Systematic Innovation

e-zine

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In this month's issue:

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

Our guarantee to the subscriber is that the material featured in the e-zine will not be published elsewhere for a period of at least 6 months after a new issue is released.

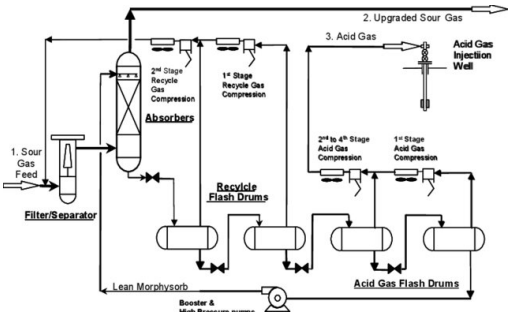
Readers' comments and inputs are always welcome.
Send them to **darrell.mann@systematic-innovation.com**

Failure Case Studies: #1, Sour Gas

The Brief
The client, a large Oil & Gas industry OEM, is expecting to begin exploiting a large offshore gas-field. Surveys have shown that the methane is relatively low quality and contains a high percentage of carbon dioxide. In order to separate the two gases, an already proven separation process has been specified. Because the field is offshore, the separation plant will be installed on a custom-designed vessel that will offer appropriate flexibility of operations. The ship and onboard CO2/CH4 separation plant have been specified and detail designed. The project is expected to cost around $450M (converted to 2026 economics), and prior to launching the build, the SI team is being commissioned to assess the overall project risks and to identify opportunities to reduce this cost without adversely affecting operational performance or project duration. We are to be given full access to all the technical aspects of the project, including drawings, work breakdown structure and project plans, and expected to deliver our Phase 1, 'no-stone-unturned', top-level findings for review in eight weeks.

The Project
Given the somewhat ambitious timeframe allowed for the work, with the client's approval, we established two independent teams: one to work on cost reduction opportunities within the current plan, and the other to step back and look at bigger-picture step-change cost reduction options. The primary focus here will be on the work of this latter big-picture team.

We don't always get the opportunity to go back to the drawing board on these kinds of projects, but when we do, we will inevitably begin by stripping everything back to first principles. What that meant in this case was focusing on the primary task of separating carbon dioxide and methane. Psychological inertia meant that the client had initially given the problem to chemists, and as soon as chemists look at the separation challenge they start designing chemical reactions. And then chemical plants. And before you know it, it has become a $300M goliath. Even before we start mounting said plant onto a ship.



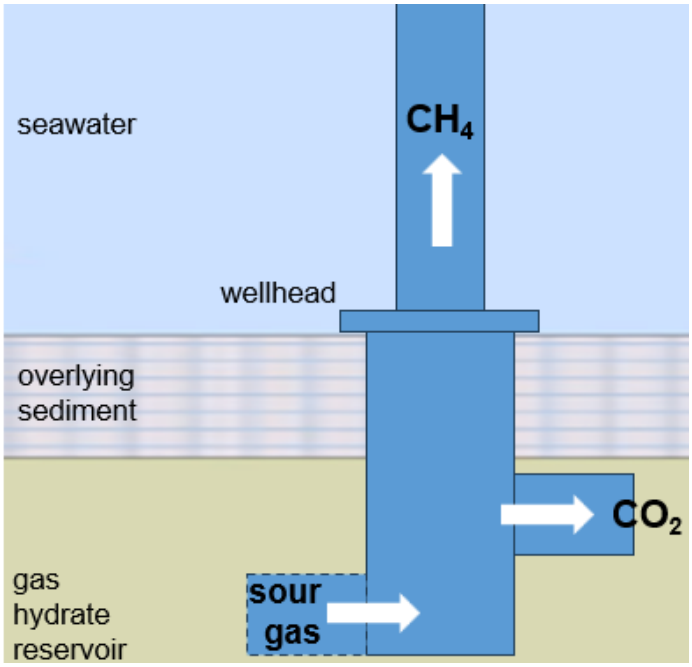
We didn't have a lot of domain knowledge, but on the plus side that meant we had zero psychological inertia. That meant it was easy for us to explore the various TRIZ-based function databases to see if there might be other non-chemical alternatives. Whatever solution we might end up with, first principles told us, we needed to identify resources that would allow us to distinguish between the carbon dioxide and the methane. Within an hour we had homed in on the difference in their molecular weight and use of an aerodynamic separation method. Another hour beyond that, we had further homed the aerodynamic options down to a little known device called a Ranque-Hilsch Vortex Tube (RHVT) and set up an exploratory meeting with what turned out to be the only active researcher on the

topic in the world to see if our concept might be valid. The RHVT is a simple, no-moving-parts mechanical device that splits a single stream of compressed gas into two separate streams: one hot and one cold. Without giving away the details of what we were exploring (i.e. we didn't mention carbon dioxide or methane in the conversation), the expert gave us a preliminary positive message, and an expression of interest in helping us to set up a simple experimental test to prove the concept.

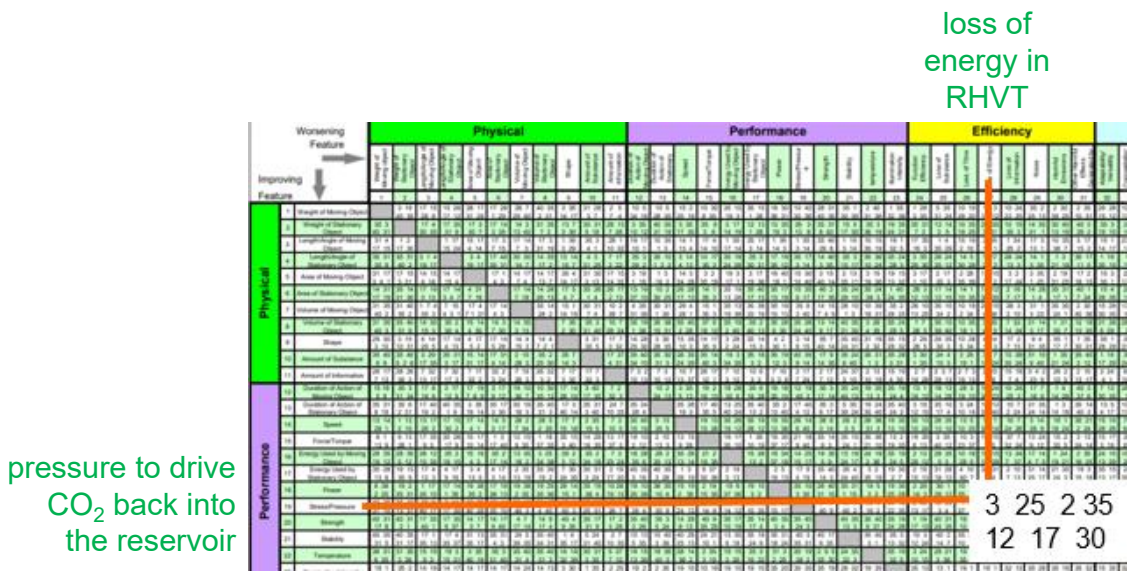
It's rarely appropriate to rule out other possibilities at such an early stage of a concept design, but the fact that the RHVT had no moving parts seemed like a big positive in terms of the difficult operating environment in which it would be expected to operate. With this in mind we decided to dig deeper into what an actual solution built around the concept might look like. This meant the creation of an Ideal Final Result based exploration of the solution specification. This in turn, staying at the first principle level, meant thinking about a solution that performed the required gas separation function as close to its source as possible. Here's what we ended up with:

- The separation should take place in or as close as possible to the underwater gas-field well-head.
- After separation, only the methane should be brought to the surface; the unwanted carbon dioxide should remain in the gas-field.
- There should be no moving parts, and no need for maintenance; the RVHT should be able to withstand whatever particulate or potentially corrosive/erosive foreign objects that may be present in the gas-field as they passed through the tube and considered 'fit and forget'.
- There should be no need for an external power source (i.e. we would need only the pressure difference between the inside and the outside of the gas-field).
- The solution would need some form of on/off switching capability. If this meant moving parts, they should be separated from the RVHT and ideally placed above water for easy access.
- There should be no change to the established practices of penetrating and sealing access into the gas-field, and no changes to existing working safety protocols.

We sketched a block diagram and took it for a preliminary concept design review with the client project management team. It looked something like this:



Theis concept sketch deliberately didn't reveal any inventive steps at this point, but we knew that a big part of the attraction of the concept would be that it would be a protectable solution. It wouldn't be possible to patent the RHVT, even though it was going to be used with sour gas rather than the usual air, but it would be possible if we could identify and solve 'the next contradiction. Fortunately, there's always a next contradiction. And in the underwater sour gas separation challenge it didn't take long to find it: the desire to keep the carbon dioxide in the reservoir was impeded by the fact that, in the process of passing through the RHVT there was an inevitable pressure (energy) loss that would mean the pressure of the separated carbon dioxide was now below that of the reservoir. Without getting into too much detail (or giving away the patentable inventive step that solved the contradiction), the problem was mapped onto the Contradiction Matrix like this:



Finally, knowing the question of cost would come up at some point during the discussion, we had made some fairly conservative estimates of what the eventual production solution would be. After nodding their heads sagely during our explanation of the solution, we watched their collective jaws drop when we answered the inevitable cost question with a number that was a shade over $5.6M.

That's not possible they eventually replied. We nodded in agreement. There will need to be a development programme, obviously. We estimate $50K (2026 economics again) to conduct an initial trial to demonstrate that an off-the-shelf RVHT can fully separate the two gases. Then another $600K to design, build and test a bespoke, modified RVHT consistent with the desire to keep the carbon dioxide inside the gas-field. Then, probably another $5M to build and test the first on-site, underwater gas-field prototype.

We didn't feel the need to emphasise the point, but in our minds, the total project cost, on a like-for-like risk basis with the current project solution, looked to us like a 98% saving.

We thought the client would do the maths for themselves and be happy with our work.

They were not happy. The meeting was then ended fairly abruptly, with a closing message that they would review what we had proposed and get back to us.

Needless to say, they did not get back to us. It was almost as if the meeting had never happened.

We reached the final review for the overall project. This was the opportunity for our other team to present their findings regarding the other incremental-cost-reduction part of the project. There we were able to report a little over $2M in ‘low-hanging-fruit’ cost savings, and, depending on how hard the client wanted to push their contracts with the contractors that would build the ship and the floating separation plant, another potential for $12-15M in risk/revenue sharing savings. The client review team gave us the expected grilling and at the end, everyone was smiling.

Smiling in a way that meant I knew our modest invoice for the work would be paid.

Everyone started to pack their brief-cases.

“Just as a final thought,” I ventured, “perhaps it would make sense to invest some of the low-hanging fruit project savings into a staged, ‘spend a little to learn a lot’ project to validate the RVHT alternative?”

Everyone’s face looked over at the Project Head.

He looked at me, smiled, and replied, “that’s an interesting idea. We will get back to you.”

The SI team retreated back to our hotel, shared a bottle of champagne in the bar, and I submitted our invoice.

A month later, I received notification that the invoice had been paid.

It was the last we ever heard from the client.

After Action Review I – ‘Heart’

In retrospect, of course, it seemed obvious that we had fallen into the classic trap of the J.P.Morgan quote we so often include in our workshops, ‘people make decisions for two reasons, the good reason and the real reason’. The good reason we’d been asked to conduct our review was because there was some kind of internal audit requirement for a $450M project to be stress-tested. The real reason was for the Project Head to have our study confirm that the project wasn’t going to adversely affect his career progression. Spending $450M, keeping his team of chemists happy, and having several years of being able to show photos of an impressive ship being built was definitely good for his career.

