

Systematic Innovation



e-zine

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Our guarantee to the subscriber is that the material featured in the e-zine will not be published elsewhere for a period of at least 6 months after a new issue is released.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

Making Sense Of Fake News #1 – Problem Definition



When we were assembling the narrative for the TrenDNA book and the likely triggers of the S-Curve-shifting Crisis the world is inexorably moving towards, all of our analyses concluded that it wasn't possible to know which of the many emerging contradictions was going to be the one that ended up causing the big shift. All we could see then was that there were a number of interdependent candidates, the fall of any one potentially triggering an impact on all the others. There were multiple 'dominoes', in other words, and the fall of the right one would likely be sufficient to topple all the others. What we can now see, thanks in no small part to Steve Bannon, a man who seems to think the Strauss & Howe 'Generations' model is a play-book rather than a warning, is that there are indeed many wobbling dominoes, and they're all positioned close enough together that even a domino that might seem trivial could end up 'causing' the fall of all the important ones. In such a scenario, our focus in TrenDNA on the 'big' crisis-triggering contradictions laid us vulnerable to missing out on the 'little' ones that could end up being bigger than all the others. A classic butterfly-wing-flap-causing-a-hurricane-half-a-world-away situation.

So, here we are eight years after the publication of TrenDNA, still not knowing what all the dominoes look like, or how many of them look set to fall in the coming years. We are, however, somewhat clearer about some of the 'smaller' dominoes that may have become bigger in the last few years. One of these is Fake News. And, if you care to take a look at our Book Of The Month recommendation this month, the growing slew of business texts on the 'weaponisation of Social Media'.

Completely counter to Mark Zuckerberg's intentions, I'm sure, the ability for people to connect to everyone else almost instantaneously is doing the exact opposite of 'connecting everyone'. Facebook and its ilk are causing enormous fragmentation of society. And the fact that things can happen instantaneously means there is no damping in the global communication system anymore so the presence of positive feedback loops can very quickly create non-linear effects. And right now, things seem to be unravelling at a rate that feels exponential.

Not that there's anything a tiny entity like ours can hope to do about such an enormous unravelling problem, we decided anyway that it was a good idea to explore the potentially explosive domino-toppling propensity of the continuing spread of Fake News. Just to see

the impact it might have on our enterprise and our ability or otherwise to continue operating in the broader world of innovation.

As well as there being nothing we can do about the problem, it could also be that *no-one* can do anything about it. If that's the case, we'd all better hunker-down and prepare ourselves for some turbulent times ahead. Better to know this is the case than not, we think.

Here goes.

As with just about any complex problem, we typically start by formulating a question. We decided to start with, 'Ideally, the Fake News phenomenon diffuses and disappears (by itself), but...' And from there, we compiled a list of all the 'yes, but' statements we could devise or find out there in the big wide Fake News world. By the time we'd done, we had compiled 30 statements (Table 1):

26	(Enemy) State funding of Fake News 'factories' (armies)
27	People love and become addicted to being influential and top-of-the-heap
28	Humanity has no common enemy to unite against
29	The more radical the story, the more viral it is
30	Governments desire to control content within their territory

Table 1: List Of 'Yes, But' Statements For Fake News Question

Then, in usual fashion, we use the Perception Mapping 'leads-to' analysis to map the relationships between these 'yes, but' statements. When we did that, we found ourselves looking at a map with three independent loops, each representing a different 'downward spiral' issue relating to the Fake News problem and the contradictions that would need to be resolved in order to achieve a resolution.

Fake News is ultimately subject to the same S-Curve dynamic as any other phenomenon in that it can't continue forever. Sooner or later it hits a limiting contradiction. Each of the three loops is a contributor to determining what that limiting contradiction is all about.

Here's the first of the three loops we found. In my mind, now I've lived with the image for a few days, I think of this as the 'Confirmation Bias Polarisation' loop.

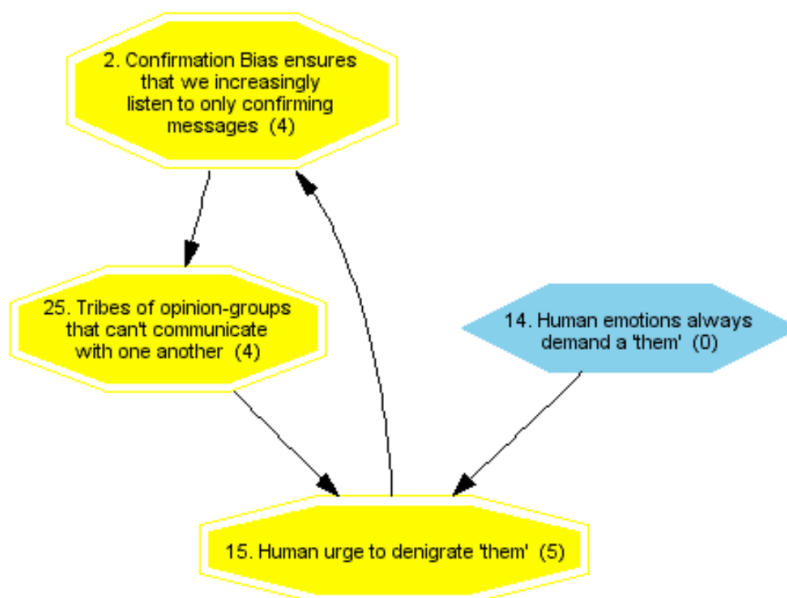


Figure 1: 'Confirmation Bias Polarisation' Fake News Downward Spiral

I'd have to say that, when thought about on a global scale, this is a loop that doesn't hold up much prospect for being solved in a win-win fashion. Fighting innate human nature is the stuff of human evolution, and a creeping, generation-on-generation progress. If we look at how the world has tended to solve 'us versus them' problems traditionally, certainly at the global level, it tends to be a very win-lose Cold War style 'Iron Curtain'. A curtain used to break the loop by making it difficult to see the 'them's on the other side. The idea being that while we might continue to denigrate the people on the other side of the curtain, they don't actually know we're doing it. Think here at how the Chinese Government has effectively gated the internet access of all of their citizens so that they can speak freely within the country, but the information able to get in and out from the outside world is very tightly controlled. The curtain, even though it is digital rather than iron, is nevertheless increasingly impenetrable. If I had to bet on how this loop plays out in the coming years, I find it difficult to see beyond the spread of this kind of win-lose isolationism.

Let's have a look at the second loop to see if we can fare any better with that one. This loop is a lot bigger than the first one, but somehow feels more addressable. Walking through the flow of logic, in my mind I've come to think of it as the 'Virality-Beats-(Expert)-Veracity' loop:

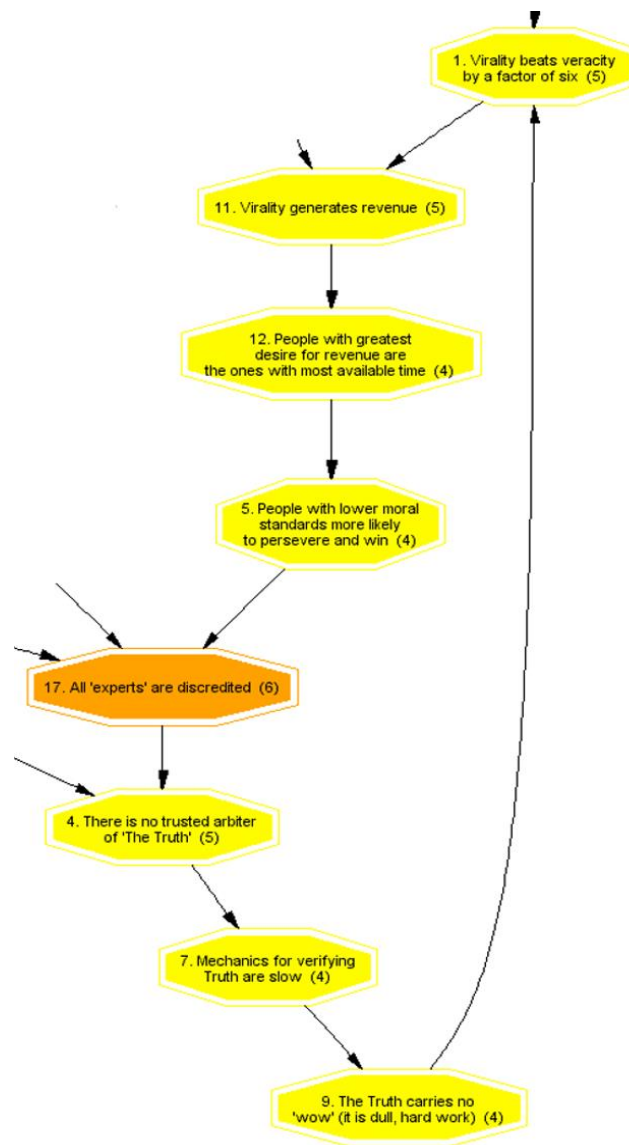


Figure 2: 'Virality-Beats-(Expert)-Veracity' Fake News Downward Spiral

Complicated as this downward spiral is, it feels like the one most amenable to a technical solution. One centering around the need to speed up the process of verifying truth. Admittedly, looking at the complete island of perceptions surrounding the Figure 2 downward spiral – Figure 3 – there are a number of connected thorny ‘human’ issues that need to be addressed...

