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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Our guarantee to the subscriber is that the material featured in the e-zine will not be published elsewhere for a period of at least 6 months after a new issue is released.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.
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From StrengthsFinder to FutureFinder: Redefining Human Value in the Age of AI

When Tom Rath published StrengthsFinder 2.0 in 2007, it marked a turning point in how individuals and organisations approached personal development. Building on decades of Gallup research into human talent, the book offered readers a simple yet profound idea: focus on developing your natural strengths rather than obsessing over fixing weaknesses. Accompanied by an online assessment that identified a person's top talent themes, StrengthsFinder 2.0 struck a chord with business leaders, HR professionals, and career coaches alike.

The impact has been staggering. For years, the book has held its place as one of Amazon's all-time bestsellers—frequently topping lists in business, leadership, and personal development—and the StrengthsFinder language has become woven into the fabric of modern workplace culture. Today, "What are your strengths?" is as common a question in performance reviews and leadership programs as "What are your goals?" Once a niche tool for talent development, Rath's framework has become a standard part of the global business lexicon.

The world of work that StrengthsFinder 2.0 (now *CliftonStrengths*) helped shape is now undergoing another seismic shift. The rapid rise of generative AI is changing not only the tasks we perform, but also the very definition of what it means to add value as a human. Just as Rath's framework encouraged us to double down on our innate talents in an era of knowledge work, we now face a new challenge: identifying and cultivating the uniquely human strengths that will matter most when intelligent machines can already replicate – or even surpass – many of our technical and analytical abilities.

Here's a breakdown of which of the strengths Rath identified may become less relevant, more automatable, or need redefinition in an AI-dominated world—and why.

Strengths Potentially Less Relevant (or in Need of Redefinition):

Theme	Why It May Be Less Relevant
Input	AI excels at storing, organizing, and retrieving vast amounts of information instantly. Input used to be about "collecting and archiving useful knowledge." That's now a commodity.
Learner	Rapid AI-driven learning systems reduce the value of human learning *for learning's sake*. Curiosity remains critical, but the process of accumulation of learned knowledge will shift toward AI. 'Lifelong learning' is often taken as a given in today's world, the shift generative AI necessitates is one from learning answers to learning how to ask better question.
Context	AI can process historical data, patterns, and timelines faster and more thoroughly than humans. Contextual awareness still matters—but mostly in the synthesis and framing, not retrieval.
Analytical	Traditional logical analysis is increasingly being done faster and more accurately by machines. Humans will need to focus more on *why* and *what if*, not just *what*.

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Theme	Why It May Be Less Relevant
Deliberative	Caution, risk assessment, and slow decision-making are things AI can often outperform humans in—especially in data-heavy environments. However, *ethical deliberation* may still be very human.
Discipline	Routine, structure, and order are increasingly managed by automated systems. Humans may still need to implement and oversee—but AI will likely become the primary tool here.

Strengths Still Critical—But May Be Augmented by AI:

Theme	Note
Achiever	AI may help streamline tasks, but *intrinsic drive* to accomplish will still differentiate leaders and creators.
Strategic	AI can surface options, but choosing the *right* path still needs human judgment—especially in uncertain moral terrain.
Focus	AI can help manage distractions and logistics, but *sustained attention* is still very human (and increasingly rare).
Arranger	Coordination of resources will be co-managed with AI, but human oversight is essential when values, trust, and relationships are involved.
Restorative	AI helps solve known problems quickly, but humans still need to tackle *emergent*, ill-defined, or value-laden issues.

Strengths Likely to Become More Valuable in the AI Age:

Theme	Why It's Increasingly Crucial
Empathy	Cannot be fully replicated by AI. Emotional resonance and human connection remain core needs.
Developer	Cultivating others' growth is increasingly about meaning, identity, and purpose—not just skills.
Connectedness	Seeing systems, relationships, and holistic meaning is a meta-strength AI lacks.
Ideation	AI can remix ideas, but *truly novel*, cross-domain insight is still a human superpower.
Intellection	Deep thinking about abstract and philosophical questions remains uniquely human, especially in ethics and meaning.
Harmony	Mediating between emotional and ethical perspectives in conflict is a deep relational skill.
Adaptability	In chaos and ambiguity, this remains crucial. AI likes pattern—humans thrive in irregularity.

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Theme	Why It's Increasingly Crucial
Individualization	AI can personalize, but the nuance of real human uniqueness and complexity is still best read by humans.
Woo	Winning over others—especially in emotionally charged or symbolic ways—is hard to automate.

As AI reshapes what is easy, cheap, and scalable, your irreplaceable value lies in what is hard, deep, and human. That means:
- Emotional intelligence
- Ethical reasoning
- Creativity and synthesis
- Systems-level pattern recognition
- Relationship-building and persuasion

Tom Rath's strengths *don't become obsolete*, but some shift from being advantages to baselines. Others, particularly the human, emotional, and integrative ones, become **superpowers** in a world of synthetic intelligence.

Here are the new or missing strengths that, according to our thinking, belong in a 21st-century strengths framework:

1. Contradiction Navigation
- *What it is*: The ability to hold opposing truths and see the value in both without defaulting to compromise.
- *Why it matters*: In a polarized world full of moral complexity, this is key to innovation, mediation, and ethical progress.
- *Related to*: Dialectical thinking, TRIZ, paradox mindset.

2. Cognitive Flexibility
- *What it is*: The ability to shift mental models, change perspective fluidly, and adapt to new contexts or information.
- *Why it matters*: It's the antidote to ideological rigidity and a survival trait in an AI-mediated, rapidly shifting world.
- *Related to*: Gravesian Yellow, Holarchy thinking, complexity awareness.

3. Sensemaking
- *What it is*: The capacity to interpret messy, ambiguous situations and construct meaning where there's little clarity.
- *Why it matters*: Leaders increasingly face fog-of-war conditions where data alone won't help.
- *Related to*: Dave Snowden's Cynefin framework, systems thinking, Perception Mapping, Complexity Landscape Map.

4. Ethical Meta-cognition
- *What it is*: Reflecting on your own ethical reasoning processes and recognizing moral blind spots.
- *Why it matters*: Essential in a world where decisions increasingly affect not just others but whole systems and future generations.
- *Related to*: Moral maturity, metacognition, ethical design… our impending 'Solving Ethical Contradictions' book.

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5. Pattern Transposition
- *What it is*: The ability to take a solution or structure from one field and reapply it in a completely different one.
- *Why it matters*: AI still struggles with analogical thinking at the level of deep abstraction.
- *Related to*: Lateral thinking, biomimicry, TRIZ Principle 13 (The Other Way Round).

6. Resonant Courage
- *What it is*: The ability to take principled, uncomfortable stances—and bring others with you.
- *Why it matters*: Ethical progress often requires moral leadership in opposition to the status quo.
- *Related to*: Moral entrepreneurship, whistleblowing, psychological safety creation.

7. Regenerative Thinking
- *What it is*: Seeing opportunities to design systems that heal and restore rather than extract and exhaust.
- *Why it matters*: The shift from sustainability to regeneration is a hallmark of advanced systems-level thinking.
- *Related to*: Permaculture, circular design, eco-literacy ecosystem innovation.

8. Trust Architecture
- *What it is*: The ability to design social and institutional systems that build, maintain, and restore trust.
- *Why it matters*: Trust is breaking down—restoring it requires active design, not just good intentions.
- *Related to*: Institutional design, transparency frameworks, ethics of care.

9. Narrative Weaving
- *What it is*: Synthesizing diverse perspectives into coherent, compelling, and inclusive stories.
- *Why it matters*: In a fragmented media and belief landscape, story is the only bridge.
- *Related to*: Collective sensemaking, myth-making, storytelling, conflict transformation, unlearning redundant narratives.