Spending less than six million dollars on an untried, non-chemistry-based concept definitely was not.

I could never quite bring myself to dig deeper into what happened. I know the money was spent and that the ship and plant was commissioned. The bit I don’t want to explore is what happens to all the carbon dioxide after it’s pumped out of the gas-fields and passed through the separation plant. I’d like to think that it was pumped back down into the gas-field. My suspicion is that it isn’t.

If it didn’t, I guess my one final consolation is that we never revealed the inventive steps that we added to the basic RVHT solution, and, when I check the global patent database, still no-one has reverse engineered our design concept or worked out what they are. Meaning that, if someone did come along and ask if we could help them to think of a better way to separate methane and carbon dioxide without releasing billions of tonnes of the latter into the atmosphere, we’d be more than happy to chat.

After Action Review II – ‘Head’

At the time, we found the outcome puzzling. The technical risks appeared manageable. The financial case appeared compelling. The proposed validation programme was inexpensive. Yet the idea disappeared without trace.

With hindsight, we had misunderstood the nature of the system we were working within. The technical system was designed to separate methane from carbon dioxide.

The organisational system was designed to deliver a large, already-approved project. Within the technical system, the vortex-tube concept reduced complexity, cost and operational risk.

Within the organisational system, however, it created new uncertainties.

Accepting the idea would have required revisiting assumptions, reopening decisions, challenging established expertise and potentially delaying a project that was already moving forward.

The concept solved the technical problem.

It simultaneously created organisational problems.

The larger lesson was that invention and innovation obey different rules.

TRIZ helped us identify a radically different way of separating methane and carbon dioxide. What it did not change was the wider system within which decisions were being made. The methane separation problem turned out to be relatively easy. The harder problem was that the project was no longer really about methane separation.

It had become about whether an organisation built around one solution could accommodate the possibility that a fundamentally different one might exist.

(We currently have around 40 more failure case studies like this one. We’ve put off the job of creating a book of case studies for a long time now, largely because, if readers are anything like us, as soon as we read a case, we immediately start thinking about how we would have done it better. We are wondering, therefore, whether a shift in emphasis from success stories to ones that went wrong might be the thing that will make a case studies book useful. Consider this first write-up as an attempt to test the waters – if you enjoyed reading this case study and want to hear more, drop us a line. Likewise, if you don’t, also drop us a line. Including whether you prefer the ‘heart’ or ‘head’ After Action Review sections… dangerous question, of course, no question with the word ‘or’ in it is the right question.)

Everything Works & Nothing Works: Jiu Jitsu, Innovation, Managed Decline & The Price Of Stamps

John Evans

As a long time user of TRIZ and SI a recent episode of the 1%er podcast reminded me of a fundamental truth that I often forget. That when tackling complex problems there are real world constraints which mean that at a certain point there is no longer sufficient time or resources to solve the problem. Focus must then shift to managed decline.

For nearly five years I've been learning the 'gentle art' of Brazilian Jiu Jitsu, and I've come to see it as a powerful lens for understanding multiple aspects of life. At its core, Jiu Jitsu is a grappling martial art, the aim is to control your opponent and eventually submit them, either by manipulating their body for a pain response or applying a choke. But it's not just about dominance. Knowing how to survive, escape, and counter from bad positions is just as critical.

Techniques are often taught as structured sequences of movements, built on a smaller set of underlying principles. But there's a clear gap between drilling a technique and applying it against someone who is actively resisting. Every opponent is a different, size, strength, and experience level. Which means no technique can be applied in a fixed way. It has to be adapted in real time. I once heard Jiu Jitsu described as a debate: the person with the more compelling argument wins.

Among my regular training partners, we often repeat a simple mantra: "Everything works and nothing works." Each technique has its moment and its limitations. Some things make perfect sense intellectually but can prove unreliable in practice, only working in very specific conditions, requiring time and repetition to become effective. What consistently improves your chances is understanding the underlying principles and, crucially, recognising what's happening as early as possible.

Take a choke, for example. It might unfold over a sequence of several movements. Early on, you have options, space to move, time to react. As the sequence progresses, those options disappear. An escape that works at one stage becomes ineffective at the next. Leave it too late, and there's nothing left to do. The outcome is already decided. In 1%er language this is critical mass at the critical point.

This translates far beyond the mat. Most organisations don't realise they're being "choked" until they're deep into the sequence. And by the time they do, they either don't know how to escape, or they no longer have the resources to do so.

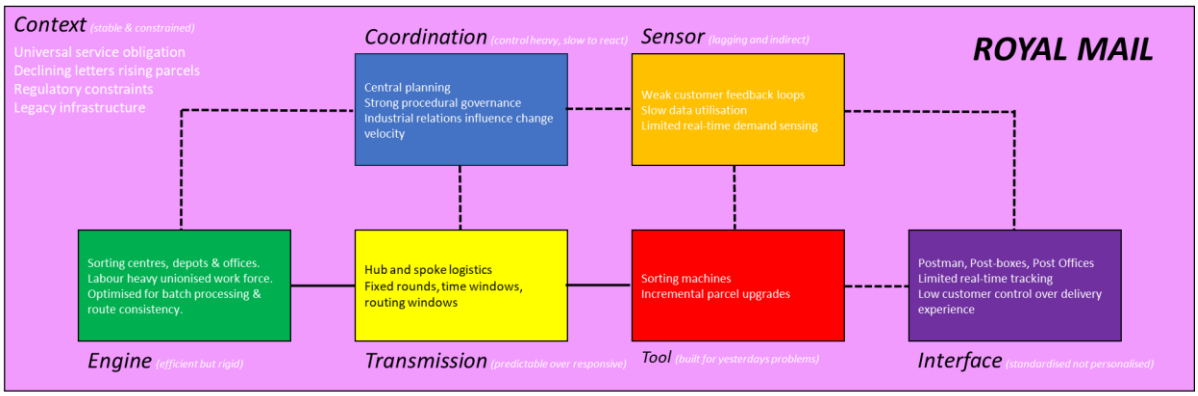
It was recently announced that Royal Mail were increasing the cost of postage stamps in response to a reduction in people using stamps. Clearly making a failing service less attractive to the customer is likely to only accelerate that failure. On the surface, it looks like a simple commercial response to declining demand. But step back, and you start to see something deeper, a system caught in a self-reinforcing loop, slowly tightening around itself. The Royal Mail is being choked and it doesn't seem able to escape.

For decades the Royal Mail was a masterpiece of operational excellence. So how did Royal Mail fall from its dominant position? Why wasn't it able to capitalise on the cultural shift brought about by online shopping? It seems almost criminal that Amazon managed to build its own vast delivery network and infrastructure so quickly and effectively.

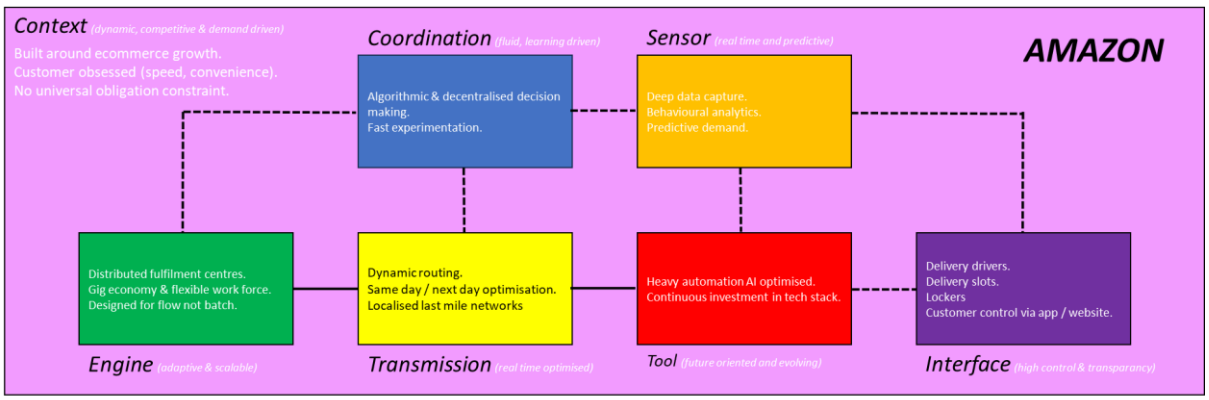
For decades, the UK's postal system was designed to do one thing incredibly well: deliver letters, reliably, everywhere, at a consistent price. Routes were optimised, processes refined, variability reduced and efficiency improved year after year. From a system perspective, it became highly tuned: stable, predictable and scalable. But the world moved on, communication shifted from physical to digital. Letters declined. Parcels rose. Customer expectations changed from "reliable" to "fast, flexible, and visible." And the system, optimised for a different era, struggled to adapt.

I hate it when people fall foul of hindsight bias and break out the well-worn factually inaccurate tropes of Kodak and Blockbuster. However at first glance there does seem to be similar elements to these stories. So, let's examine the situation in more detail and understand what the future might have in store for Royal Mail.

Contrasting Royal Mail and Amazon's delivery infrastructure at a systems level is revealing but doesn't show the full picture.



Amazons quest became: "How do we get what the customer wants to them, exactly when and how they want it?"



One system optimises for consistency. The other optimises for adaptability. And in a changing environment, adaptability tends to win.

- Fixed routes → dynamic routing.
- Batch processing → continuous flow
- Standardised service → personalised experience.
- Delayed feedback → real-time data

One of the most overlooked aspects of any system is how it senses change. In Jiu Jitsu this having a heightened awareness of threats, it's one of the main differentiators between students at the different belt levels. Detecting a threat early gives you the best chance of survival and for the highly skilled it is often an opportunity to exploit.

In a stable environment, slow feedback loops are fine. Trends move gradually. Adjustments can be incremental. But in a shifting environment, slow sensing becomes dangerous. Changes are noticed late. Signals are misinterpreted. Decline appears gradual, until suddenly it isn't. By the time the need for transformation becomes undeniable, the system is already deeply committed to a path that no longer fits reality. And at that point, change is no longer an adjustment. It becomes a disruption.

Royal Mail didn't ignore change; they felt it too late and too slowly. Letter decline was gradual and easy to rationalise. Parcel growth was seen as "adjacent," not existential. Industrial relations slowed change cycles, governance prioritised risk avoidance and the system became anti-experimentation.

The Contradiction That Changed Everything
There is an additional layer to this story that makes it even more complex. The requirement to provide a universal service. Delivering everywhere equally, at a consistent price. This introduces a fundamental tension. Royal Mail must be fair, but the market rewards 'unfair' organisations who optimise selectively.

Whilst universal service ensures fairness, supports social infrastructure and maintains national connectivity. It limits flexibility, constrains pricing, and slows innovation. Meanwhile Amazon operates without these constraints. They can choose where to serve, how to price, what level of service to offer and are free to optimise.

Until this contradiction is resolved (politically or structurally), they are competing with an uneven playing field not because one system is better managed, but because the rules of the game are different. Handy capped by a constraint Amazon doesn't have. Should the goal be to compete in the same way? Or to play a different game altogether?

The Missing Piece: Leadership
Up to this point, it's easy to describe the problem as structural. But systems don't degrade on their own. They are maintained or changed by leadership.

"In Jiu Jitsu, the person who wins isn't the one who tries hardest, it's the one who understands what's happening soon enough to act. Organisations are no different."

In most organisations, three distinct mindsets are at play:

- *Run the business* (Red World) delivering value today through stability, standardisation and efficiency

- *Lead the business* (Blue World – Reference 1) aligning people, process and values to what is actually needed
- *Change the business* (Green World) creating value tomorrow through adaptability, learning and experimentation

All three are necessary. But they are not equally present or equally effective.