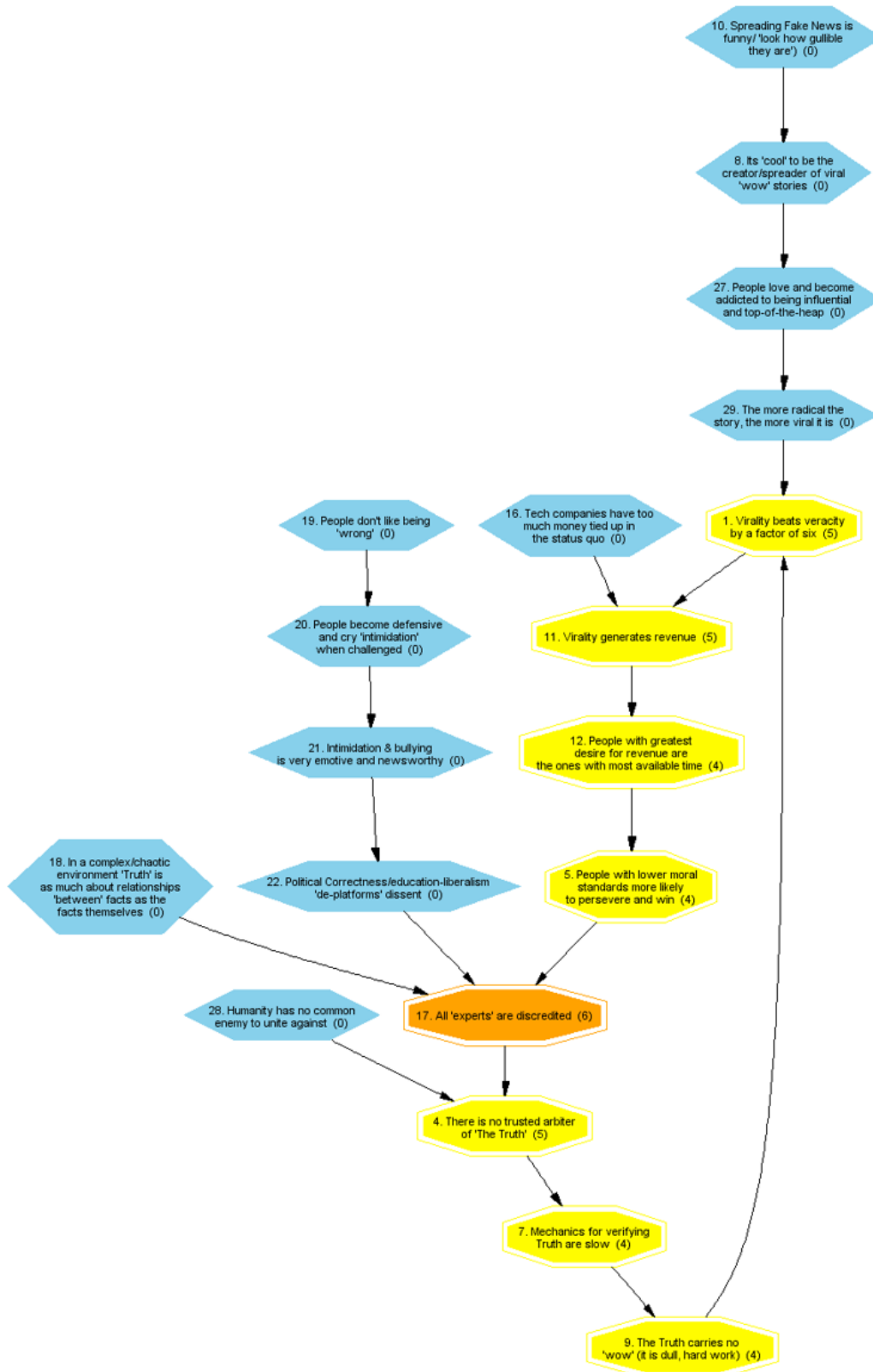


Figure 3: Complete ‘Virality-Beats-(Expert)-Veracity’ Island

...the delusional liberalization of academia and growing tendency to cry 'bully' when someone's opinion is challenged feeling like they top of the list. Still, even these thorny issues can be seen would be diffused if a 'veracity technology' was able to highlight the harmful consequences non-truth and identify the fakers in such a way that they're (self-) incentivized to change their behavior. I don't feel so worried about the world's ability to solve this loop, so, on to the third one...

Figure 4 shows this third loop. It's the simplest of the three. I quickly came to think of it as the State-sponsored Fake News factory. Simple as it looks, it sounds like one that, like the first loop, is nigh on impossible to solve in today's world. A world dominated by geo-politics and the perceived need to maintain instability in certain key strategic regions of the planet. What the Russian and Macedonian tampering with the 2016 US election, the UK Brexit vote and elections in the Philippines, Brazil and others appears to have revealed is that employing a small army of fake-Facebook authors is a far, far cheaper way to create instability than deploying thousands of expensive actual armies into those regions. Given the compelling instability economics, it is really difficult for me to begin to conceive of how anyone other than the dominant global powers could hope to do anything about this one.

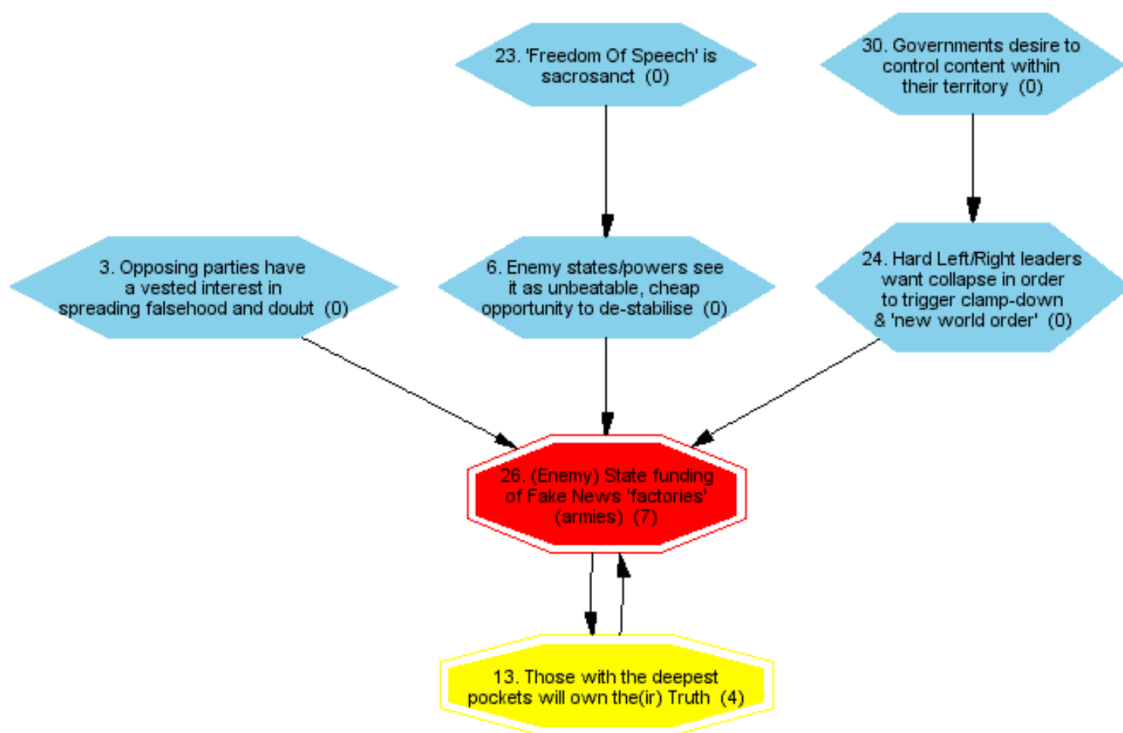


Figure 4: 'State-Sponsored Fake News Factory' Fake News Downward Spiral

Never say never, of course, is a common TRIZ expression. There's no such thing as an unsolvable problem. There are, on the other hand, problems that can very easily be transformed into insoluble ones when we apply sufficient constraints to them. Let's give ourselves a month or two to incubate on these three loops and see what emerges from the fog. You might like to join us in that process... feel free to write in with your thoughts. This is a domino-toppling problem, and it feels to me like we're ahead of the game. If only because TRIZ tells us we need to be focusing on the contradictions, and now have a clearer idea what the critical ones are.