10. Antenna Sensitivity
- *What it is*: The intuitive, embodied ability to detect weak signals and unspoken tensions within systems.
- *Why it matters*: In chaotic systems, noticing the early tremors is more valuable than reacting to the earthquake.
- *Related to*: Systems intuition, emotional radar, design foresight, measuring what's important rather than expedient, measurement dynamics.

11. Epistemic Humility
- *What it is*: recognition that our knowledge is always partial, provisional, and open to revision. Epistemic humility doesn't mean doubting everything; it means holding our beliefs lightly enough to adapt when new evidence, perspectives, or contexts arise. It's an intellectual posture that balances confidence in what we know with curiosity about what we might be missing.

- *Why it matters*: Generative AI tools can produce outputs that appear authoritative but may be wrong, incomplete, or biased. If humans cling rigidly to our assumptions—or to AI's answers—we risk amplifying errors at scale. Epistemic humility allows us to question, cross-check, and integrate diverse sources before acting. It keeps decision-making flexible in a landscape where knowledge is expanding (and shifting) faster than ever.
- *Related to*: Critical thinking – questioning the validity of information and arguments; Cognitive flexibility – adapting to new data or viewpoints; Collaboration – respecting others' expertise and lived experience.

12. Boundary-Spanning/Interoperability
- *What it is*: The ability to operate across disciplines, cultures, systems, and perspectives—connecting ideas, people, and resources that usually sit in separate silos. Boundary-spanning doesn't mean being a shallow generalist; it means being able to "speak multiple languages" (literal or metaphorical) well enough to foster understanding and create value at intersections.
- *Why it matters*: AI thrives in domains with clean, bounded data and clear rules—but many of today's most urgent challenges are complex, cross-sector, and messy. The big breakthroughs often happen when insights from one field are applied to another, or when diverse teams tackle problems together. Boundary-spanners are the human glue and translators who can make these connections work in practice.
- *Related to*: Systems thinking – understanding how parts interrelate within a whole; interdisciplinary literacy – grasping core concepts from multiple domains; Cultural competence – bridging communication across different backgrounds.

13. Meta-Learning
- *What it is*: The skill of learning how to learn – quickly, effectively, and in a self-directed way. Meta-learners understand their own cognitive processes, can choose the right learning strategies for the situation, and can unlearn outdated methods or knowledge when needed.
- *Why it matters*: The shelf life of skills is shrinking dramatically. As AI changes the nature of work, the ability to pick up new tools, adapt workflows, and master unfamiliar domains becomes a core competitive advantage. Meta-learners can pivot faster than their peers because they aren't just learning content, they're improving the process of acquiring and applying knowledge.
- *Related to*: adaptability – adjusting to new conditions with minimal friction; self-regulation – managing motivation, focus, and persistence; growth mindset – believing abilities can be developed through effort.

14. Attractor Design
- *What it is*: The ability to create environments, narratives, products, or experiences that naturally draw people, ideas, and resources toward a shared goal. In complexity science, an "attractor" is a force or pattern that shapes how systems evolve over time. In human terms, it's about intentionally designing conditions that pull rather than push—where people feel inspired, compelled, or curious to engage without needing heavy-handed enforcement or persuasion.
- *Why it matters*: When AI accelerates the pace of change, alignment and participation can't always be mandated from the top down. Teams and communities need focal points – shared visions, compelling challenges, or mutually beneficial platforms – that people want to contribute to. Attractor design enables leaders,

innovators, and community-builders to channel energy and creativity toward meaningful outcomes. In a digital ecosystem increasingly influenced by algorithms, well-crafted attractors also help cut through noise and foster authentic engagement.
- *Related to*: narrative framing – crafting stories that clarify purpose and invite action; experience design – shaping environments where participation feels rewarding; community building – cultivating shared identity and belonging; strategic foresight – anticipating patterns and designing for emergent behaviour.

15. Systems Literacy
- *What it is*: The ability to identify and model interconnections, feedback loops, and emergent outcomes in complex systems.
- *Why it matters*: Without it, we mistake symptoms for causes, and interventions make things worse.
- *Related to*: Donella Meadows, Peter Senge, Barry Oshry, Stafford Beer's Viable System Model, panarchy, TRIZ Law O System Completeness, STABLE frameworks.
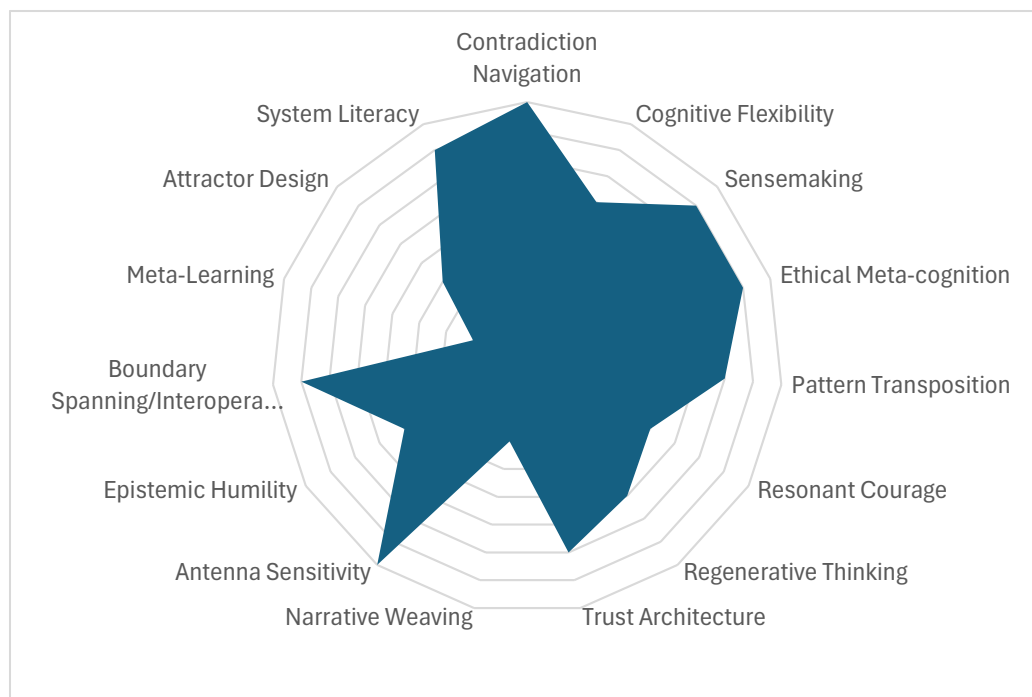
With that fifteenth new Strength in mind, there is value in evolving StrengthsFinder from a shopping-list of strengths to a system of strengths. A System with a clear layered structure that reflects the complexity and interconnectedness of the world we're moving into. Here's what we think that looks like:

The System of Strengths for a Post-AI Era

The proposed system is structured across three levels:
1. Meta-Level Strengths (Ways of Thinking)
2. Transversal Strengths (Ways of Navigating)
3. Contextual Strengths (Ways of Acting)

This mirrors how individuals move through and influence complex systems: **see → adapt → do.**

1. META-LEVEL STRENGTHS (Ways of Thinking)

These are foundational capacities – lenses that shape perception and decision-making.

Strength	Description
Systems Literacy	Seeing feedback loops, unintended consequences, and patterns over time.
Contradiction Thinking	Ability to hold opposing truths and resolve them through synthesis.
Sensemaking	Turning ambiguity and uncertainty into structured understanding.
Meta-Learning	Learning how to learn, unlearn, and re-learn efficiently.
Epistemic Humility	Comfort with uncertainty, ambiguity, and provisional truths.

These shape how you see problems, design interventions, and decide what matters.

2. TRANSVERSAL STRENGTHS (Ways of Navigating)

These operate *between* domains — helping individuals shift perspectives, join dots, and catalyse coherence.

