power supplies.

Interestingly this isn’t the first bacteria battery his team has made. The team “developed its first paper prototype in 2015, which was a foldable battery that looked much like a matchbook.”

No patent applications as far as we can tell, and lots of untapped evolution potential. It might not be an investment for the research team, but the right entrepreneurial kick could turn this into a very nice niche solution with a lot of market potential.

Generational Cycles – Generation K (Or P)

Academic and author, Noreena Hertz recently published the results of a study she'd done on 13-20 year old girls. Not quite aligned with our GenerationDNA model and the generation born after 9/11, but close enough to make the point I think, given that the oldest of Generation Z hits sixteen this year. Anyway, if you want to know what the implications and outcomes of a 'Suffocated' upbringing means, Hertz gives us a pretty good start point. For the girls at least…

Noreena Hertz

'A world of Instadanger, Facebook Envy and austerity has proved a particularly toxic cocktail'

Generation K: what it means to be a teen

I could hear the anxiety in her voice as she recalled "the incident". Her words became staccato, her breathing more perceptible. "It was the worst thing ever. Awful. Horrible. Terrible." What trauma was this poor young woman recounting? Had she witnessed a mugging? Experienced the loss of someone close? Been shunned by her peers? Not quite. This is how Jen, 19, recalled feeling after dropping her smartphone in the toilet. For Jen, *I connect, therefore I am.*

When I first started researching "Generation K" – my term for 13- to 20-year-old girls, named after their icon Katniss Everdeen, heroine of *The Hunger Games* – I'd expected that technology would be core to their identity (even if I hadn't quite envisaged Toiletgate). This is, after all, the generation which has come of age alongside the iPhone and Facebook. They can't conceive of a world without the internet and have almost no sense of the revolution technology has brought to our lives.

But technology is not the only thing that has shaped them. This generation's formative years have been moulded by two other distinct factors – the worst recession the west has faced in decades and the greatest geopolitical dangers it has confronted in years. They have grown up alongside Islamic extremism, austerity and Edward Snowden.

This spring I partnered with Survey Monkey to conduct a poll of more than 1,000 American and British teenage girls (interestingly, I found few significant differences between the two). I also carried out a series of one-to-one interviews. I wanted to hear directly from this generation. What do they care about? Worry about? Want? And what does it mean for our political, social and economic futures?

Many of those in their twenties and thirties – the "Yes we can" generation – grew up believing the world was their oyster. But for Generation K the world is less oyster and more Hobbesian nightmare. Al-Qaeda and Isis have been piped into their smartphones and they have witnessed their parents lose their jobs. They are a group for whom there are disturbing echoes of the dystopian landscape Katniss encounters in *The Hunger Games*'s District 12. Unequal, violent, hard.

They are concerned about existential threats. Sadly, their anxieties stretch way beyond the typical teenage anxieties.

Seventy-five per cent of teenage girls I surveyed are worried about terrorism; 66 per cent worry about climate change; 50 per cent worry about Iran. They also worry inordinately about their own futures. Eighty-six per cent are worried about getting a job; 77 per cent about getting into debt.

Such concerns will not only have an impact on future savings and consumption patterns – they are having an effect right now. Generation K is more sober: teenagers drink less alcohol and take fewer drugs than their recent predecessors. It is also more physically scarred. In 2013, as many as 22 per cent of female high-school students in the US seriously considered committing suicide, according to the US Department of Health. In the UK, a World Health Organisation survey discovered a threefold increase in the number of teenagers who self-harm over the past 10 years. A world of Instadanger, Facebook Envy and austerity has proved a particularly toxic cocktail for boys as well as girls.

Wanting to understand who they turn to in such a harsh environment, I pushed them on who they trusted. Their answers were unambiguous. Only 4 per cent of Generation K girls trust big corporations to do the right thing (as opposed to 60 per cent of adults). Only one in 10 trusts the government to do the right thing – half the percentage of older millennials. These numbers have big implications for the future of business and politics.

Their distrust of traditional institutions bleeds into a more generalised distrust of traditional social mores. As many as 30 per cent of teenage girls are either unsure about marriage or don't want to get married. Even more strikingly, 35 per cent are unsure if they want to have children or definitely don't. This is a seismic difference compared with older millennials.