Case Study: Friction And No-Friction



Margaret Heffernan @M_Heffernan · 1h

Wrong. Collaboration generates friction - what the Wright bros called 'scrapping'. It's how weak ideas grow strong.

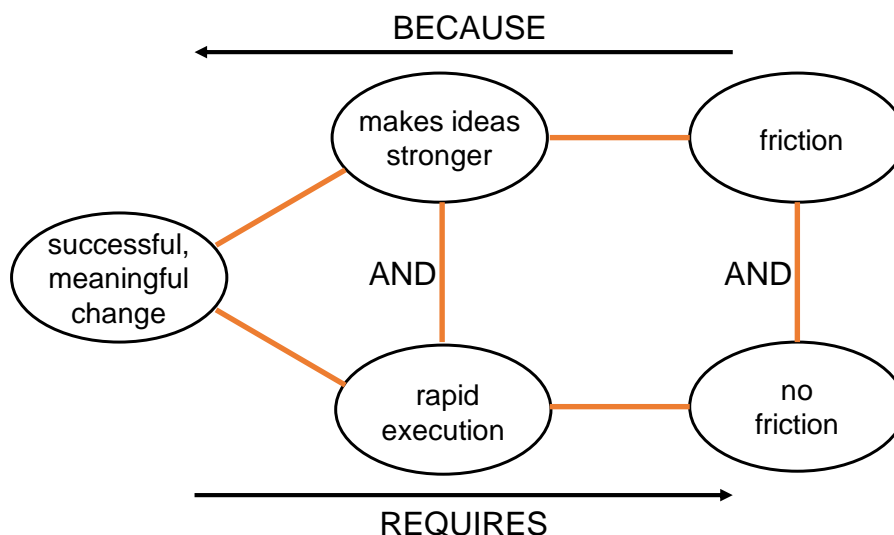
John Maeda @johnmaeda

"The keystone of successful business is cooperation. Friction retards progress." —James Cash Penney maeda.pm/2018/10/08/my-...

Anyone that follows me on Twitter may have noticed that I'm not very good at following other people. It's nothing personal, just that my brain is not capable of tuning in to fast moving streams of information/noise. That plus the fact that I restrict myself to a maximum of 20 minutes of Twitter-time a day, so what I skim through has to have some kind of focus to it. Occasionally I get to witness the five-second arguments that have a habit of flaring up when individuals get the wrong end of someone else's stick. Or, the ones that intrigue me, when two 'right's turn into a conflict. Right-versus-right contradictions offer us the opportunity to make the most progress. Even if the two sides of the story can't see it for themselves.

That's what happened recently when Margaret Heffernan (author of *Wilful Blindness* – one of our previous Best Of The Month recommendations) picked up on a Tweet from John Maeda. Taken together, these two esteemed figures have close to half a million followers between them, so clearly lots of people think they have something interesting to say. I don't know what any of those half million thought of the spat – reproduced above – but for me it immediately sparked one of those right-versus-right moments. Pity that neither of them could apparently see it, and so their argument fizzled out into the usual sense of stuck'ness that tends to signify people who don't understand TRIZ, or the importance of revealing and then resolving contradictions.

The Heffernan-Maeda (or should that be 'Heffernan-Penney' since all Maeda was actually doing was re-quoting an old JC Penney quote) contradiction centred around friction. One that, from a TRIZ perspective, could be mapped something like this:



It's funny how smart people can so easily find themselves falling into pointless either-or arguments. Probably sometimes because the 'or' part of the story is invisible or implied. As it was in this case. Most people don't have a well trained either-or radar because most people don't understand that such situations are the gateway to breakthrough solutions.

From a TRIZ perspective the parallel need for both friction and no-friction in the business context is the key to progress. Penney was right. And so was Heffernan. They both could have been 'righter' if they'd recognized that the other wasn't wrong. What we have here is a classic physical contradiction. And, moreover, one that is pretty much solved by the time the Bubble Map has been drawn. It's a separation in time problem. *Sometimes* it's beneficial to have friction within and around a team, and sometimes it isn't. The key to an actual best-of-both-worlds solution is to know the appropriate context for each side of the contradiction. Friction is really useful *when* we're in the fuzzy-front-end confusion and conceptualization of new ideas; friction is really not needed *when* everyone has decided what we're going to do and we just need to get on and do it.

It might look simple from a TRIZ perspective. The real problem here, perhaps, is being surrounded by really smart people who don't know when they've found progress gold-dust. It's the contradiction, stupid.

Not So Funny – Pet Rock Redux & Other Barely Essential Luxuries



One thing I've never been able to properly forgive my parents for is their refusal to let me have a pet-rock when I was a boy. Spool forward 35 years, and it got re-launched as the USB version. Now I'm old enough to buy my own. The Inventive Principle 5, USB upgrade is now smarter. You can simply plug the USB cable into a free port, and let the USB Pet Rock do its magic, and unlike other pets, it doesn't make noises, doesn't poop on your sofa, and requires relatively little fuss and attention. In fact, it doesn't do anything at all. You just put it there among the other detritus on your desk, introduce it as your pet and tell stories about it. And because it doesn't do anything, it's compatible with any operating system, and spec of computer, and any powerbank. Sadly, like your iPhone7, it doesn't have a 3.5mm jack, so suck it Apple!

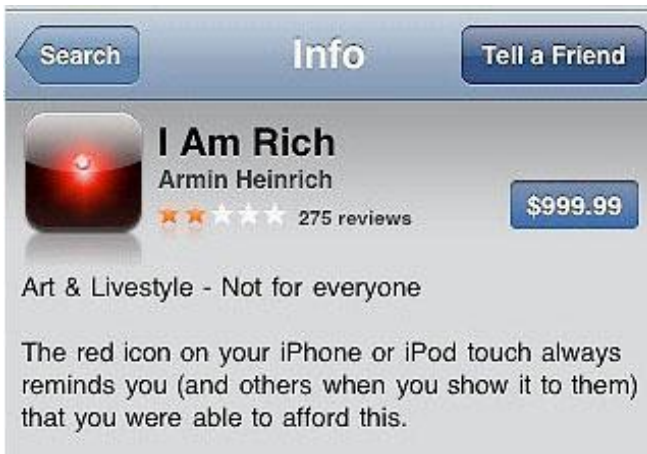
I was going to get one. But then I saw this other piece of Principle 5 genius...



The NVX 200 targets a pretty specific niche – businessmen like me. It's basically a dock that converts any mobile phone into a desktop phone. It's great for conference calls as it has physical buttons for speed dials, easy muting and eliminates distracting microphone noise for better clarity.

Now that's a good idea... if you lived in the 1950s. I mean it's great until you realize that the NVX200 is nothing but a glorified bluetooth speaker only your rich uncle upstate would buy. All of its functionality can be replaced by a more decent bluetooth speaker. For about quarter of the cost. But then again, it's not always about the money is it?

Unless you count these two...



On the left is the 'I Am Rich' app. Recently available on the iTunes store for an eye-watering \$999. It is of no practical use whatsoever (Principle 2) and merely serves to demonstrate that the phone's owner was wealthy enough to waste their money on it. Funnily enough it was removed from the App Store. Probably because the sales were causing server overload problems.

Meanwhile, still available for \$425, the gold pills on the right of the image will "turn your innermost parts into chambers of wealth" and make your excrement (Principle 32) glittery. And who wouldn't want that?

The environmentally-obsessed freak who bought a JumpSnap, that's who. Another terrific example of Principle 2 in action...



...welcome to the rope-less skipping rope. That should take a big chunk out of the climate-change problem right there.

No doubt assisted by this piece of Principle 34 inspired sustainable innovation ...



As I understand it, the banana skins were burned to provide the necessary heat to the plastic packaging injection moulding machine. Which makes sense.