In reality, most organisations are dominated by Red. They are built to: deliver, optimise, improve efficiency and create operational excellence. But it also creates fragility. Because Red doesn't want change and doesn't know how to change.

Green exists in many organisations, but it is often: underfunded, isolated and the first thing cut when pressure increases. So, while ideas for the future exist, they rarely scale.

Which leaves Blue. And this is where the real failure sits. Blue is not about maintaining the system. It is about understanding when the system no longer fits reality and aligning the organisation to change it. It recognises when the world has shifted. It recognises the rules that made the organisation successful are becoming constraints and continuing to optimise will make things worse

For The Royal Mail, that didn't happen. Instead, Red continued to optimise the existing system. Green was unable to gain traction. Blue failed to realign the system early enough. So, the organisation kept improving… just in the wrong direction.

This is how decline typically happens. Not through sudden failure. But through continued success within an outdated model. This is not unique. It is a universal pattern. Any organisation that becomes highly optimised will face the same moment: the system works, signals of change appear and adapting requires breaking what currently works. At that point, everything depends on Blue.

If Blue is strong: it recognises the shift early, aligns people, process and values to a new direction. It gives Green the space to build the future and constrains Red before optimisation becomes destructive. If Blue is weak or absent: Red dominates, Green is marginalised and the system is protected. Right up until it no longer matters. And by then, the choke is already in place.

This isn't just a Royal Mail problem. It's what happens when organisations are built to run the business but not to lead or change it. Most are far better at delivering value today than they are at creating value tomorrow. And without strong Blue leadership to bridge that gap:

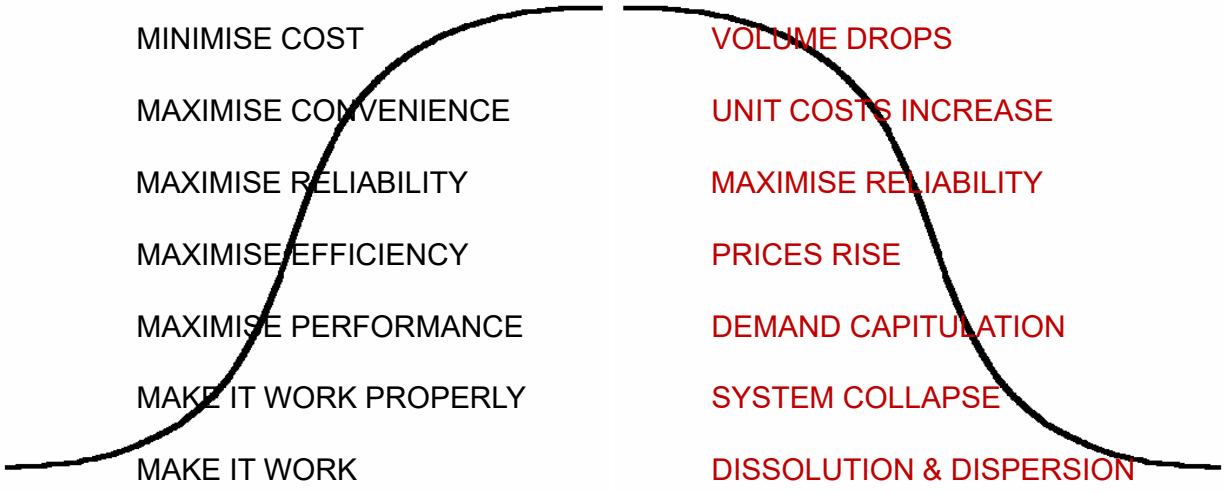
The future doesn't fail to arrive it just delivered by someone else.

Royal Mails Potential Futures - AKA Managed Decline
When a system designed for stability faces declining demand, a familiar pattern emerges:

Volume drops, Unit costs increase, Prices rise, Demand falls further

Each step is logical in isolation. Together, they form a reinforcing loop. This is often described as "managed decline." But in many cases, it isn't truly managed. It's reactive erosion, not true strategy. A series of short-term decisions – like introducing AI to replace humans – that accelerate long-term failure. When a system reaches this point, there are typically three paths forward:

1. *Passive Decline:* continue adjusting within the existing model. Incremental cost reduction, Gradual price increases, Preservation of legacy structures. This is the easiest path. It is also the one most likely to lead to a slow, drawn-out erosion of relevance. This seems to be what's happening at Royal Mail.
2. *Strategic Shrinkage:* accept that the original purpose is no longer dominant. Reduce scope deliberately, focus on extracting remaining value efficiently, scale down in a controlled way. This requires clarity and discipline. It means letting go of identity. But it avoids the worst of the downward spiral.
3. *Reinvention:* Redefine the system entirely. Change the underlying purpose, reconfigure how value is created, build new capabilities alongside or in place of the old. This is the hardest path. It requires breaking assumptions that have been reinforced over decades. But it is also the only path that leads to renewed relevance.



The Panarchy Perspective: When Escape Is No Longer Possible

There is another way to understand what is happening here, drawn from Panarchy (References 2, 3). Panarchy describes how systems evolve through an adaptive cycle: growth, accumulation, maturity, collapse, and renewal. In Systematic Innovation terms, this maps closely to the S-curve. But Panarchy adds something important that we often overlook: collapse is not failure, it is a necessary phase in the creation of the next system. At maturity, systems become highly efficient, tightly connected, and optimised. But those same characteristics also make them brittle. When disruption comes, the system cannot adapt incrementally. It doesn't bend. It breaks.

In Jiu Jitsu terms, this is the moment where the choke is no longer preventable. The grips are set. The structure is compromised. There is no technical escape left. At that point, the goal changes. You are no longer trying to "win" in the current exchange. You are trying to control how you lose.

Panarchy suggests that when a system enters this late stage, there are three critical levers:

- Release – letting go of structures, assets, or assumptions that can no longer be sustained
- Conserve what matters – protecting the elements that still have value (capabilities, relationships, infrastructure)
- Enable reorganisation – creating the conditions for something new to emerge, even if it cannot yet be fully defined

This reframes “managed decline.” It is not about slowing failure. It is about harvesting value from the old system while deliberately seeding the next one.

Most people think Jiu Jitsu is about escaping bad positions. But at higher levels, practitioners understand something more subtle: when escape is no longer possible, you don’t resist the choke directly. You change the game. You might:

- Concede position to avoid worse damage
- Redirect energy to create a future opportunity
- Protect yourself long enough for the opponent to transition—and expose something new

In other words, even in a losing position, you are still shaping what happens next. Organisations rarely do this. They continue to fight the choke – cutting costs, raising prices, optimising harder – long after the outcome is effectively decided. A Panarchy-informed, Jiu Jitsu mindset would do something different:

- Accept that the current system will decline
- Stop over-investing in preserving it
- Actively transfer resources, capability, and attention into what comes next

Looked at from this perspective, Royal Mail’s challenge is not just to choose between decline, shrinkage, or reinvention. It is to recognise that these are not sequential choices, they must happen simultaneously, but in different parts of the system.

- Letters = Release and manage decline deliberately
- Core infrastructure = Conserve and protect what still has value
- Parcels/logistics/new models = Enable reorganisation and future growth

Trying to do all three within a single, unified system creates friction and paralysis. Panarchy tells us these phases require different rules, different metrics, and different leadership behaviours.

The Real Challenge: Identity

The biggest barrier to change is rarely technical. It is conceptual. If an organisation sees itself as “a postal service,” then every decision will be shaped by that identity. But what if the underlying capability is something else? A national logistics network, A trusted delivery infrastructure, A platform for physical connectivity. Reframing the system’s purpose opens up entirely new possibilities. Without that shift, change efforts tend to remain incremental and insufficient.

Be Flexible or Be Replaced

At its core, this is not a story about any single organisation. It is a pattern that shows up wherever systems become highly optimised. The lesson is not “don’t optimise.” It is

Optimise with awareness of what you are trading away.

Because every gain in efficiency comes with a potential loss in adaptability. And in a world that changes faster than expected, adaptability becomes the defining capability. Systems that can sense, respond, and evolve continue to find relevance. Systems that cannot are gradually replaced – not because they failed, but because they succeeded in solving the wrong problem for too long.

There is something slightly tragic in watching a highly capable system being choked. Not because it lacked value. But because it had so much of it, built over time, embedded in infrastructure, knowledge, and people. The real challenge is not deciding whether to preserve or replace such systems. It is finding ways to transform them before the need

becomes unavoidable. Because once the attack begins, the space for meaningful change narrows quickly. And by then, the choice is no longer between flexibility and optimisation. It is between reinvention, irrelevance, or being choked unconscious.

We need more leaders who can balance the need to deliver value today AND create value tomorrow. Who poses the power and vison to alter the system as needed to align people, process and performance.

So, what should happen? At a minimum, the system needs to be separated: one part optimised for decline (letters). One part built for adaptability (parcels and logistics). Different models. Different constraints. Different ways of working. Trying to run both within a single system creates constant unwanted friction.

In Jiu Jitsu, the outcome of a choke is rarely decided at the end. It's decided much earlier, when the first grip is allowed, when awareness is delayed, when the opportunity to move is missed. The same is true in organisations. Recognise the pattern early, and you have options. Leave it too late, and the system decides for you.

Everything works. Nothing works. Understand the principles. Sense what's changing. Act early. Because in the end, the choice is simple: Be flexible or be replaced… Be flexible early, or be deliberate about what you let go of, what you protect, and what you build next.

References

1) SIEZ, 'Blue World', Issue 257, August 2023.
2) Gunderson, L.H., Holling, C.S., 'Panarchy: Understanding Transformations In Human And Natural Systems', Island Press, 2002.
3) Gunderson, L.H., Allen, C.R., Garmestani, A., 'Applied Panarchy: Applications And Diffusion Across Dsciplines', Island Press, 2022.

Not So Funny – The Late Capitalism Pizza

As challenging economic times continue, it is becoming increasingly noticeable that the food industry is struggling more than most. Just down the road from where I live is a great pizza takeaway business. Great in the sense that I could probably go eat there everyday and always want to go back for more. I've noticed, however, that their reluctance to put up prices – we live in a fairly poor part of the UK – has very definitely been compensated by putting progressively less of the expensive component parts onto the pizza. The diameter has remained the same, but the proportion of the surface area covered with topping has steadily declined.

Capitalism being what it is, as a customer if this drift continues long enough, I'll eventually start looking around at other pizza offerings.

That hasn't quite happened in this case yet because the latest menu has started offering 'crust dippers'. Meaning that I now don't just buy my pizza, but also a pot of dipping sauce. So now I then dutifully tear off bits of topping-less crust and dip them into the sauce. The combination is very tasty. Sometimes, I buy two or more different sauces. So now I'm spending 30+% more.

Fair play to the business owner, the queues outside the door don't seem to be getting any smaller. Quite possibly because the menu of pizzas is now smaller than the menu of crust-dippers. Customers, it seems, love more choice. I always thought that customers loved three meaningful choices, and anything above that caused a net increase in dissatisfaction. Especially if you happen to live with other family members that now spend

what feels like an hour working their way through the myriad combination options before still changing their mind when it's time to make the order.

Yet again, capitalism means that we're always at liberty to go find an alternative, less confusing, pizza provider.

In the interests of my mental health, I did a little research. The first thing I found is that pizza-topping shrinkage has become fairly universal. As it seems have crust-dipper sauces. So now everyone has accepted a 30% price rise for a product that now contains almost none of the expensive essential food groups, and a lot more of the essential inexpensive food groups. At this rate, I imagine it won't be too long before the business starts offering gym membership in order to help me lose the carbohydrate-and-sugar based weight I'm putting on.