Strength	Description
Boundary Spanning	Moving fluidly across disciplines, cultures, and silos.
Interoperability	Making ideas, technologies, or people work together across domains.
Narrative Weaving	Making sense of the world by creating or surfacing meaningful stories.
Ethical Metacognition	Navigating moral pluralism while holding to higher-level coherence.
Perspective Shifting	Seeing issues through the lenses of different value systems and stakeholders.

These strengths help individuals operate effectively in messy, complex, human contexts.

3. CONTEXTUAL STRENGTHS (Ways of Acting)

These focus on *what you actually do* in response to situations, often enabled by the layers above.

Strength	Description
Regenerative Thinking	Designing actions that replenish social, environmental, and systemic vitality.
Human-AI	Knowing what to give to machines, what to hold back, and how to

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Strength	Description
Collaboration	work synergistically.
Pattern Transposition	Acting today with a deep sense of consequence for tomorrow.
Attractor Design	Creating conditions that invite others to move in constructive directions.
Pattern Stewardship	Identifying and sustaining the positive patterns that systems want to sustain.

These strengths turn awareness into action and help shape healthier futures.

(Bonus Layer: Integrator Strength)

Adaptive Coherence
The rare (but vital) ability to **reconcile the tensions between all three layers** — helping teams and organizations work across different time horizons, moral lenses, and knowledge systems without collapsing into dogma or incoherence.

Relationship to Traditional StrengthsFinder
Tom Rath's StrengthsFinder model focuses on individual talents (like Achiever, Input, Strategic, etc.), and while many remain useful, they tend to operate at the personal productivity or team-dynamic level, not the systemic level.
In contrast, this model is:
- Multi-layered
- Principle-agnostic (values can vary by system)
- Designed to stay relevant as AI absorbs more procedural and analytical functions

A key aim of this new model is not just to describe a better *individual skillset*, but to help people become "ethical integrators" and "post-crisis architects", those who can:
- Spot system traps
- Hold polarities
- Co-create viable paths forward
- Better know 'the right' questions to ask AI
- Better able to choose between options generated by AI

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Ethics And The Nolan Principles

The Nolan Principles, also known as the Seven Principles of Public Life, were established in the UK in 1995 by the Committee on Standards in Public Life, chaired by Lord Nolan following a series of scandals involving apparent abuses of power by a host of elected politicians. They are:

1. **Selflessness**
2. **Integrity**
3. **Objectivity**
4. **Accountability**
5. **Openness**
6. **Honesty**
7. **Leadership**

These principles are intended to guide the behaviour of public officials and those in positions of trust. Given the implied function '(good) behaviour in public life', the seven should by rights form a coherent system. Here's how we think they do that:
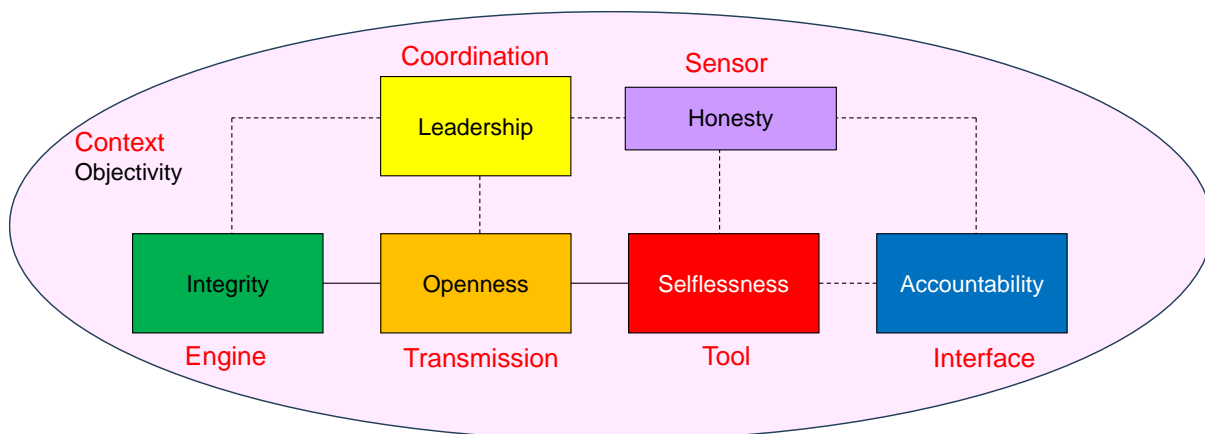
In terms of coherence, they collectively aim to foster trust, transparency, and ethical conduct in public life. And there's a logical flow from personal ethics (*selflessness*, *honesty*) to interpersonal behaviours (*objectivity*, *openness*) to structural expectations (*accountability*, *leadership*).

However, the principles are normative rather than procedural: they tell people what to be. As we also saw with the Universal Declaration of Human Rights (Reference 1), they specifically do not provide any mechanisms to help guide how to act in dilemmas or navigate tensions between principles.

Despite being broadly coherent, they can easily come into conflict in practice:
- **Selflessness vs. Accountability**: Doing the right thing might require ignoring public opinion or political pressure, which could be seen as evading accountability.
- **Openness vs. Leadership**: A leader may have to withhold sensitive information temporarily for strategic or security reasons, conflicting with openness.
- **Objectivity vs. Integrity**: Maintaining strict neutrality (objectivity) may sometimes conflict with a deeply held ethical stance (integrity).

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Here's a summary of each of the Nolan Principles and the likely conflicts with other Principles:

	Selflessness	Integrity	Objectivity	Accountability	Openness	Honesty	Leadership
Selflessness	—	⚠	⚠	⚠	⚠	✅	⚠
Integrity		—	⚠	✅	⚠	✅	✅
Objectivity			—	✅	⚠	⚠	⚠
Accountability				—	✅	✅	⚠
Openness					—	⚠	⚠
Honesty						—	✅
Leadership							—

Legend:
- ✅ : Generally synergistic
- ⚠: Potential contradiction or tension

These potential moral conflicts suggest the system isn't entirely self-resolving and lacks mechanisms for resolving contradictions.

In practice, their viability often depends on:
- Whether organisations embed them in **enforceable codes of conduct**
- Whether there are **mechanisms for arbitration** when values conflict
- Whether **leadership models** and cultures embody them beyond lip service

Viewed through a systems-thinking or TRIZ lens:
- In practice, the Nolan Principles act like system constraints or design values, but not like a functionally complete operating system.
- To form a **truly viable ethical system**, they would benefit from:
  - Contradiction-resolution methods (e.g. weighted decision matrices or moral reasoning frameworks)
  - Feedback mechanisms (e.g. institutional transparency audits)
  - A diagnostic tool to assess individual or group alignment
  - As a moral compass, they are strong, but as a decision-making system, they are incomplete without augmentation.

Here's an attempt to map the Nolan Principles onto the moral and ethical taxonomy as previously discussed in our STABLE ethical contradiction story (Reference 2) – soon to become the foundation of the book, Solving Ethical Contradictions:

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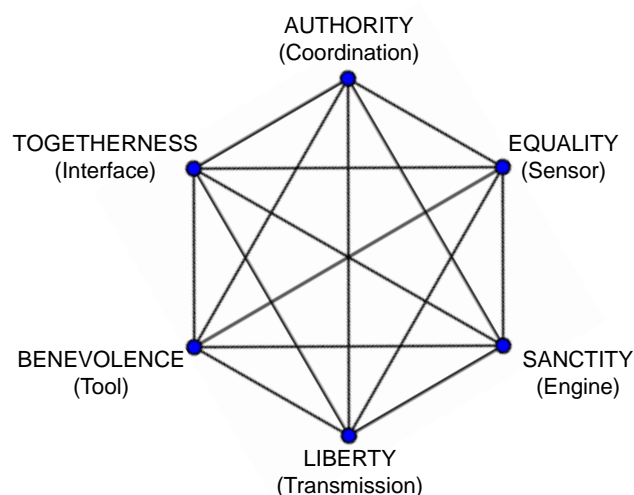
Nolan Principle	Primary STABLE Dimension	Rationale
Selflessness	Benevolence	Focuses on acting for others' benefit, even at personal cost. Anchored in compassion and concern for collective welfare.
Integrity	Sanctity	Integrity is about moral wholeness, incorruptibility, and adherence to personal/professional ethical codes — a kind of internal "purity."
Objectivity	-	Strives to treat all parties fairly and without bias — seeing all sides equally and resisting favouritism.
Accountability	Togetherness	Upholds hierarchical responsibility and answerability. Authority is respected when individuals own their actions and outcomes.
Openness	Liberty	Promotes transparency and autonomy of thought, enabling others to make informed, independent decisions.
Honesty	Equality	Honesty is to feedback loops what Equality is to justice: a sensor that enables systemic correction.
Leadership	Authority	Leadership assumes the mantle of responsibility in social or organisational structures (Authority).