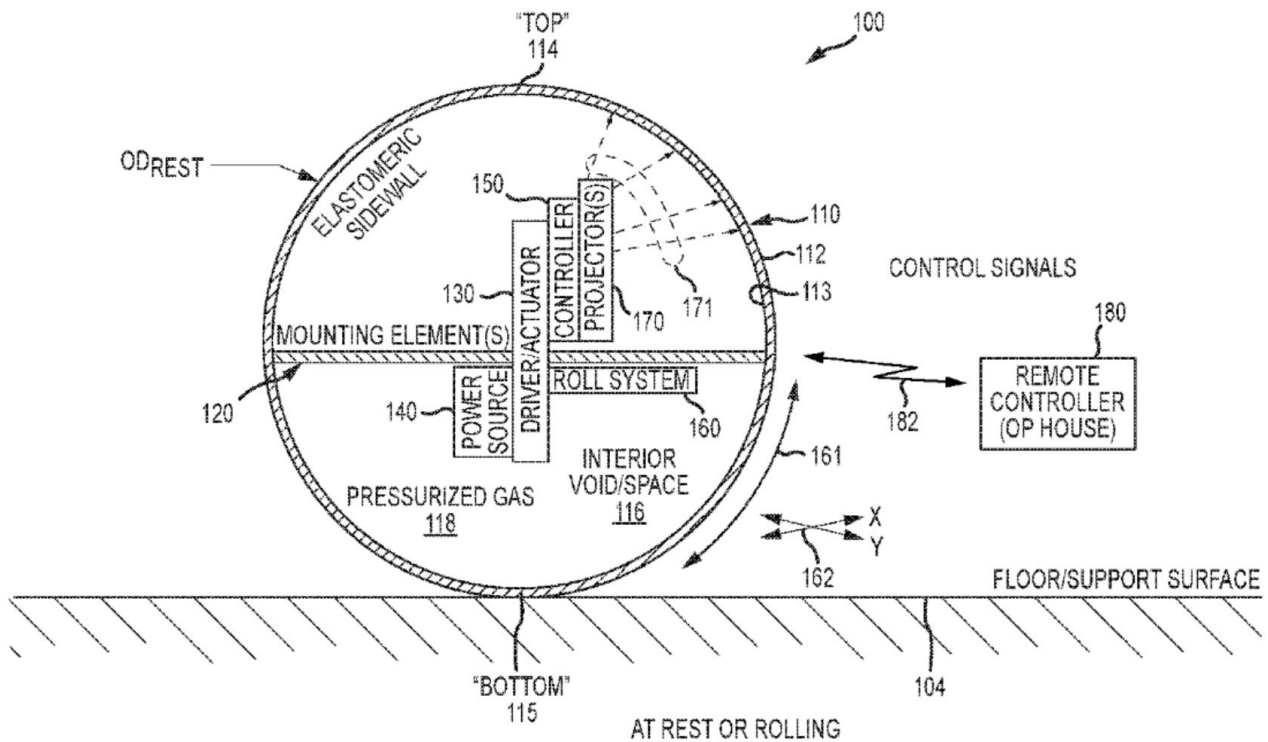
Although not nearly as much as...



...(Principle 12) Anti-radiation underwear. An all-in-one garment solution made from pure silver-coated polyester threads. Great for keeping the werewolves and vampires at bay. Plus it also claims to block radiation of cellphones, WiFi Signals, microwaves and more. It also cools your hooha while keeping it clean from bacteria and odour. You'll definitely want to check out the Kickstarter video behind this one. After putting a cellphone in their underwear, the signal was lost.

Hmm. I think that's given me another idea.

Patent of the Month – Robotic Bouncing Ball



Well, I never expected to be featuring a patent assigned to Disney in this section of the ezine, but here we are. Never say never. I suppose, too, the presence of California Institute of Technology has a bearing on matters. That plus the fact that an awful lot of breakthrough solutions start life as toys.

Anyway, the patent in question is US10,092,850, which was granted to a quartet of inventors on October 9. Here's what they have to say about the background to their invention:

Robotics is a rapidly expanding branch of engineering and science that includes mechanical engineering, electrical engineering, and other disciplines. Robotics involves the design, construction, operation, and use of robots as well as computer systems, sensory feedback, and information processing to allow proper control of these robots. Often, those who work in robotics are developing robots that are designed to act and behave similar to humans and can be substituted for humans such as in dangerous environments or to perform highly repetitive tasks in a way that is humanlike.

In other cases, though, there are demands for robots that do not look, move, or behave like a human. For example, there has been for demand for robots and robotic characters with novel appearance and that use unusual or even difficult to recognize methods of locomotion. These robots can be used for entertainment in settings with larger crowds or to entertain users at home. In other cases, robots with unusual or uncommon locomotion can be used to perform household or industrial tasks such as vacuuming a room.

There are many examples of robotic characters from movies and comic books that have been developed for use to entertain or for use as toys. Each of these robots has been designed to be safe to operate by and among a crowd of people. Examples include tracked robots and robots that imitate movement of an animal-based character such as a dinosaur. More recently, robots that roll about a space have been created, and these rolling robots have thrilled audiences as they roll around and have been very popular as toys for all ages.

Hence, while there has been much progress in providing robots with unusual locomotion, there will continue for the foreseeable future to be a strong demand for robots with new and unexpected novel appearance and locomotion.

Mapping this one onto the Contradiction Matrix is not as easy as it is for most patents. The best way, I think is to recognize that, because right now the primary motivation is to create something that entertains people, the most appropriate improving feature is 'Positive Intangibles'. In terms of the other side of the conflict, there are really two issues, the first relates to the difficulties of getting the ball to move in the 'right' ('unexpected') directions, and the other to the more pragmatic issue of powering the motion. Here's how I mapped the two problems onto the Matrix:

IMPROVING PARAMETERS YOU HAVE
SELECTED:

Positive Intangibles (47)

WORSENING PARAMETERS YOU HAVE
SELECTED:

**Length/Angle of Moving Object (3) and
Power (18)**

SUGGESTED INVENTIVE PRINCIPLES:

19, 3, 14, 35, 7, 8, 32, 21, 28, 25, 26

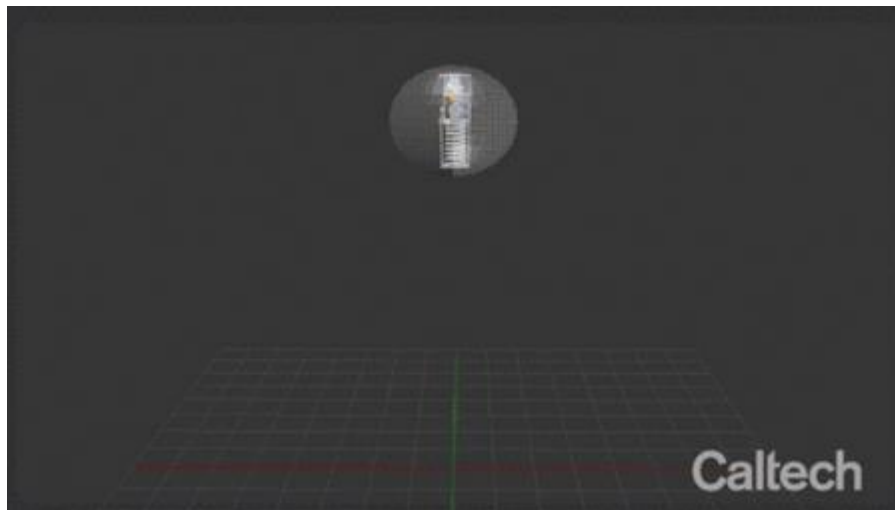
And here's how the inventors claim to have solved the problems:

The spherical body [Principle 14, Curvature] will typically be formed with a thin wall of elastomeric material or elastic material such as a rubber or the like [Principle 35B, Parameter Change, 'increase flexibility]. A drive or actuator assembly will be positioned in the interior space of the body [Principle 7, Nested Doll] along with a local controller and a power source to cause the spherical body to bounce up and down vertically [Principle 19, Periodic Action] and to provide horizontal/lateral movement of the spherical body by selectively applying deforming and reforming/spring assist forces on the outer wall of the body [Principle 3, Local Quality]. Because the body is formed of a rubbery or elastic material, the robotic bouncing ball is relatively safe, and its bounce will allow it to ford obstacles that might hinder or block a rolling or walking robot.