Prior to that step, I'm guessing that it won't be too long before an easier 'value adding' innovation appears. Putting on weight? What you need is our air-filled crust. It looks like a lot, but most of it is air, so, you won't get that bloated feeling any longer. Well, actually, of course, you will feel bloated, just not the sort of bloated associated with eating actual food, with actual calories in it. The food industry, naturally, has already mastered the Principle 31 art of selling more volume and less mass. Here's what that is already beginning to look like in pizza form:

On the plus side, I guess they haven't – yet – gone full Inventive Principle 22 and started trying to convince me that the crust is the primary reason for buying the pizza. Some restaurants have emphasised the point by literally making the (Principle 13) crust the centre of the pizza:

Slightly more imaginative, it wouldn't surprise me if the (Principle 17) 'pizza rose' eventually became a thing: even more volume, even more expensive, even less nutrition. What's not to like?

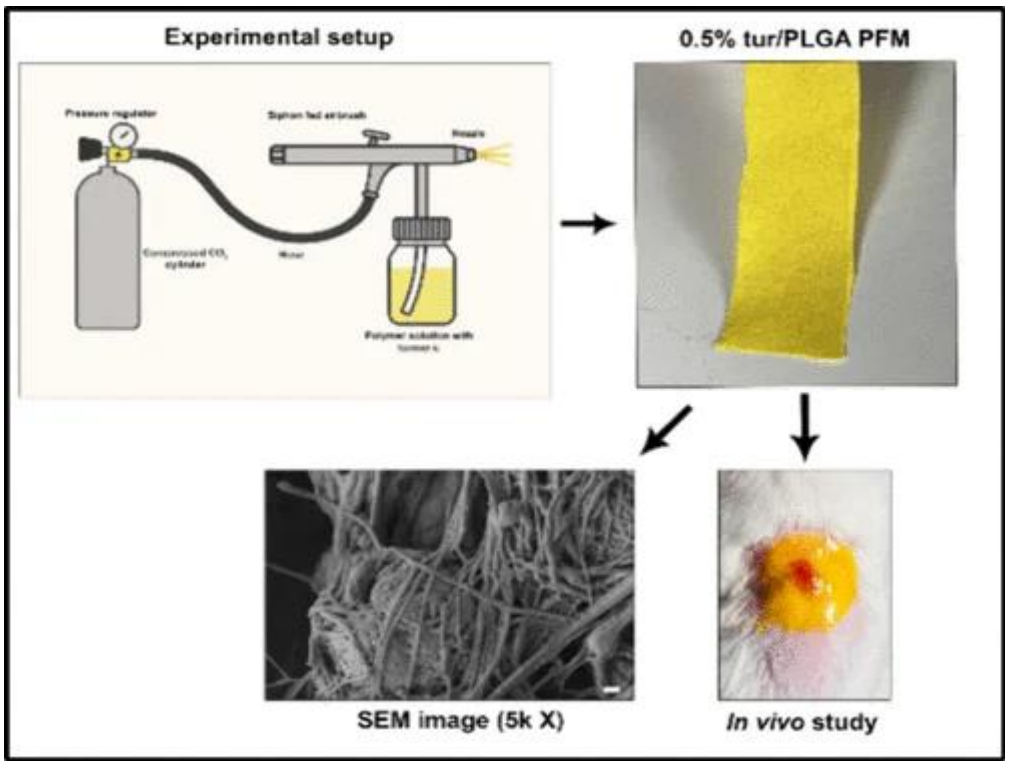
Apart from all of it?

And yet, I still hold out hope for a breakthrough to a whole new level of business competition. One that doesn't try to generate value out of turning customers into Wall-E human blobs, but rather starts solving one or two contradictions that no longer make money out of externalising harm. Stop selling short-term loveliness that turns into long term unflourishing.

Me, I'm on the lookout for this pizza:

With the 30% I save from not having to buy crust-dippers any longer, I'm all in. Especially once I've managed to buy shares in the Pizza-Size Pepperoni Company Ltd.

Patent of the Month – Hemostatic & Wound Healing Turmeric-Polymer Materials



We head to the City University of New York for our Patent of the Month this month. US12,642,885 was granted to a sextet of inventors on the 2nd of June. Here's what the background description has to say about the problem addressed by the invention:

Annually, the United States reports the cost for wound care to be around $31.7 billion. Haemorrhage is the number one killer on the battlefield for the U.S. army. In the U.S. army, 90.9% of acute mortality was associated with haemorrhage and most soldiers perished before reaching a surgeon. The leading cause of death for people under the age of 46 in the United States is due to trauma and 30 to 40 percent of civilian deaths by traumatic injury are the result of haemorrhage. As mass killing events in the U.S. continue to rise, Hartford Consensus Joint Committee created a policy to increase survival in mass casualty shootings. The policy views stopping haemorrhage as a crucial step to improving the survival of victims of an active shooter. Chronic wounds impact about 15 percent (8.2 million) of Medicare beneficiaries.

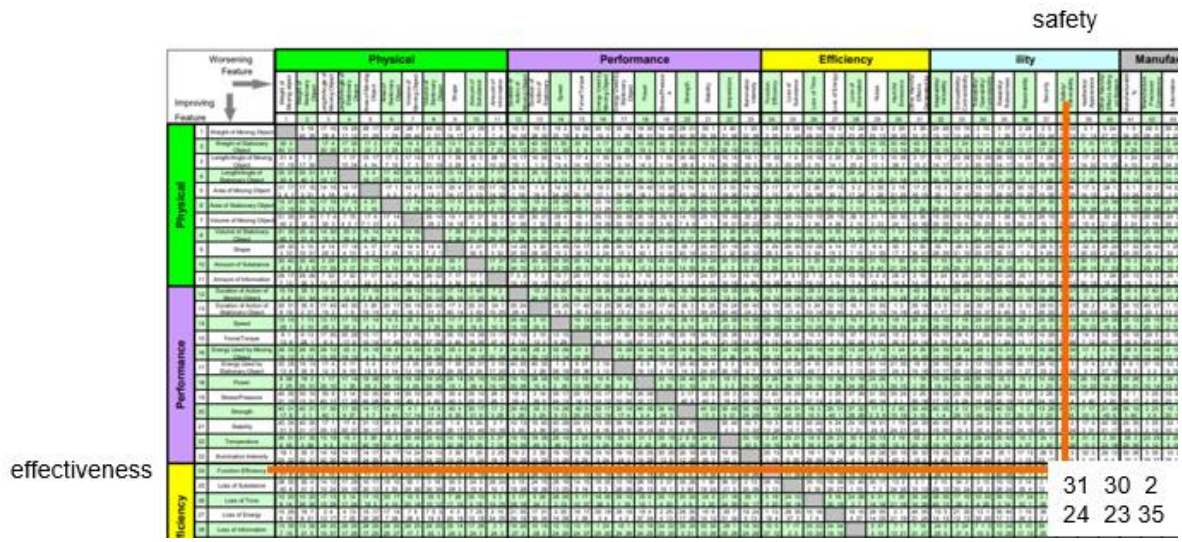
Current technologies to address haemorrhage have significant limitations. These include a) making close or direct physical contact with the wound and possible exposure to patient blood, b) ingredients not appropriate for long term use, necessitating removal of the agent from the body, once the victim is transported to a medical facility, c) use of expensive ingredients and lack of availability of ingredients due to supply chain issues, d) ingredients not being biodegradable and bioabsorbable, e) agents appropriate only to arrest haemorrhage but not useful for wound healing, f) possible side effects.

Some technologies which have been used for treating haemorrhage contain zeolite, which promotes blood clotting but has side effects (the reaction of zeolites with blood is exothermic which caused second-degree burns). Other current haemorrhage treatment agents contain kaolin—a white clay. The kaolin-based products are effective in arresting haemorrhage, but the ingredients are not bioresorbable. Other haemorrhage treatment agents are not appropriate for long-term use and need to be removed from the body once the victim is transported to a medical facility. The

complications that can arise with these agents include coagulopathy, the development of progressive stages of shock. Added to these issues is the danger associated with the release of fragments of the products into the systemic circulation which can lead to embolus formation. Hence, they are not appropriate for long term use. Still other haemorrhage treatment agents are made from human blood and carry the risk of transmitting infectious agents.

Furthermore, the world is facing several issues that make the treatment of haemorrhage very challenging. These include a global pandemic that overwhelmed the hospital emergency rooms as witnessed during the COVID 19 pandemic, increasing global conflicts, climate change related natural disasters which cause severe delays stretching into several days before a patient can be transported to a medical facility. The issue of addressing haemorrhage in underdeveloped areas of the world that have limited access to medical facilities has been a long-standing issue. The increase in cases of mass shootings in civilian areas where first responder civilians are incapable of administering the treatment due to the fear of coming in contact with the victim's blood and the lack of a readily accessible tools to treat haemorrhage at the point of occurrence are also other urgent matters that need to be solved immediately. An improved technology to address at least some of these issues is therefore desired.

There are multiple contradictions described here, but overall, they all distil down to the recognition that the more aggressive and effective a haemostatic agent becomes, the less biocompatible, resorbable, safe, and deployable it tends to be. Here's how we might best map that overall effectiveness versus safety conflict onto the Contradiction Matrix:



At a superficial level, reading the title of the patent, the solution is (Principle 35) 'turmeric'. The real inventive leap, however, is not merely "using turmeric." It is creating an in situ formed nano-fibre composite by spray-deploying a suspension of insoluble turmeric powder in a biodegradable polymer solution, where solvent evaporation during flight creates a mechanically adherent haemostatic matrix directly on the wound. Or, as described in the main Claim of the patent:

A method for treating a wound, the method comprising: spraying a bleeding wound with a composition of matter comprising: a volatile organic solvent that at least partially evaporates during the spraying; a biocompatible polymer; turmeric powder; and permitting the volatile organic solvent to evaporate, thereby forming a haemostatic composite on the bleeding wound, wherein the haemostatic composite stops the bleeding.

Whaile turmeric might be the conceptual centre, the overall novelty comes from an elegant combination of several inventive leaps and more granularly defined contradictions:

1. Solution blow spinning / airbrush deposition (Principle 29)

2. Mid-air solvent evaporation (Principle 2, Principle 36)
3. Suspension (not dissolution) of turmeric powder (Principle 5)
4. PLGA nanofiber matrix formation (Principle 40, Principle 10)
5. Direct wound sealing under pressure (Principle 35)
6. Long-term bioresorbability (Principle 34)
7. Remote/non-contact deployment (Principle 2)

Here's a deeper-dive look at the key inventive steps and the contradictions they are designed to resolve:

Reframing Turmeric Powder as a Haemostatic Agent
This is probably the most intellectually important step. The patent explicitly notes that curcumin, the main active ingredient in turmeric, alone is an anticoagulant. Purified curcumin ≠ whole turmeric powder though and turmeric powder behaves differently because it is a heterogeneous particulate biological mixture. This allows them to claim unexpected behaviour, namely that whole turmeric powder embedded in PLGA unexpectedly promotes haemostasis and healing.