Emily, 15, who "definitely doesn't", explained that this decision stemmed from a realisation that women can't have it all, that she'd have to choose between career or children. We clearly still have a way to go for girls to see child rearing as a gender-neutral responsibility. And this generation is definitely career-minded – 90 per cent consider it important to be successful in a high-paying profession.

Careerist definitely. But, like Katniss Everdeen, Generation K also has a strong sense of what is right and fair. Time and time again the girls told me how disturbed they were by gender pay gaps, sexist comments, the attitude that "women cannot be engineers". They shared their frustration that "men are able to do anything but women still can't", along with concerns about economic, racial and social inequality.

Equality for this generation is not about conformity. Eighty per cent of them support equal rights for transgender people. Indeed, I was fascinated by the extent to which Generation K celebrates difference. When I asked the girls to describe themselves in one word, "unique" was the one they most commonly chose. Unique – and proud to be so. Sarah, 16, explained what this meant to her: "To me, it's about being your own person, not having to think the same as others or dress the same as them. It's about not caring if I'm the same as everyone else."

In a world of Toiletgate and terrorism trauma, I find this revelation not only inspiring but also very hopeful. FT

Illustration **Shonagh Rae**

Noreena Hertz is co-founder and CEO of Generation K and honorary professor at University College London. She will be launching her research on Generation K girls at The Women in the World Summit in New York on April 24. Gillian Tett returns next week

SYSTEM ATIC INNOVAT ION

As is often the case, generational cohorts don’t get their ‘official’ name (i.e. label-that-resonates with sufficient people that it becomes a societal norm) for quite some time after they started arriving on the planet. Hertz’s ‘Generation K’, I think, will be an attempt that will fall by the wayside.

I like the idea. Katniss Everdeen is a character that a lot of teenage girls will have seen a lot during their formative years. But, while the dystopian world in which she inhabits carries clear parallels to the world today’s teens will see around them, reluctant Hero, Katniss, is very much out of the Generation Y, Hero, mould. A veritable Hero for a Hero generation.

Suffocated GenZ kids, are, for the most part, way too anxious to step up to the plate. Not helped by the fact that their Heroic parents are too busy stepping in to play the Katniss role on their kids’ behalf.

A far better model for the actual GenZ archetype is Katniss’s young sister, Primrose. Unlike her sister in many ways, Prim was the opposite of Katniss in both looks and character; a gentle personality (unlike Katniss' prickly one) and a talent for healing, as opposed to Katniss' talent for hunting. I think the Generation Z Hunger Games fan can see more of themselves in Primrose than in Katniss, honestly. Which, given Primrose’s sad fate, probably doesn’t do much to solve the GenZ anxiety problem.

I don't care if we're rich. I just want you to come home.
You'll try, won't you? Really, really try?"
Primrose Everdeen to Katniss Everdeen

Biology – Mugger Crocodile

New research shows that alligators and crocodiles can use small sticks to attract birds looking for nesting materials. If the birds get too close, they become a meal. The behavior has so far been observed among American alligators in Louisiana, as well as mugger crocodiles (also known as marsh crocodiles) in India.

Alligators only engaged in this trickery during the nesting season and in areas where birds nested, said Vladimir Dinets, a behavioral ecologist at the University of Tennessee Knoxville. During nesting season, there's often a shortage of sticks in marshy areas where these reptiles and birds overlap, and birds sometimes even fight amongst themselves to procure sticks to build nests. The study, which Dinets co-authored and which was published in late November in the journal Ethology Ecology & Evolution, suggests that there is no other explanation for this behavior than as one of tool use.

"What's really remarkable — they are not only using lures, but they are timing it to just when the birds they want to capture are nesting and looking for sticks to use," said Gordon Burghardt, an ethologist (animal behaviorist) and comparative psychologist specializing in reptiles at UT-Knoxville. "They are making some assessment of the birds themselves."