In some embodiments, the robotic bouncing ball is adapted to be able to vary the height of each of its bounces [Principle 3, Local Quality]. Further, the robotic bouncing ball is able to plot and navigate a course either in a remotely controlled manner or with internal sensing and navigation (e.g., operations of its local controller or control system) [Principle 25, Self-Service]. This may involve utilizing cameras and other sensing modalities to observe and react to its environment. In some applications, a group of the robotic bouncing balls act in a coordinated way to provide a show or perform a task. In interactive settings, a person may participate with the robotic bouncing ball by, for instance, directing the robotic bouncing ball to jump through a hoop or to continue bouncing long after being dribbled by a person. In other cases, the person may instruct the robotic bouncing ball to follow them as they move about a space. The robotic bouncing ball may also include internal projection components that can be selectively operated by the controller to create an animated face or other special effects using still or video images projected (e.g., remote tracked video projection, internal illumination, or the like) onto the inner surfaces of the wall forming the spherical body, e.g., to bring a particular character to life via operations of the robotic bouncing ball. In some embodiments, the robotic bouncing ball would also be able to roll, and it would be adapted to quickly transition between these two modes of ambulation or locomotion.

More particularly, a robot is provided that is designed to have bounce-based locomotion on a support surface. The robot includes a body including an outer wall enclosing an interior space, and the outer wall includes at least a first portion formed of an elastic material such as a rubber (e.g., foam rubber), a plastic, a vinyl, or the like. The robot further includes a driver supported by a mounting element within the interior space of the body. The robot has a controller generating control signals to operate the driver to cause it to apply a first force upon the first portion of the outer wall of the body. In response to this force, the body bounces at least in a vertical direction through a range of heights above the support surface. Additionally, there may be included a "smart skin" that is compliant and includes sensors, e.g., temperature, force, and the like, to allow for richer interactions with the environment.

All in all, a pretty good match to the suggested Inventive Principles. Which is always nice. Far nicer, though is how cool this sounds to be. I want one. And I can already think of a dozen more serious applications for it. Expect big things to come from this one. This could be the next Segway. Except without the massive financial failure. Start with a toy, people, start with a toy.



Best of the Month – LikeWar



Here's one guaranteed to polarize. Doesn't everything these days. Whatever one person likes, a thousand other will shortly describe as the worst thing ever. In a lot of ways, that's kind of the premise of the book. Who's right? The person who tells the truth? Or the person capable of constructing the message that goes viral?

Here's one of the more negative reviews of our 'Book of the Month' choice this month, LikeWar. Just so you can get a flavor of both sides of the argument:

Social media is not just a rancorous gabfest but a literal “battlefield... with real-world consequences,” according to this overwrought jeremiad. Singer (coauthor of Ghost Fleet), a contributing editor for Popular Science, and Brooking, a former research fellow at the Council on Foreign Relations, rehash alarming internet phenomena, including the Islamic State’s use of social media to recruit followers and post beheading videos, the Russian government’s exploitation of social media to manipulate American politics, and the white nationalist movement’s dissemination of pernicious ideas. The authors’ survey is wide-ranging, but doesn’t really support their argument that “online information itself [is] a kind of weapon” posing dire threats to democracy. Their scattershot brief bundles serious issues, like the Chinese government’s arrests of online dissidents, with trivialities like the “memetic warfare” of Pepe the Frog cartoons; mostly their evidence just illustrates the banal truth that, like every communications technology, social media is used to spread propaganda. Worse, the authors’ militarized rhetoric underpins their calls for “legal action to limit the effects of poisonous super-spreaders” and for companies like Facebook, Twitter, and YouTube to “police” the “dangerous speech” on their platforms and act as “the arbiters of truth.” Readers who value free speech may be dismayed at the authors’ conflation of words with warfare.

If these words are an attempt to discredit the book by declaring the authors as scare-mongering, I'd have some sympathy with the view. There's no doubt in my mind that both P.W. Singer and Emerson T. Brooking have been guilty of considerable confirmation bias. They've hypothesized an update of von Clausewitz's book 'On War' and have found lots of evidence to confirm it. They've not done nearly enough searching for evidence that fails to confirm the theory. At least not to convincingly. That said, what the authors have done is a lot like what the initial TRIZ researchers did: they examined lots and lots of online conflicts

– covering a spectrum from national election to Chicago gang-warfare – to look for patterns. That can only be a good thing. Even if their bias is still left glaring at the reader. Good because, as the authors themselves say, the vast majority of society are still so naïve when it comes to the implications of massive social media connectivity, that what they need to do is wake people up. Forget balance right now, the ‘other side’ – the side of those looking to create havoc – is winning the virality war, and the rest of us need to be able to see the other side of the contradiction.

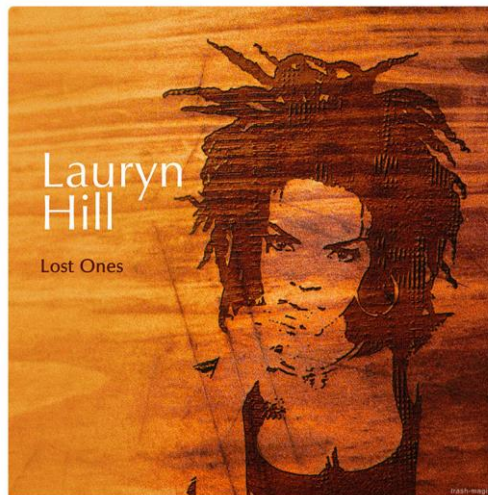
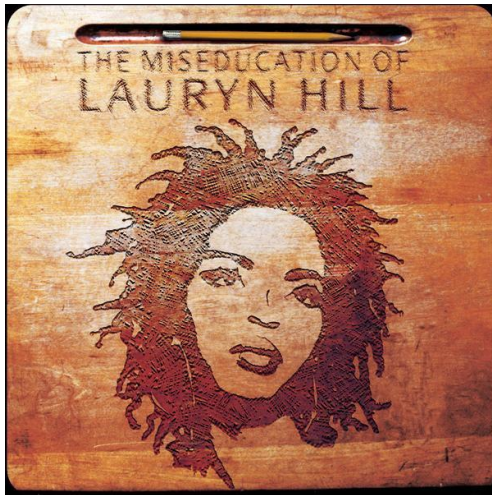
And let there be no doubt, there is some potent content here. Some compelling pattern-building capability (an early favourite: the rapid rise of ISIS followed the same pattern as Nazi Germany’s rapid defeat of France in the Second World War. ISIS had social media, but that was merely a faster version of the way that the German’s used radio propaganda during their two-month long rout of the French). (On the counter side, the author’s mention that the same basic strategy didn’t work with the Blitz of the UK, but never really got to grips with why it worked in one situation and not the other. A knowledge of TRIZ, one suspects, might well have helped.)

The book overall centres around five core principles:

- 1) The internet has left adolescence – despite its infancy in calendar years, never has a communication technology accommodated so many people so quickly. The rapid rise (up its S-Curve) of social media has happened because so many of the damping forces and delays of previous communication channels have now been eliminated.
- 2) The internet has become a battlefield – ‘every battle seems personal, but every conflict is global’
- 3) The altered battlefield changes how conflicts are fought – ‘social media has rendered secrets of any consequence essentially impossible to keep. Yet, because virality can overwhelm truth, what is known can be re-shaped.’
- 4) The battle changes what ‘war’ means – winning online battles doesn’t just win the web, but wins the war.
- 5) We’re all part of this war – ‘if you’re online, your attention is like a piece of contested territory, being fought over in conflicts that you may or may not realise are unfolding around you’...

..and if that sounds like scaremongering to you, it’s very likely because Singer and Brooking have an inkling that you need to be scared right now. This probably won’t be the best book about the weaponization of Social Media, but until such times as the definitive tome appears, for my money, it makes for a pretty darn good proxy. Essential 2018 reading.

Wow In Music – Lost Ones



The Miseducation of Lauryn Hill is the debut solo album by American singer and rapper Lauryn Hill. It was released on August 25, 1998. The album debuted at number one on the Billboard 200 chart, selling 422,624 copies in its first week, which broke a record for first-week sales by a female artist. The Miseducation of Lauryn Hill produced three hit singles: "Doo Wop (That Thing)", "Ex-Factor", and "Everything Is Everything". Its lead single "Doo Wop (That Thing)" peaked at number one in the US, with the latter two singles peaking within the top 40. The album's success propelled Hill to international super-stardom and contributed to bringing hip hop and neo soul to the forefront of popular music. At the 41st Annual Grammy Awards, The Miseducation of Lauryn Hill earned 10 nominations, winning five awards, making Hill the first woman to receive that many nominations and awards in one night. By 2013, it had sold over 8 million copies in the US and over 19 million copies worldwide. It is now generally regarded as not only one of the greatest albums of the 90s, but one of the greatest – and most influential – albums of all time.