Using Suspension-Based Blow Spinning Instead of Electrospinning
The disclosure emphasises that electrospinning requires solubility, but turmeric contains mixed solubility fractions, insoluble particulates, oils, fibres, carbohydrates, hydrophobic and hydrophilic components, and so conventional nano-fibre fabrication fails. Their solution uses compressed-gas spraying, a large nozzle airbrush, volatile solvent and in-flight evaporation. Thus bypassing the solubility problem entirely. That appears to be a significant process innovation. Instead of using a dissolved bioactive to electro-spin, they use a particulate suspension and then use blow-spin-like aerosol deposition

In Situ Fibre Formation During Flight
Another important inventive step is that the fibres are not pre-manufactured, but rather form during aerosol transit while solvent evaporates, and before impact on tissue, so the wound receives a semi-formed nano-fibre composite mat. This solves multiple contradictions at once:

Problem	Solved By
Wet bleeding surface	Dry-semi-dry arriving matrix
Solvent toxicity	Evaporation before contact
Adhesion	Fibre entanglement + blood wetting
Rapid sealing	Instant conformal deposition

This "mid-air phase transition" is arguably the real process invention.

Transforming a Spray Into a Structural Membrane
Most haemostatic sprays are foams, liquids or powders. This invention instead creates a mechanically coherent nano-fibre membrane. Which enables arterial pressure resistance, water impermeability, and prolonged residence.

Solving the Contactless Haemostasis Problem
A major practical contradiction: severe haemorrhage often requires direct pressure, but direct contact exposes rescuers to blood and requires training. Their solution, spraying from 10–20 cm away and forming the required seal remotely, is especially targeted toward

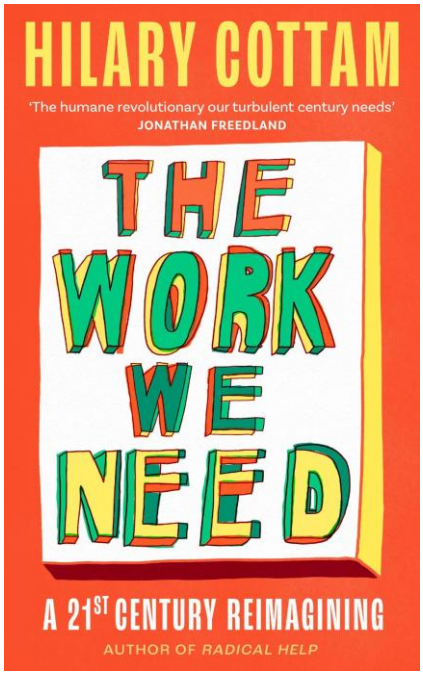
battlefield medicine, civilians during shootings, pandemics, and delayed evacuation scenarios. So, the invention is as much a *deployment architecture* as a material invention.

Long-Term Residence Without Removal
Existing haemostats often need to be surgically removed, risk emboli, cause burns, and are non-resorbable. The new system instead uses PLGA, biodegradable polymer scaffold, and a bioresorbable matrix, thus offering a transition from “acute haemostatic” to “therapeutic wound matrix.”

All that said, the deepest insight may actually be that haemostasis is achieved not purely biochemically, but mechanically. The system, in other words, behaves more like a sprayed bioactive synthetic scab.

This is, by some distance, my favourite patent of the year so far. I really hope this one has an opportunity for widespread saving of lives. And commercial success.

Best of the Month – The Work We Need



Hilary Cottam's new book, The Work We Need, can be read as a natural successor to her earlier work, Radical Help (reviewed in Issue 211, back in October 2019). In that book, Cottam argued that many of the institutions underpinning modern society were designed for a world that no longer exists. The welfare state, healthcare systems, education systems and public services were largely conceived in the aftermath of the Second World War to address the challenges of that era. While their underlying values remain important, the social, economic and technological realities they were designed to serve have changed dramatically.

At its heart, Radical Help was an exploration of the social contract. How should society organise itself to help people live meaningful, productive and connected lives? What responsibilities should individuals, communities and institutions assume? And how might we redesign systems that increasingly appear to be producing outcomes very different from those originally intended?

One of the striking features of Radical Help was that work sat somewhat at the periphery of the discussion. Understandably so. In the immediate post-war period, the central challenge was reconstruction. Employment was largely assumed to be available, and the primary task was rebuilding housing, infrastructure, healthcare and public services. Today's world presents a different challenge. Work itself has become increasingly problematic. Technological change, globalisation, platform economics, declining community structures and shifting expectations about life and identity have transformed the relationship between people and work.

It is therefore unsurprising that Cottam's attention has now turned directly to the question of work itself.

The central premise of The Work We Need is difficult to argue with. For many people, work simply is not working. The rewards are often insufficient, the hours inflexible, the work disconnected from meaning, and the surrounding systems increasingly unable to

support a flourishing life. Drawing on thousands of interviews and conversations across Britain and the United States, Cottam identifies six recurring principles that emerged regardless of geography, profession or social class:

* Securing the basics
* Work with meaning
* Tending to what sustains us
* Rethinking our use of time
* Enabling play
* Organising in place

The consistency of these themes is one of the book's strengths. They emerge not as abstract theories imposed from above, but as recurring aspirations expressed by people themselves. Whether speaking with investment bankers, care workers, grave-diggers, delivery riders or local government officials, Cottam repeatedly encountered similar desires. People want security. They want purpose. They want balance. They want community. They want the opportunity to contribute while remaining fully human. They want to flourish.

Reading the book through a systems lens, however, immediately triggered an interesting hypothesis.

Six principles. A previous book about redesigning social systems. A future-oriented agenda for transforming work. Was Cottam, perhaps implicitly, describing a system?

The answer, I think, is both yes and no.

The six principles certainly possess a coherent internal logic. They reinforce one another and collectively describe a vision of work that is markedly different from the dominant models inherited from industrial-era thinking. Yet the more I attempted to map the principles against the seven-element Law of System Completeness, the more uncomfortable the fit became.

The reason, I believe, is revealing.

The principles are not system elements.

They are design criteria.

A complete system requires certain essential functions. Something must provide direction. Something must perform useful work. Something must provide energy. Something must connect intention to action. Something must sense what is happening. Something must interact with the beneficiary. And all of this must exist within a wider context.

Cottam's principles do not naturally fulfil these roles. Instead, they describe the qualities that a future work system ought to exhibit.

If we force a systems interpretation onto the six principles, we quickly encounter overlaps and ambiguities. "Work with meaning" appears partly concerned with purpose and coordination. "Securing the basics" seems related to energy and viability. "Organising in place" looks like context. Yet several principles simultaneously touch motivation, wellbeing, community and sustainability. The categories overlap because they were never intended to function as architectural components.

Viewed differently, however, the framework becomes much more powerful.

The six principles operate less like a blueprint and more like a set of constraints or design requirements. They define conditions that any successful future work system should satisfy. In TRIZ terms, they resemble aspects of an Ideal Final Result rather than descriptions of an existing mechanism.

This interpretation helps explain both the strengths and limitations of the book.

Its primary strength lies in expanding the system boundary.

Much contemporary discussion about work remains trapped inside economic or organisational boundaries. Productivity, efficiency, profitability and labour markets dominate the conversation. Cottam deliberately broadens the frame. Work is no longer treated merely as an economic transaction but as part of a wider system encompassing care, identity, belonging, health, time, community and place.

Many of the problems associated with modern work emerge precisely because we have narrowed the system too aggressively. Organisations optimise productivity while externalising impacts on family life, mental health, social cohesion and local communities. From a systems perspective, these are not externalities at all. They are consequences of drawing the boundary in the wrong place.

Here, Cottam performs a valuable service. She reminds us that work exists within a larger human system.

Yet the broader the boundary becomes, the more difficult implementation becomes.

And this is where a systems critique begins to emerge.

The six principles tell us a great deal about what good work should look like. They tell us much less about how such systems might be constructed, coordinated and sustained in practice.

What provides the energy that keeps the system functioning?

How are competing objectives balanced?

What feedback loops determine whether meaningfulness, belonging or wellbeing are increasing or decreasing?

What incentives prevent future work systems from drifting back toward the same productivity-centric patterns that dominate today?

Who coordinates the trade-offs? Who is tasked with transcending them?

These questions are not ignored entirely, but they remain underdeveloped compared to the richness of the diagnosis.

In this sense, The Work We Need exhibits an interesting form of incompleteness. Not because the vision is lacking, but because the operational architecture required to sustain that vision remains largely unspecified.

This is perhaps best understood through comparison with another influential work discussed recently in our workshops, and written about in deeper terms in next month’s ezine: Stephen Covey's The 7 Habits of Highly Effective People.

Covey's framework suffers from almost the opposite limitation.

Covey focuses intensely on the individual. Agency, discipline, self-management, understanding others and continuous improvement. He assumes the surrounding system largely exists and seeks to improve the human operating system within it.

Cottam, by contrast, focuses on the surrounding conditions. Community, place, time, sustainability, care and meaning. She questions the system itself while saying comparatively less about the mechanisms through which individuals and organisations navigate it.

The two perspectives are almost complementary.

Covey under-specifies context.

Cottam under-specifies architecture.

Together they reveal an important systems lesson. Solving the future of work requires both. We need individuals capable of agency, responsibility and adaptation. But we also need systems capable of supporting meaning, belonging, sustainability and flourishing.

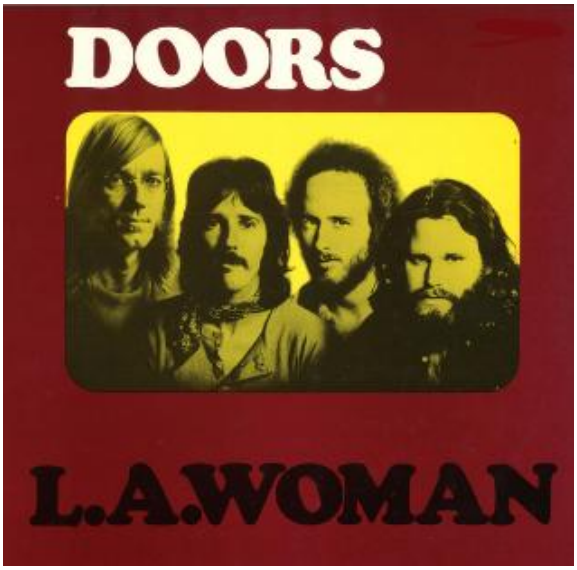
Ultimately, this is what makes The Work We Need such an important book. Its greatest contribution may not be the six principles themselves, but the challenge it poses to our assumptions about what work is for.

For decades we have largely treated work as an economic problem. Cottam invites us to see it instead as a human one.

Whether her six principles ultimately become the foundation of future work systems remains to be seen. But they succeed in something arguably more important: they force us to redraw the system boundary.

And as every systems thinker eventually discovers, once the boundary changes, everything else is likely to change with it.

Wow In Music – LA Woman



One of my all-time Top 50 albums, the Doors' L.A. Woman has that rare quality of sounding both like an ending and a breakthrough. It's not just that it *holds up,* it feels alive in a way many late-career albums don't. The interesting question isn't just *what* it is, but *why* they didn't coast. A few things changed in the band's world – and in their mindset – that help explain it.

1. *Pressure, but not the usual kind: b*y 1970–71, The Doors were in a strange position. They were already huge, already culturally significant, but also unstable. The biggest factor was Jim Morrison himself. His arrest and trial following the Miami incident had put the band under intense scrutiny. Tours were cancelled, bookings dried up, and Morrison's public image shifted from charismatic frontman to liability. That kind of pressure can push bands into safe territory, but here it seems to have done the opposite. There's a sense on *L.A. Woman* of a band with less to lose reputationally, and therefore more freedom artistically.

2. *A return to roots*: earlier Doors records had a strong psychedelic and theatrical edge. On *L.A. Woman*, they pivot hard into blues and R&B. Tracks like "Roadhouse Blues" (already a hint on the previous album) and the title track feel less like stylistic choices and more like *grounding*. The band stripped things back to something more fundamental. This wasn't regression. It was closer to reconnecting with first principles – a move many artists make late in their careers when surface experimentation starts to feel exhausted.