The finding, along with other recent work, suggests reptiles are much more intelligent than generally acknowledged, Dinets said. As anybody who studies the beasts can attest, they are quite smart, he added. Crocodiles, for example, have complex communication systems, can hunt in coordination and ambush prey, and both parents may help raise young, he said.

Relatively less is known about crocodiles and alligators than many animals, because, as large predators, they are difficult to raise in the lab and study up close in the wild. Their cold-bloodedness also makes them slow.

"They operate on a different time scale; they do things more slowly," Burghardt said. "Sometimes we don't have the patience to let them strut their stuff, as it were … so this kind of study is important."

Wading birds like snowy egrets have been known to nest in wooded islands near areas with high levels of alligators, for example in Florida. Scientists think the birds nest near such scaly enemies because the alligators keep at bay predators like snakes. Apparently, the occasional loss of adult birds to the hungry alligators, or nestlings that fall into the water, is worth the lowered risk of being eaten by something else, according to the study.

From a contradiction-solving perspective, the mugger crocodile is wanting to increase its ability to feed (‘productivity’), but this is made difficult through a combination of the relative speed of prey and inability to connect. Here’s what that looks like when mapped on to the Contradiction Matrix:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Productivity (44)

WORSENING PARAMETERS YOU HAVE SELECTED:

Speed (14) and
Compatibility/Connectivity (33)

SUGGESTED INVENTIVE PRINCIPLES:

24, 13, 35, 10, 3, 2, 5, 28, 4, 12, 1, 19

Balancing sticks on your back looks like a pretty good illustration of Principle 24, Intermediary. Now, time for the egret’s to evolve their revenge…

SYSTEM ·ATIC INNOVAT· ION

Short Thort

Over the entrance to a small *paelstra* —- a wrestling school — in ancient Greece was emblazoned the phrase: ***Strip or Retire***.

During this period, men competed in sports and exercised in the nude. Thus, the inscription served as a challenge to each man entering the gymnasium: come in, participate, and struggle — or keep out. Mere spectators were not welcome.

To be part of this wrestling school, you were literally required to put your skin in the game.

In antiquity, such a requirement extended far beyond athletics; a man could not participate in civic life, business transactions, war, or philosophical debates unless he had metaphorical skin in the game — unless he was willing to risk his life, and what was even more valuable, his *honour*.

“At no point in history have so many non-risk-takers, that is, those with no personal exposure, exerted so much control.”

Bankers and hedge fund managers make risky investments and trades that contribute to cratering the economy, but avoid punishment while taxpayers pick up the tab.

Corporate CEOs run companies into the ground, but walk away with millions in bonuses.

Journalists write columns that contribute to support for a war or a criminal accusation, but retain their jobs when the claims they made turn out to be false.

Researchers publish “ground-breaking” studies that are later retracted, but do not publicly apologize or admit mistake.

Politicians and media pundits offer analyses and make predictions about current and future events that turn out to be wholly inaccurate, and yet continue to wield power and talk to the cameras night after night.

News

Minneapolis

Darrell's series of Certification Workshops are all set for launch on 13 February. The first cohort is almost sold out already, but if anyone is interested in joining, you might like to check out the online booking site: https://www.eventbrite.com/e/systematic-innovation-three-day-conferences-level-1-level-2-level-3-darrell-mann-tickets-2759368345

India

Darrell's March trip to India has shifted slightly and will now take place between the 20th and the 29th. Most of the days are now allocated, but there are currently two still free if anyone wishes to make use of them in Mumbai, Pune or Bengaluru.

iLEGO Workshop

Darrell will be keynoting at the Innovation Lean Effective Green Operations one-day event at Cardiff University on Thursday 30 March. More details at the event website: https://www.eventsforce.net/cbs/269/home

New Projects

This month's new projects from around the Network:

- Food& Beverage – PanSensic framework agreement
- Food & Beverage – Turnkey Development Project
- Automotive – SI Certification Workshops
- IT – SI workshops
- Automotive – IP Study
- Automotive – ICMM Assessment
- Industrial – Design-Thinking+TRIZ Workshops
- Government – Innovation Culture Initiative Support
- Agriculture – GenerationDNA workshop
- Education – Strategy Workshop