The normal convention in this part of the ezine is to focus on a 'wow' moment within a single piece of music. For many listeners, the wow in the case of The Miseducation of Lauryn Hill is the whole album. Taken at that level, I'd say the innovation behind the wow is the fact that it represents a (Principle 5, Merging) first bringing together of three musical elements. Musically it arrived, seemingly from nowhere, as the conceptual confluence of three of the most powerful musical ideas in all of black music: hip hop, Motown-era soul and reggae. Doo-wop harmonies and the flushed distortion of voices singing their pain were cast over taut snares and hard boom-baps. The lo-fi production and warm, thickly muzzled bass tones purposefully recalled vintage vinyl on a rainy Sunday afternoon. After having written for Whitney Houston, having traveled to Detroit to sit with Aretha, it then made sense that Lauryn Hill returned to look upon her former hip-hop band, the Fugees, and their hard, brick-city, midnight-winter rap with a newfound skepticism.

Beyond the musical 'wow', the album is also a declaration of independence. It is a break-up letter to the bullshit routine of dealing with men who can't stop hurting the women who love them. And it is a love letter to the liberated self, the maternal self and to God. It is an album of junctures: Between adolescence and adulthood, between Lauryn as $\frac{1}{3}$ of the Fugees and Lauryn as a woman on her own, between being a child and being a parent. (She conceived of the album at 22 years old, single and pregnant with her firstborn.)

It is often said that the greatest music is born of crisis, and – looking in from the outsiders perspective – I'd say that there's lots of evidence of those S-curve-jumping crises in evidence prior to and during the making of this record.

I think I could've chosen just about any individual song from the album to illustrate the wow contained in the whole, but the one I'd recommend readers listen to (if you're only going to try one song – really what you ought to do is listen to the whole thing!), is the opening track, Lost Ones. An amazing way to declare your revolution. And not just musically. The opening lyric is often cited as one of the best opening lines of all time:

*It's funny how money change a situation
Miscommunication leads to complication
My emancipation don't fit your equation
I was on the humble, you on every station
Some wan' play young lauryn like she dumb
But remember not a game new under the sun*

The words are so much more than a passing reference to Lauryn Hill's falling out with former Fugees band-mate (and partner) Wyclef Jean: They're damning and understanding, angry and morose, layered with the kind of subtext only two people who have been through a shitstorm together can pick up on the first time around. There's a reason Lauryn Hill won so much acclaim for this album, and it's not because we got dirt on the end of the Fugees: We got an insight into the end of our own relationships, right from the beginning, and the education of Ms. Hill's listeners started immediately.

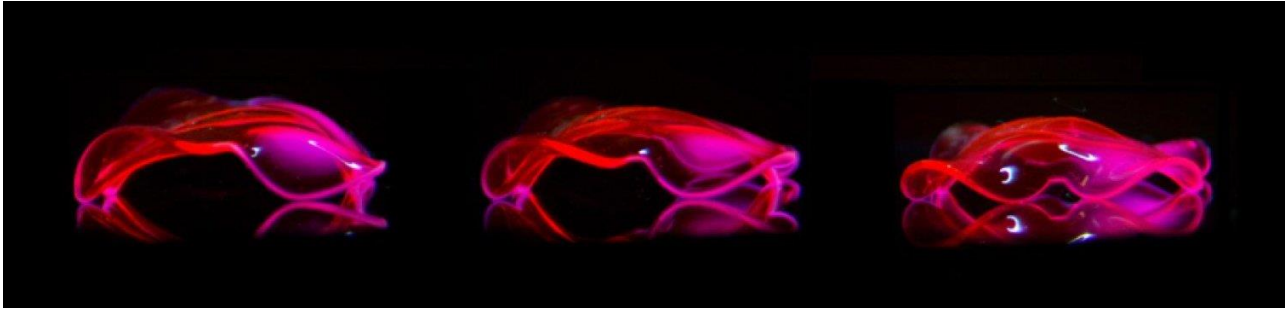
Then there's the music itself. First up the bass-line, a (Principle 26) sample of a classic Jamaican reggae hit from the early 80s.

Check out <https://www.whosampled.com/sample/43929/Lauryn-Hill-Lost-Ones-Sister-Nancy-Bam-Bam/> to the wow in the original version. And, for me, the bigger wow of how Hill and her production team seamlessly took a very reggae pattern and integrated it into hip-hop.

Then, listen out of the repeated dak-dak staccato rhythm guitar part. Or rather not so much the part itself but the way it is synchronized – or rather not synchronized (Principle 37) – with the bass and drum rhythm. Is it ahead of the beat? Or is it behind? Its so far in one direction it could easily be taken for the other. I play guitar so no doubt I'm biased, but that timing 'mis-match' is the thing that gets me every time. There aren't many tracks I'll find myself playing on repeat, but Lost Ones is definitely one of them.

*You might win some but you just lost one
You might win some, but you really lost one
You just lost one, it's so silly how come?
When it's all done, did you really gain from
What you done done? it's so silly how come?
You just lost one*

Investments – Programmable Materials



Living organisms expand and contract soft tissues to achieve complex, 3-D movements and functions, but replicating those movements with human-made materials has proven challenging.

A University of Texas at Arlington researcher recently published groundbreaking research in *Nature Communications* that shows promise in finding a solution. Kyungsuk Yum, an assistant professor in UTA's Materials Science and Engineering Department, and his doctoral student, Amirali Nojoomi, have developed a process by which 2-D hydrogels can be programmed to expand and shrink in a space- and time-controlled way that applies force to their surfaces, enabling the formation of complex 3-D shapes and motions.

This process could potentially transform the way soft engineering systems or devices are designed and fabricated. Potential applications for the technology include bioinspired soft robotics, artificial muscles – which are soft materials that change their shapes or move in response to external signals as our muscles do – and programmable matter. The concept is also applicable to other programmable materials.

"We studied how biological organisms use continuously deformable soft tissues such as muscle to make shapes, change shape and move because we were interested in using this type of method to create dynamic 3-D structures," Yum said.

His approach uses temperature-responsive hydrogels with local degrees and rates of swelling and shrinking. Those properties allow Yum to spatially program how the hydrogels swell or shrink in response to temperature change using a digital light 4-D printing method he developed that includes three dimensions plus time.

Using this method, Yum can print multiple 3-D structures simultaneously in a one-step process. Then, he mathematically programs the structures' shrinking and swelling to form 3-D shapes, such as saddle shapes, wrinkles and cones, and their direction. He also has developed design rules based on the concept of modularity to create even more complex structures, including bioinspired structures with programmed sequential motions. This makes the shapes dynamic so they can move through space. He also can control the speed at which the structures change shape and thus create complex, sequential motion, such as how a stingray swims in the ocean.

"Unlike traditional additive manufacturing, our digital light 4-D printing method allows us to print multiple, custom-designed 3-D structures simultaneously. Most importantly, our method is very fast, taking less than 60 seconds to print, and thus highly scalable."

"Dr. Yum's approach to creating programmable 3D structures has the potential to open many new avenues in bioinspired robotics and tissue engineering. The speed with which his approach can be applied, as well as its scalability, makes it a unique tool for future research and applications," Meletis said.

Read more here:

Amirali Nojoomi, Hakan Arslan, Kwan Lee, Kyungsuk Yum. Bioinspired 3D structures with programmable morphologies and motions. Nature Communications, 2018; 9 (1) DOI: 10.1038/s41467-018-05569-8

Generational Cycles – Reservoir Dogs



Published in 2002, *The Cinema of Generation X* by Peter Hanson, is an early study of the youthful voices who defined American movies in the 1990s. Each chapter analyzes various themes in Generation X cinema and the creators behind them. Hanson uses the arbitrary dates of 1961-1971 as the birth range, so strictly speaking, he's focusing on the first half of the Nomad cohort. This is the half that came of age as the open wounds of Vietnam and political upheaval loomed over American culture, in addition to an increasing divorce rate, the AIDS crisis, and across the board cultural malaise.