3. *Self-production = creative liberation*: For the first time, the band produced the album themselves, after parting ways with long-time producer Paul A. Rothchild, who reportedly dismissed early versions of the songs as "cocktail music." That break matters more than it might seem. Without an external producer shaping or filtering ideas, the band created a looser, more immediate environment, recording in their rehearsal space rather than a formal studio. You can hear it in the record: it's less polished, more *inhabited*. This is often what happens when mature systems remove a layer of control. They can either collapse or become more authentic. Here, it's clearly the latter.

4. *Morrison's shift: from performer to writer: b*y this point, Morrison was pulling away from the role of rock frontman and leaning into his identity as a poet. There's a different tone to

his presence on *L.A. Woman*. Less theatrical provocation, more inward reflection. Even on the longer tracks, there's a sense of *observation* rather than performance. The title track (which I'll explore in more detail later) itself is almost mythic. Part love letter, part critique, part hallucination of Los Angeles. And then there's "Riders on the Storm," which feels like a meditation on transience, identity, and danger. It's hard not to read some of this through the lens of what followed – his death shortly after the album's release – but even without hindsight, there's a sense of closing a loop.

5. *Constraints that clarified rather than limited:* The band were dealing with legal uncertainty, reduced touring, internal strain, and a narrowing commercial window. Instead of fragmenting them, these constraints seem to have focused them. There's a principle here you see in other domains: when options reduce, signal can increase. The band weren't trying to be everything, they were trying to be *true* to something.

6. *Chemistry under pressure: t*he remaining members – Ray Manzarek, Robby Krieger, and John Densmore – sound locked in. Partly this is musical maturity. But it's also necessity. With Morrison increasingly unpredictable, the instrumental core had to carry more weight. And they rise to it. There's a looseness, but also a deep cohesion. The band sounds like it knows exactly what it is.

7. *The "nothing left to prove" paradox:* Progressively less than glowing reviews for the albums immediately before L.A. Woman might have given the band a feeling of having something to prove again. That's partly true, but there's also a paradox. They had already proved themselves. And that can remove a different kind of pressure. What emerges on *L.A. Woman* is a band no longer trying to *define* itself, but simply to *be* itself. That often leads to the most enduring work.

So why didn't they coast? Because the conditions didn't allow it:

- External pressure destabilised the status quo
- Internal changes removed old constraints
- Artistic identity shifted toward something more essential
- The window for the current version of the band was closing

In other words, they were at the end of an S-curve, but instead of incremental optimisation, they made a lateral move: stripping back, recombining influences, and creating something that felt both raw and fully formed. Many late-career albums fail because artists try to extend what already worked. *L.A. Woman* succeeds because it does something harder: it lets go of what made them successful in order to rediscover why they were worth listening to in the first place. And that's why it doesn't feel like an ending that faded out, but rather one that burned. It was yet another of those classic records borne out of the crises triggered by circumstances that pushed the musicians off their current s-curve and into the awkward liminal space and the search for the next.

The Title Track

L.A. Woman, the song, wasn't the very first track laid down for the album, but it was part of the early core of sessions and came together relatively quickly once recording began. By the time L.A. Woman sessions started in late 1970, The Doors had already been rehearsing extensively in their own space (the Workshop). Several of the key tracks, including "L.A. Woman," "Riders on the Storm," and "Love Her Madly", were road-tested or at least well-developed before formal recording.

When they moved into recording, "L.A. Woman" emerged early as one of the defining pieces. It wasn't something painstakingly constructed over months in the studio, it was

captured more live, with that now famous rolling groove and extended feel coming from the band locking in together in real time.

L.A. Woman is one of those tracks where the “wow” isn’t a single moment. Rather it’s a sequence of escalations. It keeps shifting shape while staying hypnotically locked in. That’s where a lot of its power comes from: it’s built on contradictions that never fully resolve. Here are what I think are the standout moments, and the tensions driving them:

1. *The Groove That Doesn’t Let Go:* from the opening seconds, the song drops into that rolling, almost vehicular rhythm, more felt than heard. It *locks in immediately* and then refuses to evolve in the conventional sense. No big chord changes, no obvious “sections”, just forward motion. The Contradiction: repetition vs progression. It barely changes (Principle 20)… yet it feels like a journey across a city. This is very un-rock in structure. Most songs create movement through change. This one creates movement through persistence… like driving endlessly through LA streets.

2. *“Well, I just got into town about an hour ago…”:* when Jim Morrison enters, it’s almost casual and feels thrown away. The vocal feels *improvised*, like he’s narrating rather than performing. The Contradiction: mythic frontman vs passing observer. Instead of commanding the song, he drifts through it. It lowers the centre of gravity. The “L.A. Woman” isn’t introduced with grandeur, it emerges from something more fragmented and real.

3. *The Rising Invocation: “L.A. Woman… L.A. Woman…”:* as the chorus (if you can call it that) builds, the (Principle 15) repetition becomes incantatory. It shifts from description to ritual. The city becomes a character, almost a force being summoned. The Contradiction: specific place vs universal archetype. It’s Los Angeles, but it’s also *any* city of desire, excess, and dislocation. This is where the song lifts from reportage into something mythic.

4. *“City of Night” – The Hidden Reference:* the line “City of night” quietly nods to City of Night, a novel about the underbelly of urban life. It’s a single phrase, but it opens a whole subtext – sexuality, marginality, the unseen layers of the city. The Contradiction: surface glamour vs hidden reality. LA as dream factory vs LA as something darker and more fragmented. The song never explains this, it just lets the tension sit there.

5. *The Breakdown: “Mr. Mojo Risin’”:* then everything (Principle 3) shifts. The groove strips down, and Morrison starts repeating “Mr. Mojo Risin’” (an anagram of his own name). It’s raw, almost trance-like. The Contradiction: identity vs disintegration. He’s naming himself, but in fragmented, coded form. It feels like both (Principle 12) self-assertion and self-loss at the same time. Is he becoming something, or dissolving? Musically, this is also a contradiction between control and looseness. The band stays tight, but the (Principle 37) vocal feels like it could fall apart at any moment.

6. *The Return Without Resolution:* after the breakdown, the song flows back into the main groove… but nothing has really “resolved.” It doesn’t climax in a traditional sense. It just *continues*, as if the journey has no clear endpoint. The Contradiction: expectation of closure vs endless motion. Most songs build toward an ending. This one suggests there isn’t one. It perhaps mirrors the experience of the city itself – always moving, never complete.

7. *The Underlying Structural Contradiction:* if you zoom out, the whole track is built on a deeper tension. It sounds loose, improvised, almost accidental, but it is structurally disciplined and tightly controlled. That (Goldilocks Curve) balance is incredibly hard to achieve. Too much looseness and it collapses. Too much structure and it loses life.

8. *The Final, Bigger Contradiction:* and perhaps the most powerful one, given where the band, and especially Morrison, were at the time – vitality vs exhaustion, movement vs ending – the song feels alive, kinetic, open-ended. But underneath, there's a sense of someone circling something they can't escape.

"L.A. Woman" works because it turns repetition into journey, identity into myth, and a city into a living contradiction. All held together by a performance that sounds like it might fall apart at any moment, but somehow never does. The groove is fixed but the meaning shifts. There's just the right amount of structure to retain control and enough looseness to breathe. The "wow" isn't any single element, it's the way the song sustains its multiple unresolved tensions without breaking. In the end, the song is perhaps less a product of the album sessions and more the anchor around which it cohered.

Investments – The ‘Impossible’ LED

Powering the Unpowerable. One of the most useful ways to spot potentially valuable innovations is to look for contradictions. This month's example comes from researchers at the University of Cambridge who may have solved a particularly stubborn one.

Lanthanide nanoparticles are exceptional light emitters. They produce highly stable, ultra-pure near-infrared light that can penetrate deep into biological tissue, making them attractive for medical imaging, sensing, diagnostics and optical communications.

There was just one problem.

They are electrical insulators.

In other words, the very materials that produce the desired light could not easily be powered by electricity. This contradiction has prevented their widespread use in practical electronic devices for years.

The Cambridge team found a way around the problem. Rather than trying to force electricity directly into the nanoparticles, they attached organic molecules that act as "molecular antennas". These molecules capture electrical energy and transfer it into the insulating material with remarkable efficiency.

The result is the first generation of LEDs built from materials previously considered impossible to power.

Commercially, this matters because solving a contradiction often unlocks entirely new markets. If the technology can be scaled, it could enable more precise medical imaging, advanced diagnostic devices, highly sensitive sensors and improved optical communications.

The most valuable innovations are often not incremental improvements. They emerge when someone finds a way to achieve two things that previously appeared mutually exclusive.

SYSTEM ATIC INNOVAT ION

In this case: electrically powered devices made from materials that don't conduct electricity.

What I particularly like about this story for an investment-themed ezine is that it follows a classic pattern seen repeatedly in breakthrough businesses:

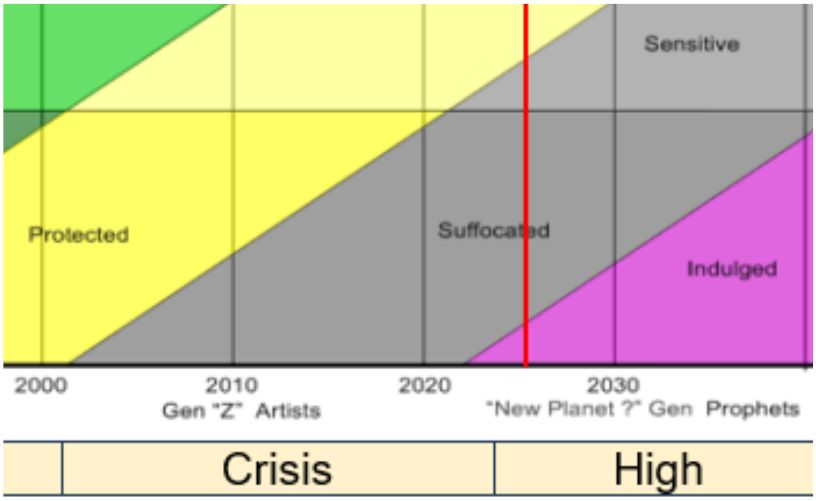
Valuable capability + fatal limitation = dormant opportunity.

The nanoparticles were already known to be valuable. The challenge wasn't creating a better material; it was removing the constraint that prevented the material from being used. Historically, some of the biggest fortunes have been built not by inventing entirely new capabilities, but by finding a way around the bottleneck that kept an existing capability trapped in the laboratory. That framing makes the commercial significance much clearer than focusing on the technical details alone.

Read more:

Zhongzheng Yu, Yunzhou Deng, Junzhi Ye, Lars van Turnhout, Tianjun Liu, Alasdair Tew, Rakesh Arul, Simon Dowland, Yuqi Sun, Xinjuan Li, Linjie Dai, Yang Lu, Caterina Ducati, Jeremy J. Baumberg, Richard H. Friend, Robert L. Z. Hoye, Akshay Rao. Triplets electrically turn on insulating lanthanide-doped nanoparticles. *Nature*, 2025; 647 (8090): 625 DOI: 10.1038/s41586-025-09601-y

Generational Cycles – Girls®



The oldest GenZ cohort members are now in their mid-20s and society is beginning to see what the Strauss/Howe descriptor, 'Sensitive', looks like in the wake of their 'Suffocated' upbringing. Needless to say, the picture does not look encouraging. At least in terms of the rapidly unfolding (unravelling?) mental health epidemic. Society reaps what it sows. And very often the results look like a bad case of unintended consequences if looked at through the wrong lens. Fortunately, however, we have authors much closer to this Artist generation than us to help us to explore what the most troubling of those consequences are. Enter what we might think of as the very definition of 'Artist' in the positive sense of how this cohort gets its name.