A few points are worth noting regarding this comparison:

Honesty as a Feedback-Enabler
- Honesty is the act of revealing the true state of the system, be it about a process, outcome, intention, or mistake.
- In a dynamic, complex system (such as a government, organisation, or team), this "truth signal" is the **only reliable sensor** available for detecting deviation from desired outcomes.
- Without honesty, the error signal in a feedback loop is suppressed or distorted, and adaptation fails.

In any effective control system, sensors must be accurate, transparent, and timely. That's what honesty provides in human systems.

Equality as a Functional Parallel
- Equality, particularly in the STABLE model, is not just a moral foundation, it's also an epistemic principle: that all voices, experiences, and **truths** matter equally.
- Functionally, equality ensures that no voice is suppressed and no data is excluded. It's what makes the whole system "observable."
- In innovation, justice, or governance, you can't correct what you can't hear — and equality ensures we hear from all corners of the system.

If honesty is suppressed or selective (e.g. whistleblowers ignored, data hidden), equality collapses, and the system becomes non-adaptive – it loses homeostasis and drifts into entropy, bureaucracy, or authoritarianism.

This also ties in with moral evolution: cultures that elevate both honesty and equality create stronger, faster feedback loops and thus adapt better in turbulent environments.

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There's a deep systems argument that Honesty ≈ Equality, because both:

- Ensure full-spectrum sensing in complex systems.
- Prevent censorship or distortion of truth.
- Enable moral and organisational feedback loops to function.
- Support resilience and antifragility by making error detection possible.

So, where is this taking us?

There are seven Nolan Principles and six elements in the STABLE model. The 'missing' element in STABLE that is 'Objectivity', which represents the context surrounding the actual system rather than the functioning parts of the system itself.

In one sense, the Nolan Principles can be seen to be 'more complete' than the STABLE structure we elected to use in the Solving Ethical Contradictions book.

The reason we didn't include it is that, when it comes to morality and ethics, we need the context to be 'everything' – society as a whole, or 'humanity' or 'Gaia' or 'Earth'. However we define it, if it really is intended to mean 'everything' there's very little value added by including it as part of the system.

Objectivity is a subset of such a whole.

Moreover, we would argue that it is a potentially dangerous subset. That's not to say that objectivity is bad, rather that it is 'necessary but insufficient. Potentially dangerously insufficient in that, per all the discussion we've been having over the last few years around the meaning of 'truth' (Reference 3 makes for a good start point if you've not been keeping up) and the need to re-unite the 'subjective truth' domain of the humanities and the 'objective reality' of the sciences. To paraphrase the Idris Shah quote that started us on the whole mythos/logos journey, ''if good behaviour in public life is considered to be dependent on the production of (objective) proof, we only have one half of knowledge, and we are surely lost.'
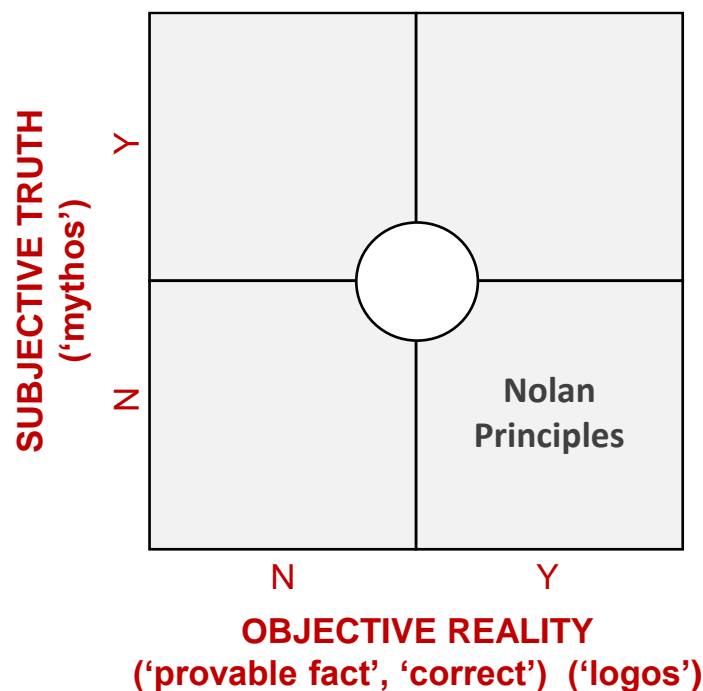
The Nolan Principles in this sense have configured themselves – like the whole of the generative AI world – around half the necessary story. Don't get me wrong, I'd rather have

a government guided by the Nolan Principles than not. But that said, where we end up, when we have Principles blind to half the story, humanity-wise, where it takes us is a world governed by 'computer says no' ethos, black-and-white lines between 'good' and 'bad' behaviour. A world, in other words, that is destined to fail in the way that all previous fractional-truth civilisations have failed.