If one could not find solace in family or institutions, the only remaining refuge was pop culture. Hence the pop culture obsessed characters that populate so many of these movies. The two convenience store employees in *Clerks* (1994) debate obscure plot points in *Star Wars*, while violent mobsters in *Reservoir Dogs* deconstruct Madonna's song lyrics, and the college grads in *Reality Bites* (1994) cannot stop talking about 1970s sitcoms.

Ironic. Slackers. Spaced Out. Ennui. Those are all words used to define Generation X and ideas the movies are obsessed with. As the children of flower power and Ronald Reagan ethics, two competing influences in 1990s America, they looked at the world with weariness and cynicism. Slackers saw the moral bankruptcy of both world views:

Slackers do . . . perceive an antagonistic force in their lives, albeit an amorphous one; some GenXers carry the activism torch passed to them by the previous generation; and postmodern style . . . is not for style's sake, but rather a spirited, if not always prudent, attempt to seek new means of conveying thematic material.

Steven Soderbergh gets credited with first Gen X film; *sex, lies and videotape* came out in 1989, its themes of sexual dysfunction, video technology, and fractured relationships, would all become preoccupations of the decade. But then Quentin Tarantino is actually the first Generation X movie-maker who belongs to Generation X, being born in 1963.

Tarantino delighted in twisting traditional narrative in his first two films *Reservoir Dogs* (1992) and *Pulp Fiction* (1994). Paul Thomas Anderson made the captivating three hour

film *Magnolia* (1999) that follows disparate misfits trapped in self imposed misery. Kevin Smith's quartet of films in the 1990s: *Clerks* (1994), *Mall Rats* (1995), *Chasing Amy* (1997), and *Dogma* (1999) are perhaps the best primer for Gen X cinema.

These movies took a personal approach to politics. Despite the generational confusion, their films embraced new ideas about sexuality, while at the same time looked at the ominous side of the sexual revolution. Male filmmakers still dominated the discourse, although Hanson does cover the early work of Sofia Coppola and Kimberly Pierce. White filmmakers tended to avoid racial issues entirely, a task left to the African-American directors Spike Lee and John Singleton.

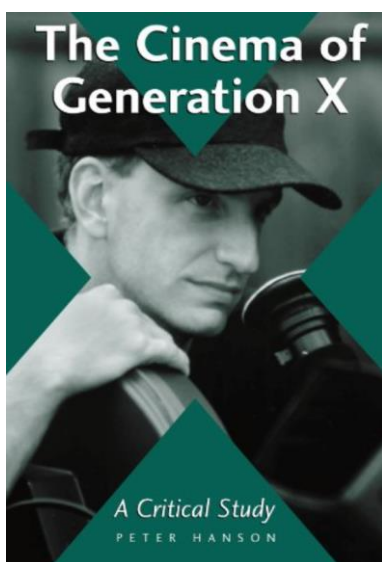
Politics also extended to the workplace, or lack of opportunities awaiting the new generation. *Reality Bites* followed an aimless group of privileged college graduates troubled about whether going corporate would make them sell outs. Mike Judge's *Office Space* was a hilarious take on white collar ennui.

There's also a fascination with violence. Tarantino dared audiences to revel in the violent criminal worlds of his imagination. Not a surprise, since the criminal life looked more appealing than the "McJobs" that were available. David Fincher's *Se7en* (1995) and *Fight Club* (1999) were bleak tales that toyed with Nihilism. The Wachowski siblings blew up the Sci-Fi genre with *The Matrix*, a visionary statement that struck a cultural nerve.

The year 1999 marked the high point of Gen X cinema: *Office Space*, *Dogma*, *Boys Don't Cry*, *The Matrix*, *Fight Club*, *Magnolia*, *The Blair Witch Project*, *The Sixth Sense*, *American Beauty*, *Three Kings*, *Girl, Interrupted*, and *The Limey* are all modern classics. As Hanson points out, the low budget *Blair Witch Project*, a found footage about 20 somethings lost in the woods, was the perfect metaphor for Gen X.

Hanson's study is well written and engaging. An early attempt to understand 1990s cinema, the energy from these movies still pops off the page. And many of these directors are still working and producing great work.

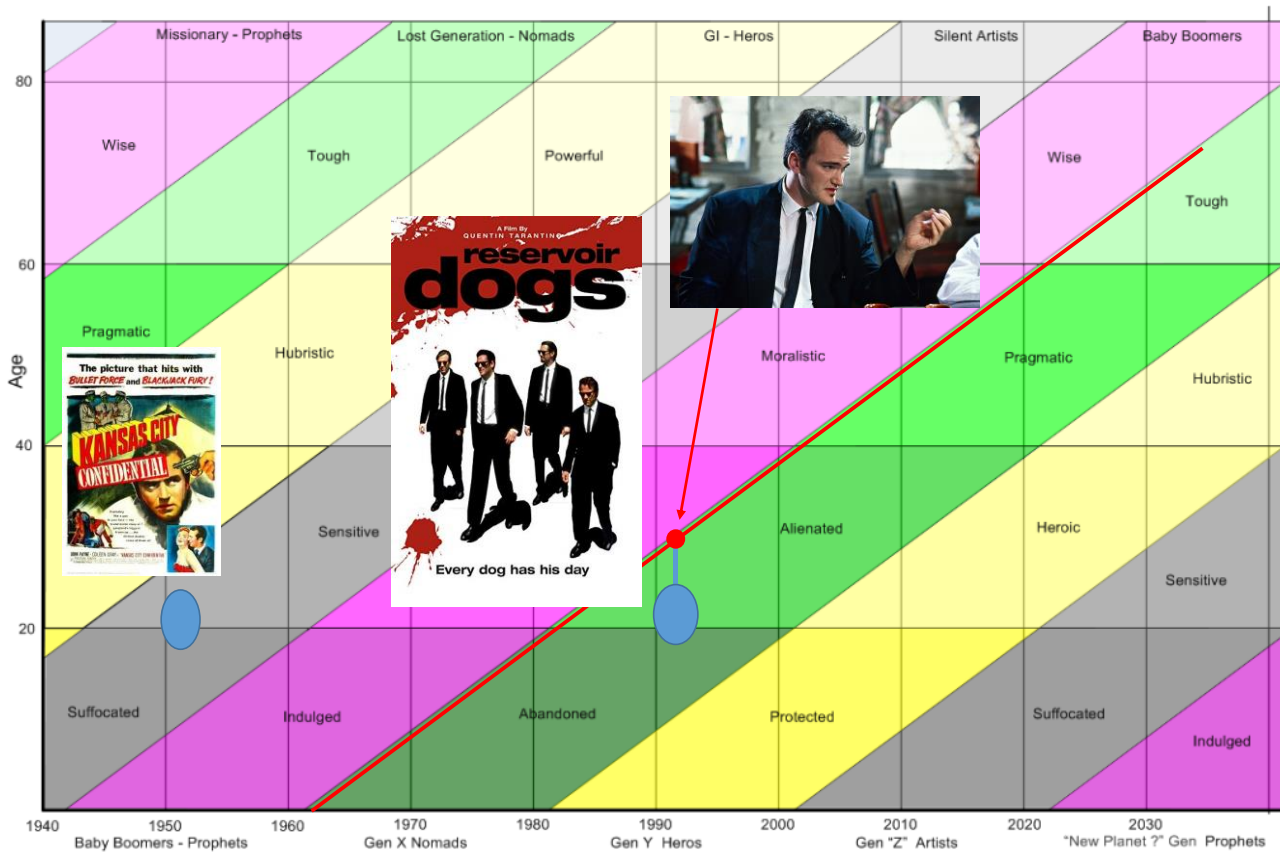
If it was necessary to choose one Gen X movie, though, I think it would have to be *Reservoir Dogs*. Here's what Hanson had to say about it:



.... the most prevalent antiheroes in Gen-X movies are career criminals, from robbers to drug dealers to killers. Generation X's embrace of lawbreakers seems utterly consistent with other aspects of their generational identity, for it follows that a group of people who, writ large, distrust institutions and feel alienated from the ideals of the previous generation would feel a kinship with characters who either make their own laws or who flagrantly defy existing laws.

The first significant film in this line is Tarantino's debut, *Reservoir Dogs*, which did moderate business at the box office but eventually developed such a cult following that by 2001, nearly a decade after the picture was made, toy figurines of the film's murderous crooks were available. And while the film's longevity can be attributed in part to its ingenious structure, alarming plot twists, and brazen content, the main reason that *Reservoir Dogs* has enjoyed a long life is that it's cool. That most ephemeral of qualities, coolness is a crucial consideration when looking at the films of Generation X, particularly those made by Tarantino and his acolytes.