Freya India's Girls: Gen Z and the Commodification of Everything arrives at an important moment in the growing conversation about the relationship between social media, identity formation and the mental health crisis increasingly visible among Generation Z. Following in the wake of works like Jonathan Haidt's 'The Anxious Generation', India's focus is less on technology itself than on what prolonged immersion in digitally-mediated environments appears to be doing to the developmental architecture of young people – especially girls and young women.

Her central concern is both simple and deeply unsettling: a generation raised inside systems optimised for visibility, performance and engagement is increasingly learning to experience itself as something to be curated, monitored, marketed and consumed. In this sense, the "commodification of everything" described in the title is not merely economic. The thing being commodified is identity itself.

India's chapter structure – Filtered, Diagnosed, Documented, Disconnected, Detached and finally Empowered – captures many of the experiential states associated with life inside the modern social-media ecosystem. Young women become progressively more visible yet less known, more connected yet less grounded, more expressive yet increasingly constrained by the invisible pressures of algorithmic performativity, aesthetic optimization and perpetual social comparison. The result is a portrait not simply of anxiety, but of developmental destabilisation.

What makes the book particularly valuable is that India largely resists the temptation toward simplistic moral panic. Rather than portraying young women as passive victims of technology, she instead highlights the subtle, recursive and often self-reinforcing dynamics

through which social-media systems reshape behaviour, expectations and selfhood. The problem is not “screens” in the simplistic sense. It is the emergence of an environment in which visibility increasingly becomes a precondition for social existence, and where identity formation unfolds under conditions of continuous observation, quantification and comparison.

Yet for all its strengths, Girls also reveals something important about the limitations of much contemporary cultural criticism. India is highly effective at describing the symptoms of the problem and the lived experience of inhabiting such an environment. But like many writers tackling these issues, she stops just short of describing the underlying architecture of the system itself. And this matters because systems – whether technological, social or economic – cannot meaningfully be redesigned until their constituent elements and interactions are properly understood.

From a systems perspective, the social-media ecosystem surrounding Generation Z begins to look less like a collection of isolated technologies and more like a complete, if largely emergent, system optimised around engagement, visibility and behavioural predictability. And once viewed through that lens, an uncomfortable possibility begins to emerge: the commodification of girls may not be the result of a consciously designed conspiracy or even an intentional cultural project. It may instead be the unintended consequence of extraordinarily powerful optimisation systems evolving in the absence of equally sophisticated mechanisms for developmental and civilisational coordination.

What does that mean?

It means we’re back in ‘The System Decides’ territory, and the thought that no-one is going to be able to meaningfully resolve the catastrophic and horrific stories found in Girls® until such times as someone looks at matters from a systems perspective.

It’s not about “what is happening to Gen Z?”, but rather: what system is producing these outcomes?

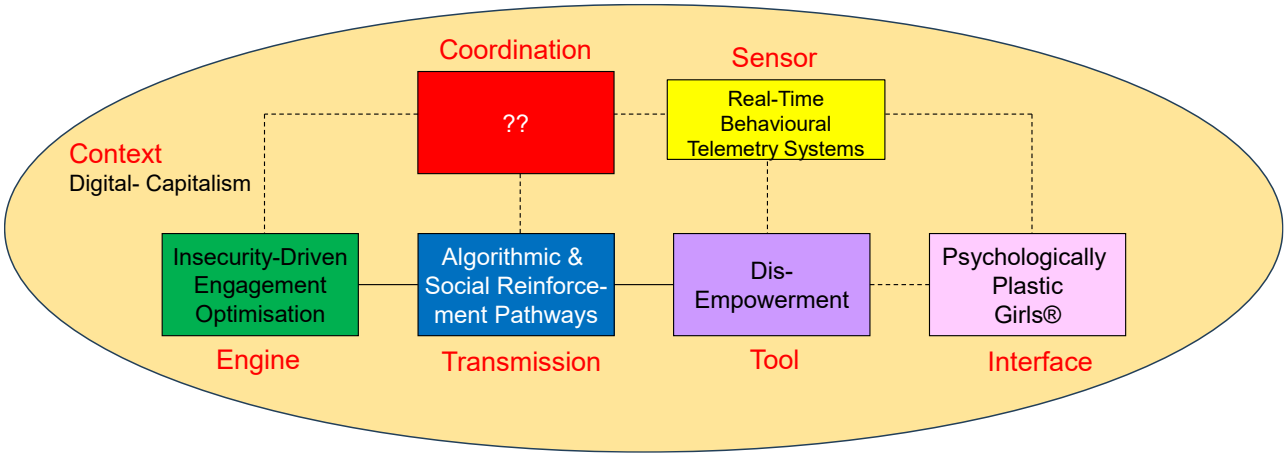
This distinction is critical. Systems routinely generate outcomes that none of their participants explicitly intended. Indeed, some of the most powerful and destructive systems in history emerged not from conspiracy or centralised design, but from the interaction of incentives, technologies, behaviours and feedback loops that gradually assembled themselves into self-reinforcing structures. The modern social-media ecosystem increasingly appears to belong to this category.

Viewed through the lens of the Law of System Completeness, the commodification dynamics described by India begin to resemble a surprisingly coherent system architecture.

At the Interface of the system sit adolescent girls and young women – or more precisely, psychologically plastic individuals engaged in the difficult and developmentally crucial process of identity formation. This distinction matters because the system is not merely competing for “attention” in the abstract. It is interacting with human beings at precisely the stage in life when questions of selfhood, belonging, attractiveness, status and social legitimacy are most unstable and most sensitive to external influence.

The Tool of the system is not social media in the broad sense, nor even technology itself. Rather, it is a cybernetic self-commodification apparatus: a set of behaviours and mechanisms that progressively transform identity into performance and performance into marketable visibility. Filtering, aesthetic optimisation, influencer mimicry, perpetual self-

documentation, algorithmically-shaped self-presentation and the conversion of private experience into public content all become operational mechanisms through which identity is reformatted into something measurable, comparable and ultimately monetizable. India's final chapter, 'Empowerment' is her attempt to suggest solutions to the commodification problem. In effect, what she has identified is that the Tool delivering the unwanted outcomes is actually dis-empowerment.



Dis-empowerment:
A Beauty industry that needs people to feel ugly.
A Dating industry that needs people unhappy in their relationships.
A Healthcare industry that needs people who are sick.
A Therapy industry that needs people unable to think for themselves.
A self-help publishing industry that needs people who need help.
A Social Media industry that needs people who feel lonely and dis-connected.
A Retail industry that needs people who need 'things' to make them happy.
A Security industry that needs people to feel fearful.
Government that needs people who feel they can't be trusted to make their own decisions.

The Engine powering this process is equally important. The system derives energy not from malice, but from the extraordinarily powerful interaction between algorithmic amplification, advertising economics, social comparison psychology, prestige competition and variable-reward behavioural loops. Human insecurity, aspiration and status sensitivity become ideal fuel sources for systems optimised around engagement and retention. Crucially, the more identity becomes unstable or externally validated, the more dependent users become upon the system itself for signals of worth, belonging and visibility.

Transmission occurs through the countless connective pathways linking platform logic to everyday behaviour: recommendation algorithms, trends, aesthetic norms, influencer culture, hashtags, platform affordances, social imitation, therapeutic language, beauty standards and the informal rules governing visibility and status online. These mechanisms act as the coupling layer between the underlying optimisation machinery and the lived behaviour of users. In effect, they translate platform incentives into social reality.

The Sensor architecture of the system is perhaps the most highly evolved component of all. Likes, shares, comments, views, follower counts, streaks, engagement analytics and algorithmic recommendation signals create a continuous feedback environment in which users are constantly informed how visible, desirable, marketable or socially valuable they are perceived to be. Never before have developmental environments become so thoroughly quantified. Adolescence itself increasingly unfolds under conditions of perpetual measurement.

And surrounding the entire structure sits a wider Context defined by digital capitalism, smartphone ubiquity, declining community structures, the collapse of developmental boundaries between public and private life, increasing social atomisation and a broader cultural shift toward performative identity. The social-media ecosystem did not emerge in isolation. It emerged within a civilisation already primed for optimisation, visibility and consumption.

The remaining question, however, is perhaps the most important one of all: what, exactly, is coordinating this system? What determines its direction, priorities and constraints? Who – or what – decides what the system should optimise for, and according to which definition of human flourishing? Here the analysis becomes significantly more uncomfortable, because unlike traditional industrial systems, the commodification ecosystem appears to possess no obvious centralised “evil decider.” And yet the outcomes it produces remain remarkably coherent.

Perhaps the clearest illustration of this absence of meaningful Coordination is captured in one of Silicon Valley’s defining slogans. Mark Zuckerberg’s early injunction to “move fast and break things” has often been celebrated as shorthand for entrepreneurial energy, technological disruption and a willingness to challenge institutional inertia. Within software culture, the phrase carried a certain logic: imperfect systems could be rapidly iterated, bugs could be fixed later and experimentation was preferable to paralysis.

The problem, however, is that social-media platforms were never merely software systems.

The “things” being broken were not lines of code, obsolete business models or inefficient organisational structures. Increasingly, the things being broken were developmental systems: attention, identity formation, social trust, embodied selfhood, emotional resilience and the fragile psychological architectures through which young people become adults. In the case of girls and young women – the primary Interface of the commodification system described by India – the consequences have been especially visible. Systems optimised around visibility, comparison and performative identity formation do not simply entertain adolescents. They reshape the developmental conditions under which adolescence itself unfolds.

And yet the deeper problem may not be Zuckerberg specifically, nor even Silicon Valley culture in isolation. Rather, it is the emergence of extraordinarily powerful optimisation systems operating in the near absence of equally sophisticated civilisational coordination.

Modern technological systems increasingly possess astonishing Engines, Sensors and Transmission capabilities. They can measure engagement in real time, predict behavioural patterns, optimise recommendation pathways and continuously refine user interaction dynamics at planetary scale. But while the optimisation machinery evolved at extraordinary speed, the Coordinating mechanisms responsible for asking larger developmental and ethical questions evolved hardly at all.

In systems terms, we have built civilisations with near-perfect telemetry and increasingly weak telos.

Platforms know precisely what captures attention, stimulates comparison, intensifies emotional arousal and increases compulsive return behaviour. They can detect which images retain users longest, which insecurities generate the highest engagement and which forms of performative selfhood spread most effectively through networks. But

nowhere within the optimisation architecture does the system meaningfully ask whether the resulting outcomes produce antifragility, flourishing, stable identity formation or psychologically healthy adulthood.

This is not because the individuals involved are uniquely malicious. Indeed, one of the most uncomfortable conclusions arising from systems analysis is that no centralised conspiracy may be required at all. Systems evolve toward whatever variables they are capable of measuring and optimising. If the measurable variables are clicks, visibility, engagement, retention and monetizable behaviour, then the system will relentlessly evolve toward maximising those things. Human flourishing, dignity, resilience and developmental coherence are extraordinarily difficult to quantify and therefore largely absent from the optimisation process altogether.

The result is a civilisation increasingly capable of optimising human behaviour without possessing any coherent agreement about what human beings should ultimately become.