The average lifespan of which, as noted in the graphic tagline, is around 336 years (Reference 4). And the further they allow themselves to deviate away from the top right hand corner of the True/Correct 2x2 matrix, the shorter their duration.
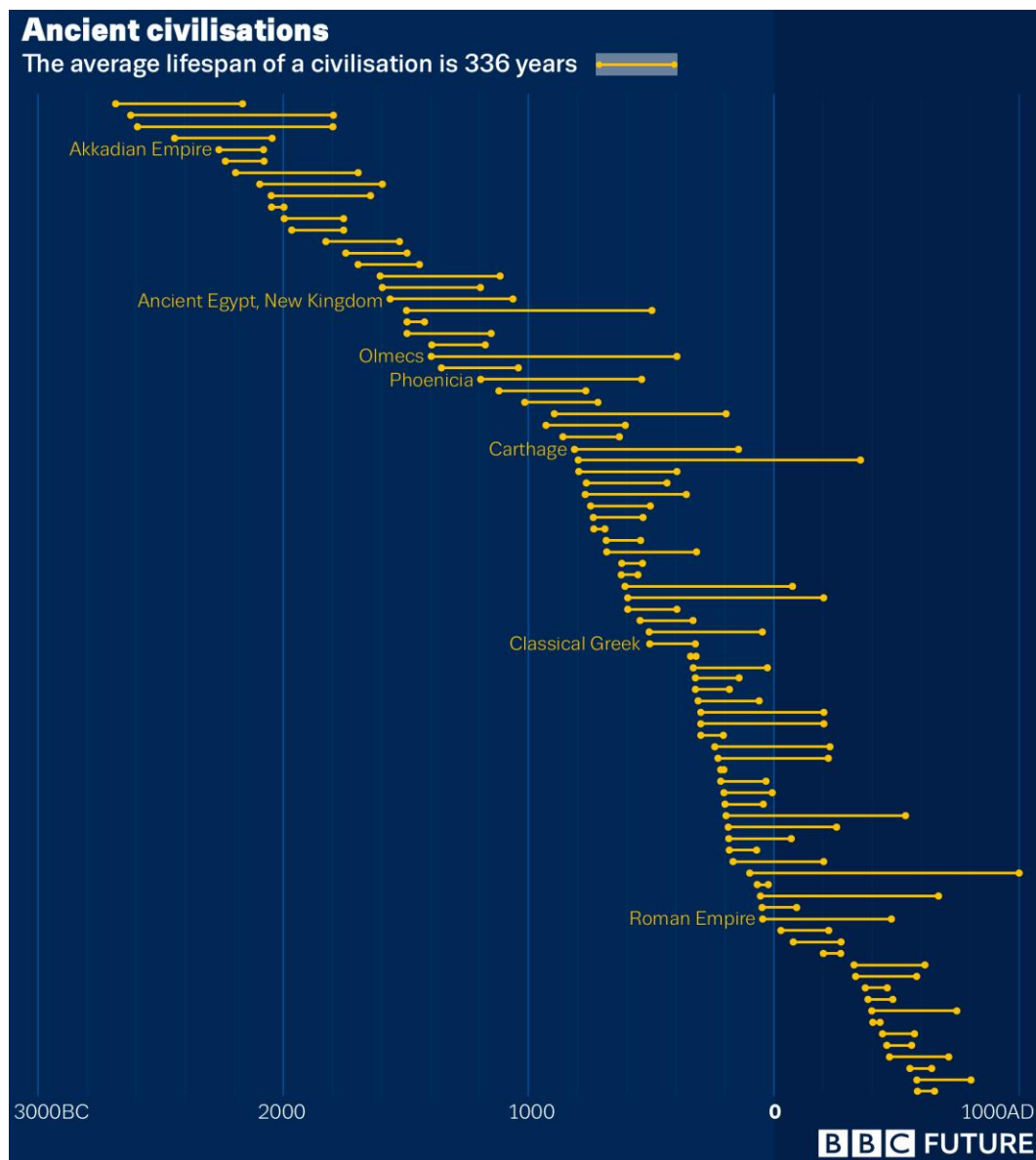
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3) Mann, D.L., 'TRIZ, Truth & AI', paper presented at the European TRIZ Association 2023 online conference.
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Not So Funny – Unnovation #335: Purple Parking

Go back twenty-five years or so and my life made a fairly stark step-change. A lot less time spent sitting in offices, a lot more sitting on aeroplanes to get to offices in different countries. One year, even though it doesn't sound physically possible, I flew a million miles. I averaged 250 nights a year in hotels or laying across empty rows of Economy Class seats on long distance flights. I calculated my average altitude and velocity. My car spent more time in airport car parks than it did at home. I got to know some of the staff at those car-parks. They were never less than nice to me.

When the step-change was happening, I did a little bit of experimenting to try and find the perfect parking solution. That didn't take long: there wasn't one. The airport I used most was Heathrow (one day, I'm expecting to have a bench named after me in a quiet corner of Terminal 3. Maybe 5.) Back in 2001, Heathrow forced drivers into a clear contradiction – park cheaply, several miles off-airport, or park very expensively, near to the Terminal buildings. Even though it was almost never my money, that usually meant I opted for option 1. That's the Yorkshire long-arms-short-pockets DNA for you. Better to arrive an hour early than have to justify to clients why parking the car cost more than the flight.

Then along comes Purple Parking. The answer to the weary business traveller's prayers. Kind of. Parking was still very definitely off-airport, but now, rather than having to wait until the parking company filled a 60-seater coach with passengers before it set off for the airport, Purple Parking introduced the concept of 'mini-bus'. Twelve-seater buses that meant a lot less time wasted waiting for the bus to fill. And there were lots of them, so, some days it felt like you didn't stop walking from locking the car to handing over the keys to stepping on the mini-bus to joining the check-in queue. It wasn't quite pleasurable, but it was a boon for getting a few extra minutes in bed before leaving home. Compared to the competition, this felt like actual innovation. Mini-buses. Who wudda thunk it?

Over the next few years, as if to prove that the mini-buses were an actual innovation, Purple Parking grew. They bought more mini-buses. And more land to park more cars on.

They were climbing the s-curve.

Eventually, the grew big enough to take over one of their competitors. They had even more land to park cars on. They bought more mini-buses.

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The roads around Heathrow – and increasingly, Gatwick and other 'London' airports – had turned purple. Some trips it felt like there were more purple mini-buses than London buses and black-cabs combined.

Purple Parking had turned into a cash cow.

They took over another competitor.

And then another.

Then, Rule Of Three time, there were no more competitors to buy, and Purple Parking were the biggest game in town.

Knowing what happens when this happens, I figured that, because the bosses had innovated once, they might do it again.

The growth s-curve, as it is inclined to do, started to plateau.

The waiting time for the mini-buses started to creep up.

And then the prices started creeping up.

Growth. Growth at any cost.

Then, one day, I got back from a long sleepless night flying over the Atlantic, landed at too-early-o'clock, waited almost an hour for a minibus and, when we got to the car-park, I was handed the wrong set of car keys. For a tiny fraction of a second I looked at the keys and thought to myself, 'I'm really tired, and that car sounds a lot more luxurious and comfortable than mine. But then the thought of all the downstream hassles kicked in and I told the service agent, these weren't my keys. My honesty was rewarded with another half hour wait while they tried to work out how the system had gone wrong.

I could've told them the answer by this stage. They had too many new staff and not enough training.

They knew already. And, bless them, the management finally set about putting their innovation hats on again.

I, meanwhile, thought maybe I'd explore their somewhat meagre competition. Perhaps, naively I also thought that, seeing how much money I was giving them, they might notice I'd gone and start wooing me back again. I wasn't expecting chocolates and roses or anything like that. A one -time 5% discount might've done the trick.

Anyway, the meagre competition turned out to be not so meagre. Meaning, they never lost my car keys. Amazing how conditioned we become to mediocrity. Out went the extra time in bed, in came leave-a-little-earlier-than-usual-because-you can-never-quite-trust-the-transfer-time-to the airport.

Then, gradually worn down a little further, next time I'm booking, I think, maybe I should see if Purple Parking have solved their contradiction yet. I booked.

I arrived at the drop-off point and handed over my keys.

'The bus is over there', the receptionist told me.
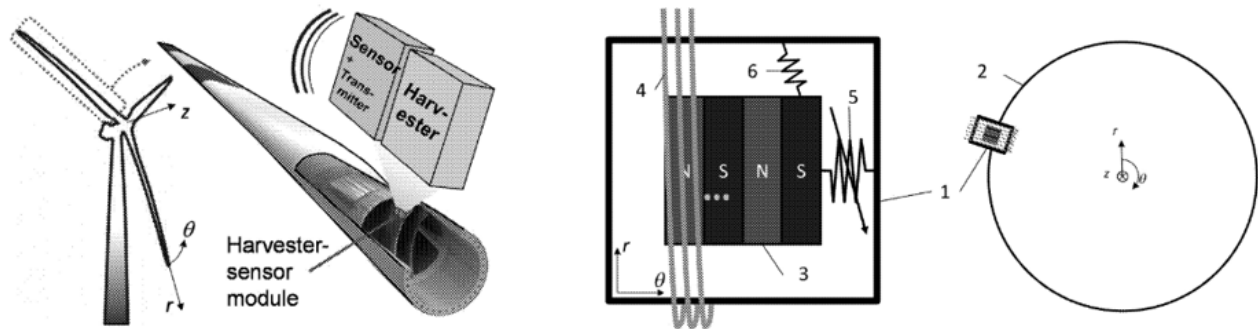
I looked over.

All the mini-buses had gone.

And there, in their place, was a solitary, newly re-painted, 60-seater bus…

…the unnovation carousel had turned full circle. We were now back where we started. Only with purple buses.