By GenX for GenX, here's what *Reservoir Dogs* and director, Quentin Tarantino look like when mapped on to one of our Generation Maps:



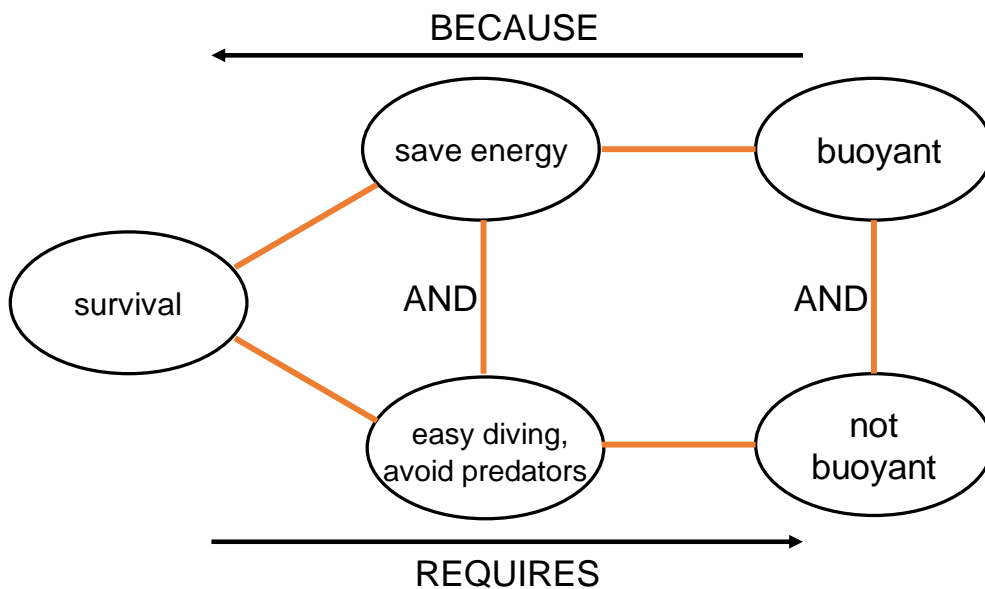
Worth noting is that, despite the fact that Reservoir Dogs was and still is deemed to be a revolutionary step change in the film industry, like a lot of Generation X-produced content, it carries a lot of precedent from elsewhere. Tarantino himself has declared the film to be an 'homage' to not just a 1987 Hong Kong film, City On Fire, Stanley Kubrick's 'The Killing' and the 1952 movie Kansas City Confidential. They often say, 'talent borrows, genius steals' and it could be seen to be the living essence of many GenX creatives. The key to stealing, however, is to make sure you make use of at least three sources. And, in the case of Kansas City Confidential – the closest to Reservoir Dogs in terms of ('heist gone wrong' plot-line) – is to steal from your generational analogues. Nomads and Artists go together like, well, Prophets and Heroes. Now there's the title of a movie.

Biology – Australasian Grebe (*Tachybaptus novaehollandiae*)



Like most grebes, the Australasian grebe is a poor flier and even worse on land due to its short wings and its legs being placed far back on its body. Grebes have large feet with flat rounded "lobate" toes and small webs between their front three toes, which adapts them well to a life of diving and swimming underwater. In fact, they are excellent swimmers and divers, and when threatened, they typically sink out of sight underwater and then swim away undetected.

This trait highlights a significant physical contradiction: The grebe needs to be buoyant and not buoyant. Sinking is a terrific escape means, but sinking all the time would mean that the bird having to continually expend energy to stay afloat. Here's what the contradiction looks like mapped on to one of our Bubble Maps:



And here's what happens when we map that onto the Matrix+ software wizard:



The Grebes' sinking ability has evolved by their unusual plumage. It is dense (Principle 5) and waterproof (Principle 11), and the underside (Principle 3) of the feathers are at right-angles to the skin (Principle 17) straight out to begin with and curling at the tip, allowing the birds to trap large air bubbles (Principle 24) so they float. When grebes press their feathers against the body (Principle 15), these bubbles are released and their buoyancy is reduced. They sink.

Simple when you know how.

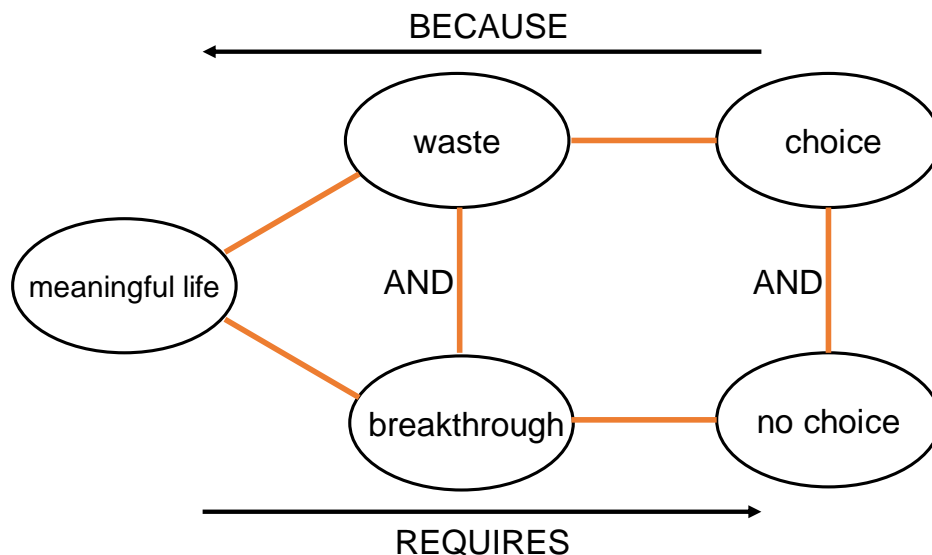
Short Thort

“Civilization did not rise and flourish as men hammered out hunting scenes on bronze gates and whispered philosophy under the stars, with garbage as a noisome offshoot, swept away and forgotten. No, garbage rose first, inciting people to build a civilization in response, in self-defense. We had to find ways to discard our waste, to use what we couldn't discard, to reprocess what we couldn't use. Garbage pushed back.”

Don DeLillo, Underworld

“Maybe what has to happen is that the individual must allow himself to be swept along, must find himself in the stream of no-choice, the single direction. This is what makes things inevitable. You use the restrictions and penalties they invent to make yourself stronger. History means to merge. The purpose of history is to climb out of your own skin.”

Don DeLillo, Libra



News

Robust Design Day

Probably short notice for most, but Darrell will be presenting a keynote address focusing on the application of TRIZ to the design of more resilient systems. The presentation will happen on the morning of 8 November at this prestigious annual event at DTU in Copenhagen. Register for the conference at <http://www.pd-symposium.org/RDD.php>.

Sochi

Darrell has been invited to give a keynote address at the 7th International Lean and Smart Production Systems Summit. It will be held in Sochi on 4-5 April 2019. The main topic of Summit is: "LEAN in INDUSTRY 4.0 as a next level of operation excellence", although we suspect that Darrell's presentation might argue slightly about whether Lean and Industry 4.0 have much in common.

India

It looks like a big part of our December will be happening in India. Two weeks in Bengaluru have been finalized so far, but given the relative temperature of the UK and India at that time of year, Darrell is more than happy to add a few days to his itinerary if

anyone else wants him (or anyone else from the team) to come and do something. Get in touch with him directly if you wish to explore possibilities.

ICSI10

The 10th International Conference on Systematic Innovation travels from its home in Taiwan to the University of Liverpool from the 8th to the 11th of July 2019. It's a rare thing to have a TRIZ event in the UK these days. Never mind one with a truly international cast of speakers. Darrell will be one of the keynote speakers.

TRIZmeta

Thanks to all readers that have already purchased a set of TRIZmeta cards. The shop has been overwhelmed by the initial response, and we're almost at the end of the early-bird discount period. Quite a few people have been ordering the cards as Christmas gifts... for those that celebrate that kind of thing, we can't think of anything better to give your nearest and dearest to show how much you care for them :)

New Projects

This month's new projects from around the Network:

- O&G – SI Certification Workshops
- O&G – SI Project Mentoring Support Programme
- Automotive – SI Certification Workshops
- Retail – SI Certification Workshops
- Entertainment – TRIZ Workshop
- Apparel – TRIZ/Design-Thinking Workshops
- Automotive – Concept Design Study
- Heavy Engineering – TRIZ Workshop
- Transport – SI Workshops