This is why attempts to solve the problem frequently feel inadequate. Much contemporary discussion focuses on content moderation, screen-time limits, online safety protocols or representational fairness. While not unimportant, such interventions leave the underlying architecture largely untouched. The Engine still optimises engagement. The Sensors still reward visibility and comparison. The Transmission pathways still propagate performative identity norms. And the Tool continues to transform identity into marketable performance.

Which raises the far more difficult question: what would a genuinely coordinated developmental system actually look like?

At minimum, it would require redesigning systems around developmental outcomes rather than engagement metrics alone. It would involve fundamentally different Sensors – measuring not merely participation and retention, but indicators connected to flourishing, resilience, emotional stability, social trust and long-term wellbeing. It would require reintroducing friction into systems currently optimised for frictionless amplification; rebuilding protected spaces for identity formation outside conditions of perpetual visibility; and restoring developmental boundaries between private experimentation and public performance.

It would also require a profound cultural shift in our understanding of status and success. The current ecosystem rewards visibility, optimisation and performative selfhood. A healthier system would likely reward competence, contribution, authenticity, local community integration and the gradual formation of stable identity independent of algorithmic validation. In effect, the challenge is not simply technological reform, but the construction of an alternative developmental ecosystem.

This becomes especially relevant when viewed through the Strauss–Howe generational lens. Young adult “Artist” generations are historically associated with sensitivity, caution, emotional attunement and heightened awareness of social fragility. Generation Z increasingly exhibits many of these characteristics, but under conditions of unprecedented digital saturation and institutional over-nurturing. The danger is that sensitivity without antifragility can easily become anxiety, dependency and identity diffusion. Developmental systems designed to eliminate all discomfort often unintentionally reduce the very resilience required for adulthood.

Which may ultimately be the central lesson emerging from both India’s work and the wider Gen Z crisis. The problem is not technology per se, nor even social media in isolation. The problem is what happens when civilisation-scale optimisation Sensor systems emerge

faster than civilisation-scale Coordination systems capable of guiding them toward human flourishing. Until that imbalance is addressed, we should perhaps not be surprised that systems built to optimise engagement continue to produce increasingly optimised forms of anxiety, comparison and commodified identity.

Each Artist generation, of course, gets suffocated in its own unique way. The current over-nurtured, under-protected Artists look to have had their own version of a Crisis period perfect-storm. The ways out of the storm, however, remain historically consistent at the principle level.

Biology – Tailorbird (Orthotomus sutorius)

The Bird That Invented Sewing. If you were asked to design a safe, enclosed nursery using nothing but a handful of leaves, your first instinct would probably be to look for something better. Something curved. Something rigid. Something that already looks like a nest. The Tailorbird takes a different approach.

Found across South and Southeast Asia, tailorbirds are small, restless creatures – typically around 10–14 cm long – with a distinctive upright tail and a surprisingly loud, insistent call for their size. They live in gardens, forests, and scrubland, rarely staying still for long. At first glance, there is nothing especially remarkable about them. Until you see the nest.

Like all birds, the tailorbird faces a fundamental challenge: eggs need a safe, enclosed, protected space that is stable, concealed, and secure from predators. Many birds solve this by finding ready-made structures – tree cavities, rock crevices – or by building robust nests from twigs, mud, or other materials. But the tailorbird operates in environments where such options are limited or suboptimal. Instead, it typically has access to:

- Broad, flat leaves
- Flexible plant fibres
- Minimal structural support

Which leads to a powerful contradiction: How do you create a strong, enclosed, three-dimensional structure using weak, flat, two-dimensional materials?

The answer is both simple and extraordinary. The tailorbird selects one or more large leaves and begins to pierce tiny holes along their edges. It then uses plant fibres, spider silk, or fine strands of vegetation as thread, pulling the leaves together and effectively stitching them into a curved form.

The result is a cradle-like structure, sometimes a single folded leaf, sometimes multiple leaves drawn together, within which the bird builds a softer inner nest.
In effect, the bird has taken flat surfaces and transformed them into a three-dimensional enclosure. It hasn't found a structure. It has made one.

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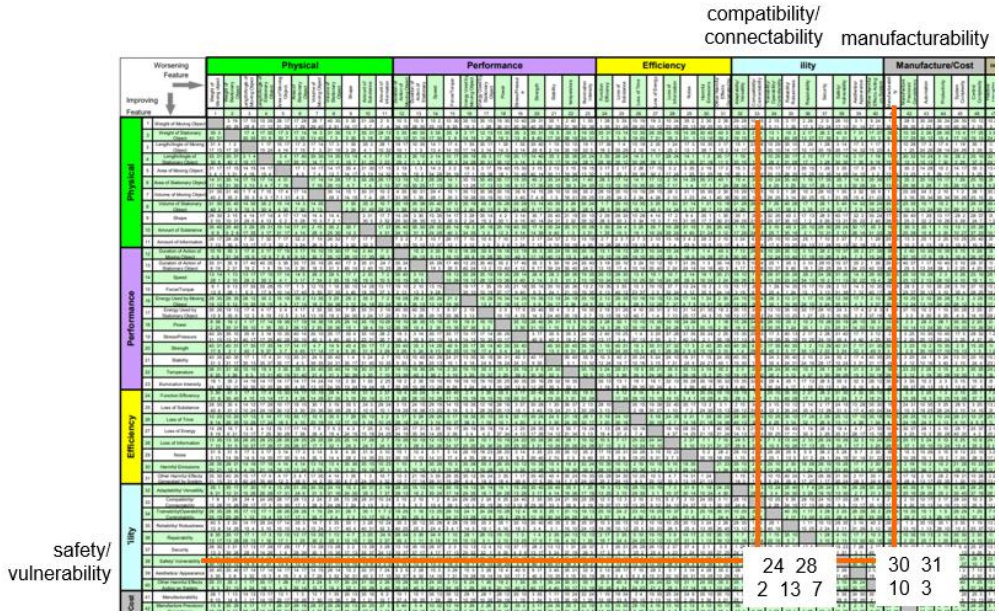
From a TRIZ standpoint, this is a beautifully clean example of contradiction solving. Here's what that contradiction looks like when mapped onto the Contradiction Matrix:



Rather than introducing new materials or constructing a rigid framework, the tailorbird works with what is available and applies a set of elegant principles:

- **Principle 30, Flexible Shells/Thin Films**: forming leaves into a single functional structure
- **Principle 3, Local Quality**: modifying only the edges of the leaves, preserving their overall integrity
- **Principle 31, Holes**: piercing the leaves without compromising strength
- **Principle 24, Intermediary**: stitching the two edges of the leaf together with plant fibres, spider silk, or fine strands of vegetation

But the deeper move is more subtle. The bird doesn't solve the problem by *building a nest on the leaves*. It solves it by turning the leaves into the nest.

What makes this solution particularly powerful is its efficiency.

- No heavy materials
- No large energy investment
- No reliance on rare resources

Instead, the tailorbird uses:

- Existing leaves (structure)
- Natural fibres (binding)
- Minimal intervention (just enough modification to change form)

This is TRIZ Ideality in action: Maximum function, minimum added resource.

Most solutions – human or natural – tend to follow a familiar pattern: if the environment doesn't provide what you need, you add something new. The tailorbird does the opposite. It asks a different question: *What if the materials I already have could become what I need?* This is a profound shift. Instead of searching for a curved structure, it creates curvature. Instead of building complexity, it reconfigures simplicity.

At its heart, the tailorbird's strategy can be summarised in a single line: don't build the thing you need, reshape what you already have into it. Or, more provocatively: when nature needed a curved, protective structure but only had flat leaves, it invented sewing.

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This pattern shows up far beyond nature. In engineering, architecture, and organisational design, some of the most effective solutions come not from adding new layers, but from rearranging existing ones:

- Turning constraints into structure
- Transforming limitations into capabilities
- Using what is already present in a different way

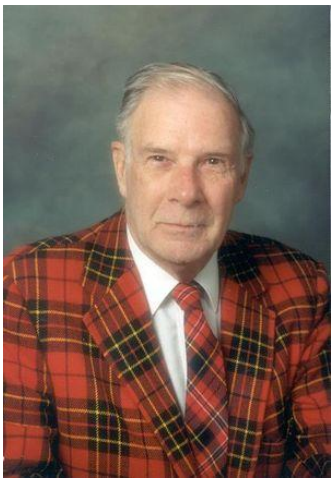
The tailorbird reminds us that innovation is not always about invention. Sometimes, it's about overcoming psychological inertia and seeing familiar things differently.

Faced with a lack of suitable materials, most systems would compromise – build something weaker, or search longer for something better. The tailorbird chooses neither. It takes the world as it finds it and, with a few precise interventions, turns it into exactly what it needs.

Everything works. Nothing works. Until you change the shape of the problem.

Check out the tailorbird in nest-building action here (excuse the robotic commentary… or better yet, turn the sound off): https://www.youtube.com/watch?v=zGqCxZMb6_M

Short Thort



Richard Hamming spent decades at Bell Labs surrounded by some of the brightest scientists of his generation. What fascinated him wasn't why some people were smart and others weren't. They were all smart. They were all hardworking. They all had access to the same resources. Yet some changed entire fields while others faded into obscurity.

Hamming believed the difference came down to a question most people avoid asking:

"What are the most important problems in my field, and why am I not working on one of them?"

Every Friday afternoon he set aside time to think about exactly that. No meetings. No emails. No busy work. Just an honest assessment of whether his efforts were directed at work that truly mattered.

The problem, he discovered, isn't identifying the important problems. Most people already know what they are. The problem is confronting the gap between what we know is important and what we actually spend our time doing. As Hamming famously observed: "If you do not work on an important problem, it is unlikely you will do important work."

Being busy is easy. Working on what matters most is much harder. The reason almost nobody does this ritual is because the honest answer is unbearable. The thing is that if you sit down on a Friday afternoon and say out loud that you are not working on the most important problem in your field, now you have to do something about it.

News

TRIZ Mastery Hub
It looks like Darrell will be back for a couple more TRIZ Mastery Hub Monday sessions before the end of the year. One will be another attempt to convince people that the long-ignored Design Methodology Trend is the key to successful AI deployment. At the moment, it is called, ‘The Reliability Paradox: Building 99.99999999% systems from 99% humans’. The second is a follow-on to his contribution for this year’s International TRIZ Conference, currently titled, ‘Homo Architectus: From unconscious evolution to intentional design of possible futures’. The two dates are 14 December and 25 January. Not necessarily in that order.

Entrepreneurship in Music and Music Production
Darrell's 2025 paper, 'New Beginnings: CBGBs, Suffering & Sur/Logic', initially presented at the Innovation In Music conference has found a new home as a chapter in the latest Routledge 'Entrepreneurship in Music' book. Publication is expected at the end of 2026. Hmm. Just in time for Christmas.

TRIZ (Failure) Case Studies Workshop
The lead article in this month's ezine is a further hint about what to expect from Darrell's new Failure Case Studies workshop. The workshop joining instructions are now live at the usual page in the SI online shop. As suggested last month, the dates are now confirmed as 7 and 14 October.

FutureProof Workshop
Speaking of workshops, we're offering up an 8-hour version of the FutureProof workshop. Getting people to take 16 hours out of their already crammed weeks no longer works, so we're scheduling a new, compressed version. The first 4 hours to take place on 3 November, and the second 4 hours on the 10th.

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

Government – Innovation Support System Hackathons
Automotive – TRIZ/SI Workshops
Consulting – Breakthrough-Proposals Workshops
FMCG – Compass Project
FMCG – Investment Appraisal Project
Commodities – Breakthrough Value Project
HVAC - Business Resilience Project
NGO – Sponsor Engagement Project
Communications – AI Embodiment Project
Conglomerate – Intrapreneur Hackathons