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Patent of the Month – Harvesting Vibration Energy

Our Patent of the Month this month takes us to an inventor at the University Of Maryland in the US. US12,378,953 was granted on August 5. Here's what the inventor has to say about the problem needing to be solved:

Wind power has become the world's fastest growing renewable energy source. The worldwide wind power capacity now exceeds 120 GW. The US targets 20% wind-based electricity generation by 2030 and 25% of electricity generation by wind is envisioned in the European Union by 2020. Reducing the operation and maintenance (O&M) cost of wind turbines becomes a critical issue to make wind power competitive with conventional energy sources. Wind turbines are hard-to-access structures, especially when they are remotely located (e.g., offshore), and this factor alone contributes to the high O&M cost. Also, the inspection labor is very costly because it is performed at high risk, greatly depends on the proficiency of the technician, and requires a huge crane. Most of the blades are currently inspected manually using a "tapping test"; the technician hammers blades lightly and hears the responding sound from them. Manual inspection requires turbine downtime which causes major economic loss. For a turbine with over 20 years of operating life, the estimated O&M is 10-15% of the total wind farm income and it increases more than 25% for offshore wind turbines. Many researchers have actively pursued remote monitoring using wireless sensors, which has great potential to reduce the O&M cost. However, the power sustainability of wireless sensors has been an important issue because the sensors are powered by disposable batteries that require regular replacement. The extreme danger of battery replacement labor in a remote location results in high maintenance costs ($80-500 per one sensor's battery replacement). Moreover, it is almost impossible to access the inside of a wind turbine blade to replace battery.

Vibrational energy harvesting, a previous solution for a sustainable power supply, is problematic because it is too difficult to use random vibration in wind turbines. Commercial harvesters usually generate useful power only at their resonance frequency. Also, the random vibration causes time-variant impedance of the energy harvester and the corresponding complex charging circuit.

It would be an advance in the art to develop a maintenance-free and self-powering wireless sensor for wind turbine blade structural monitoring. The wireless sensor can fit inside of a wind turbine blade and thus no external wind energy would be required. Advantageously, the wireless sensor does not rely on disposable batteries but instead is self-generating, significantly reducing O&M costs.

In summary, the primary motivation for looking at the problem is the need to reduce O&M costs. And the main things preventing that from happening is either, in the case of battery powered sensors, the need to replace them periodically (because they have insufficient power storage capacity), and in the case of previous energy harvesters, the fact that they only generate useful power at their resonant frequency. In both cases, what we essentially have is a reliability/robustness versus power conflict. Here's what the Contradiction Matrix has to tell us about how others have successfully resolved such conflicts:

insufficient battery power/ energy harvesters can't generate enough power

need to reduce O&M costs

35 1 4 10
40 16 3

And here's how the inventor has solved the problem, based on text from the detailed description section of the patent:

…a coil and magnet unit generator is placed on or in a rotating object, such as a wind turbine blade, and captures the rotational energy, converting it into electrical energy. The coil and magnet unit includes a snap-through mechanism (e.g., a nonlinear spring) [Principles 3, 10] *that supports the magnet (or the coil) to harvest vibrational energy from varied rotational speed (or broad frequency range). When the object rotates, its tangential (or radial) acceleration component excites the coil/magnet unit, and the relative motion between the magnet and the coil generates electrical energy by electromagnetic energy induction. The switching gravitational acceleration along the radial direction triggers the snapping of the nonlinear spring, which is helped by its* [Principle 4] *asymmetric characteristic, and the snapping behaviour effectively amplifies energy generation from a varied rotational speed. The generator of the first aspect can be used to supply power to a blade structural monitoring system from a variable blade rotating speed, thereby eliminating the necessity of a battery.*

Admittedly, it takes a substantial leap to get from Inventive Principles 3 (Local Quality) and 10 (Preliminary Action) to reach the idea of a 'snap-through' mechanism or non-linear spring, but I can't see a better clue coming from any of the other Inventive Principles. That's not to say that snap-throughs represent an illustration of a 41st Principle, but, given their frequent deployment in a host of different applications, that adding them to lists of examples of the Principles would be a good idea.

Meanwhile, what we have here is an extremely elegant solution. One that I suspect might be amenable to adaptation to suit a whole range of dynamic system situations that need to be monitored without tapping into external power sources. That word 'self' again – get the system to power itself.

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Best of the Month – Implosion Of The Submersible Titan

A bit of a switch this month. Partly because we already know that next month's Best Of the Month is shaping up to be a bit of a monster, and it felt like having some kind of 'amuse bouche this month might offer a gentle appetiser. But then also because there's a not so obvious but nevertheless crucial link between this month's reading and the magnum opus coming next month. Lest there be any confusion, our review isn't the magnum opus, the book we're reviewing is.

Anyway, to this month, and either some free reading or, if you have access to a Netflix subscription, some sort-of-free viewing. The recently released documentary, 'Titan' and the story of entrepreneur, Stockton Rush, and his attempt to set up a business taking wealthy tourists two miles down to the bottom of the Atlantic Ocean to catch a glimpse of the wreck of the Titanic. As everyone on the planet is probably aware in 2023 – per the above photo – things did not progress to plan, and tragically, the Titan imploded, killing Rush and his four not-passengers.

Because everyone knows about the tragedy, there was never going to be much prospect of suspense in the documentary. But, of course, every good documentary needs some, and for the first hour of the almost-two-hour film, it came in the form of the classic entrepreneur battle between breaking rules and not breaking them so far that you fall foul of the Laws of Physics. Between staying positive, but not so positive that you've become completely blind to the nay-sayers.

The scene where it becomes apparent Rush is a doomed man is filmed inside Titan. It's a vessel that needed a step-change innovation. The pressures it had to stand two miles underwater were incredibly high. The traditional way of achieving the necessary strength would have been to manufacture it from the strongest possible materials. That typically meant steel or titanium. The problem with either of those is that they make the vessel incredibly heavy. Not normally a great problem for marine applications, but definitely a problem on a submersible that was going to have to be lifted in and out of the water by the support ship that was going to be to carrying it to the Titanic site. A classic strength versus weight conflict. One that, like a lot of aerospace applications, Rush opted to solve using carbon fibre. He contracted Boeing to help make the pressure vessel for him. They were

already experienced at making carbon fibre tubes, the only difference for Titan being that in an aircraft fuselage the pressures inside the tube are going to be higher than on the outside, and in a submersible, the situation was the opposite. Meaning that the thousands of less-than-a-hair thickness carbon fibres were going to be loaded under compression rather than tension. Any normal engineer in one of these 'someone, somewhere solved your problem, only not quite' situations would have acted with a high degree of caution. And indeed that's what Rush's team did. They added a fair amount of safety margin, and placed lots of stress sensors and microphones around the carbon-fibre pressure vessel so they could see and hear what was happening when the submersible was in the water.

Which brings us to the give-away scene in the documentary. Rush is in control of the Titan as it descends on a test dive. The microphone picks up a disconcerting 'ping'ing noise. And then another. And then a cluster more. Rush looks unconcerned. Each ping is a carbon fibre breaking. Rush explains that the tube is being 'seasoned' by the shifting pressure. The other people in the tube with him can't hold back the sounds and look of worry. Rush remains seemingly implacable. He's an engineer and inside he knows those pings are the crystal clear sign that his carbon fibre dream is over. Except, of course, it isn't. He's running short of money, and the thought of going back to the drawing board cannot be contemplated. The dream is over, and now, so is Ruch's contact with objective reality. The tragedy begins here. The die is cast, and it is only a matter of time before disaster strikes.

The documentary offers an object lesson in what happens when entrepreneurs cross the line. It is well worth watching. Even better – this is the 'best book' part of the ezine after all – is the US Coastguard report on the tragedy that finally got published on 4 August. You can find a free copy here: https://media.defense.gov/2025/Aug/05/2003773004/-1/-1/0/SUBMERSIBLE%20TITAN%20MBI%20REPORT%20(04AUG2025).PDF

Every engineer and every entrepreneur needs to read the universal warning signs and lessons of entrepreneurial hubris, madness and delusion. It should be compulsory reading on every degree programme on the planet.

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Wow In Music – Black Sabbath
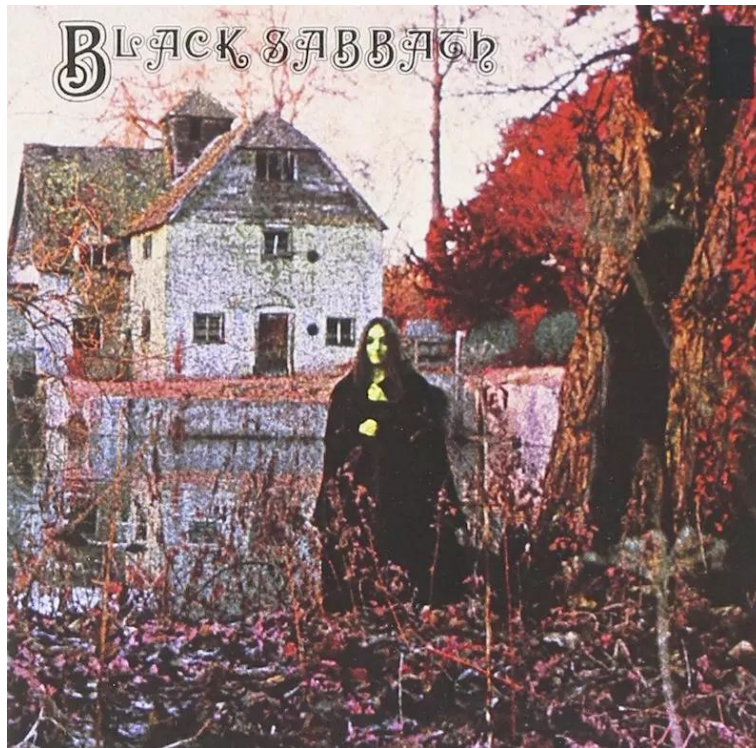
What does evil sound like?

It's not an easy thing to define. It might be the vintage, malevolent sound of pipe organ in a silent horror movie. A distant church bell tolling? The sound of an approaching thunderstorm? A reality TV theme tune? Maybe the harsh screech of power electronic white noise? The speech of authoritarian despots? Incessant elevator muzak? The 400-word-a-minute disclaimers at the end of American radio ads?

There's a more obvious answer, especially to concerned parents in the '80s and those who wish to harness the power of the dark lord through some sweet guitar licks: Heavy metal. Even more specific than that, it's the first three notes of the first song on Black Sabbath's 1970 debut album, a tritone known as "The Devil's interval."

There's nothing inherently evil about a tritone – it's just a musical interval comprising three whole steps. Or an example of Inventive Principle 22. Once a musician plays a chord, there are essentially twelve notes to choose from next. Some of the choices will sound 'right', a few will sound okay-ish, and then there are another couple that sound plain wrong. The Devil's interval is one of those plain wrong next-notes. They're just notes, of course, which we, ourselves, choose to imbue with qualities outside of the literal sounds themselves. The sound you hear on "Black Sabbath" is an inversion of a tritone, essentially the same intervals used in a power chord but with the fifth flattened, so as to create a kind of plain-wrong dissonance that feels oddly sinister and interrupts what might be a more natural sounding melody by introducing something uglier and darker. It feels like a step into unseen peril, an unresolved limbo where doom feels all but certain. In that flattened D note (which guitarist Tony Iommi trills back and forth a half step), heavy metal was birthed in dramatic overture.

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Black Sabbath didn't invent "The Devil's interval" or diabolus in musica as it's been known in Latin for much longer than rock music existed. Iommi took inspiration from Gustav Holst's "Mars, the Bringer of War," and composers like Richard Wagner and Camille Saint-Saëns, who employed them in their own works. During the Renaissance, using such sounds was roundly rejected as it was an affront to both God and ideals of beauty, which at the time were inextricable.

Naturally, that Principle 22 seal of non-approval meant the tritone was considered perfect for heavy metal. The Devil had made his debut in popular music decades earlier, in the haunted recordings and mythology of Delta Blues, and he pretty much stuck around ever since, generally causing mischief and mayhem in the name of rock 'n' roll. Maybe wearing leather and riding a motorcycle with flames on the side, but more likely wearing an Italian suit and claiming ownership of master recordings that will someday burn on a shelf in a warehouse due to general negligence. But the Devil is also part and parcel of the whole identity of heavy metal, more or less – witch covens, the number of the beast, or just the general spirit of asking What Would Satan Do?

Here a tritone often enough and its innate wrongness slowly starts to become perfectly right. To the point that Black Sabbath were still including "Black Sabbath" in their set-list fifty years later. It was, unsurprisingly, also the (taped – Ozzy was deemed to be well enough to sit on a specially made throne and to sing four soings) opening of their last ever gig, last month.

"Black Sabbath" isn't that, exactly. When Ozzy Osbourne introduces his lyric with one of the most eerily evocative opening lines ever written – "What is this that stands before me?" – he sounds as if he's standing face to face with the devil itself, though it wasn't actually his own experience that he was drawing from, but rather that of bassist Geezer Butler. A budding occult aficionado and Catholic whose belief in the devil was genuine, Butler had begun reading up on Aleister Crowley and Dennis Wheatley, and subscribing to a weekly magazine called Man, Myth and Magic. Plus, Ozzy had given him a book about magic from the 16th century, and well, we all know that when there's some kind of creepy, mystical tome from yore that comes into your possession, some pretty intense stuff is bound to happen.

The experience of immersing himself in the dark arts led to a nightmarish event in which Butler awoke in his bed to find a dark presence in front of him, which scared the hell out of him. So to speak. He immediately tossed aside all the witchcraft and occult objects, but that magic book gifted to him by his bandmate had mysteriously vanished. Had that dark figure taken what was rightfully his? Or did Ozzy stumble into his flat after hours? I suppose we'll never know for sure.

The group attempted to capture that sinister imagery on the album's artwork, the imagery of model Louisa Livingstone, draped in a black cloak, in front of the Mapledurham Watermill evoking the sort of witchy mysticism that inspired the encounter. The inclusion of an inverted cross on the original inner gatefold certainly pushed that idea forward, though more than anything it served to bring more weirdos to the band's shows – Sabbath weren't necessarily all that committed to Satanism as a bit, but that they embraced it at all appealed to a certain kind of audience. A Boris Karloff, Bela Lugosi, Christopher Lee, Hammer Horror kind of audience.

But that triad that opens "Black Sabbath" will forever be the sound of heralding of those evil-like dark figures, whomever they may be. All hail the Principle 22 riff.

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RIP, Ozzy.

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Investments – Carbon-Capture Concrete

Imagine the concrete in our homes and bridges not only withstanding the ravages of time and natural disasters like the intense heat of wildfires, but actively self-healing or capturing carbon dioxide from the atmosphere.

Now, researchers at the USC Viterbi School of Engineering have developed a revolutionary AI model that can simulate the behaviour of billions of atoms simultaneously, opening new possibilities for materials design and discovery at unprecedented scales.

Aiichiro Nakano, a USC Viterbi professor of computer science, physics and astronomy, and quantitative and computational biology, was contemplating climate-change issues after the January wildfires in Los Angeles. So, he reached out to longtime partner Ken-Ichi Nomura, a USC Viterbi professor of chemical engineering and materials science practice, with whom he's collaborated for over 20 years.

Discussing these issues together helped spark their new project: Allegro-FM, an artificial intelligence-driven simulation model. Allegro-FM has made a startling theoretical discovery: it is possible to recapture carbon dioxide emitted in the process of making concrete and place it back into the concrete that it helped produce.

"You can just put the CO2 inside the concrete, and then that makes a carbon-neutral concrete," Nakano said.

Nakano and Nomura, along with Priya Vashishta, a USC Viterbi professor of chemical engineering and materials science, and Rajiv Kalia, a USC professor of physics and astronomy, have been doing research on CO2 sequestration.

By simulating billions of atoms simultaneously, Allegro-FM can test different concrete chemistries virtually before expensive real-world experiments. This could accelerate the development of concrete that acts as a carbon sink rather than just a carbon source -- concrete production currently accounts for about 8% of global CO2 emissions.

The breakthrough lies in the model's scalability. While existing molecular simulation methods are limited to systems with thousands or millions of atoms, Allegro-FM

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demonstrated 97.5% efficiency when simulating over four billion atoms on the Aurora supercomputer at Argonne National Laboratory.

This represents computational capabilities roughly 1,000 times larger than conventional approaches.

The model also covers 89 chemical elements and can predict molecular behaviour for applications ranging from cement chemistry to carbon storage.

"Concrete is also a very complex material. It consists of many elements and different phases and interfaces. So, traditionally, we didn't have a way to simulate phenomena involving concrete material. But now we can use this Allegro-FM to simulate mechanical properties [and] structural properties," Nomura said.

Concrete is a fire-resistant material, making it an ideal building choice in the wake of the January wildfires. But concrete production is also a huge emitter of carbon dioxide, a particularly concerning environmental problem in a city like Los Angeles. In their simulations, Allegro-FM has been shown to be carbon neutral, making it a better choice than other concrete.

This breakthrough doesn't only solve one problem. Modern concrete only lasts about 100 years on average, whereas ancient Roman concrete has lasted for over 2,000 years. But the recapture of CO2 can help this as well.

"If you put in the CO2, the so-called 'carbonate layer,' it becomes more robust," Nakano said.

In other words, Allegro-FM can simulate a carbon-neutral concrete that could also last much longer than the 100 years concrete typically lasts nowadays. Now it's just a matter of building it.

'Just.'

('1% inspiration, 99% perspiration.')

The 99% perspiration work that still needs to be done isn't the point here. The point is an application of AI capabilities commensurate with what they're capable of doing that no human could do.

The professors led the development of Allegro-FM with an appreciation for how AI has been an accelerator of their challenging work. Normally, to simulate the behaviour of atoms, the professors would need a precise series of mathematical formulas -- or, as Nomura called them, "profound, deep quantum mechanics phenomena." But the last two years have changed the way the two research.

"Now, because of this machine-learning AI breakthrough, instead of deriving all these quantum mechanics from scratch, researchers are taking [the] approach of generating a training set and then letting the machine learning model run," Nomura said. This makes the professors' process much faster as well as more efficient in its technology use.

Allegro-FM can accurately predict "interaction functions" between atoms -- in other words, how atoms react and interact with each other. Normally, these interaction functions would require lots of individual simulations.

But this new model changes that. Originally, there were different equations for individual elements within the periodic table, with several unique functions for these elements. With

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the help of AI and machine-learning, though, we can now potentially simulate these interaction functions with nearly the entire periodic table at the same time, without the requirement for separate formulas.

"The traditional approach is to simulate a certain set of materials. So, you can simulate, let's say, silica glass, but you cannot simulate [that] with, let's say, a drug molecule," Nomura said.

This new system is also a lot more efficient on the technology side, with AI models making lots of precise calculations that used to be done by a large supercomputer, simplifying tasks and freeing up that supercomputer's resources for more advanced research.

"[The AI can] achieve quantum mechanical accuracy with much, much smaller computing resources," Nakano said.

Nomura and Nakano say their work is far from over.

"We will certainly continue this concrete study research, making more complex geometries and surfaces," Nomura said.

Read more:

Ken-ichi Nomura, Shinnosuke Hattori, Satoshi Ohmura, Ikumi Kanemasu, Kohei Shimamura, Nabankur Dasgupta, Aiichiro Nakano, Rajiv K. Kalia, Priya Vashishta. Allegro-FM: Toward an Equivariant Foundation Model for Exascale Molecular Dynamics Simulations. The Journal of Physical Chemistry Letters, 2025; 16 (25): 6637 DOI: 10.1021/acs.jpclett.5c00605

Generational Cycles – The Quiet Philosophy Of Indie Games

When Millennials were children, their imaginations were captured by epic fantasy quests. Harry Potter and Percy Jackson stood as clear moral beacons – heroes with destinies, villains with evil plans, and worlds waiting to be saved. But when Gen Z came of age, no such unifying figure emerged. According to the Strauss/Howe generational cycle, an Artist generation – raised in crisis and defined by parental Suffocation – typically finds its philosophical voice through gentle fables like Winnie-the-Pooh or The Little Prince. And yet, if you look at Gen Z's bookshelves, the last twenty years has seen the emergence of any single character to fill that role.

The reason isn't that Gen Z has lacked philosophical stories. It's that they found them in an entirely different place – in the indie game renaissance of the 2010s and the long, reflective hours of the pandemic.

Games have always been seen as entertainment first and art second, but the rise of cheap game engines (Unity, GameMaker, RPG Maker) and digital storefronts like Steam and itch.io unlocked a new creative freedom. Solo developers and tiny studios could build games that were less about high scores or flashy graphics and more about how it feels to be human. A medium made for moral reflection

These games were not designed to sell millions of copies; they were designed to express something honest. And for Gen Z – a generation marked by anxiety, economic precarity, and a deep concern for justice – these games became a mirror. Unlike traditional books, games are interactive. You don't just read about choices; you make them, and you live with the consequences.

Consider Undertale (2015), the quirky RPG by Toby Fox. On the surface, it's a simple game about wandering through a world of monsters. But it hides a radical idea: you don't have to kill anyone. You can choose mercy at every turn – but you must mean it. Even the smallest act of violence reshapes the story and haunts you later. For Gen Z, raised amid climate crisis, school shootings, and political polarisation, it was a revelation: you don't have to play by the world's rules.

Oxenfree (2016) is a supernatural mystery wrapped around a group of teenagers on an island overnight. It feels like a coming-of-age novel turned into an interactive ghost story – every conversation choice reshapes friendships and outcomes. Beneath the eerie radio signals and time loops is a meditation on regret, responsibility, and how even small decisions can echo for years.

Or take Night in the Woods (2017), a game about a college dropout returning to a crumbling hometown. Instead of slaying dragons, you wander through quiet streets,

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grappling with mental health, economic decline, and friendship fraying under pressure. It feels like a coming-of-age novel that refuses to give tidy answers – exactly the tone you'd expect from an Artist generation raised in the shadow of global uncertainty.

Then came Celeste (2018), a brutally difficult platformer about climbing a mountain. The twist? The mountain is really your own anxiety and depression. Every fall is a lesson in persistence. Every checkpoint whispers that progress is possible. It's not a game about winning; it's a game about learning to live with yourself.

Gris (2018) is a wordless watercolour of a game about grief and recovery. You play as a young woman moving through shifting landscapes that mirror the emotional stages of loss – from denial to acceptance. There are no enemies, no deaths, just quiet puzzles and soaring music, showing that healing is less about fighting and more about rediscovering your own voice and colour.

By the time Spiritfarer (2020) appeared – in the very heart of the COVID lockdowns – Gen Z players were ready for its meditative exploration of death and letting go. You build friendships with spirits and then ferry them to the afterlife, one by one. It's beautiful, bittersweet, and quietly radical: a game about love and loss, not about "beating" anything.

No single title defined Gen Z's childhood the way Harry Potter or Percy Jackson did for Millennials. Instead, dozens of smaller works – Gris, Journey, Oxenfree, Florence – carried the same emotional DNA. These games whispered the same messages again and again:

Life is fragile.

Other people's pain is real, even if you can't see it.

Your choices matter, even when no one's watching.

Healing isn't linear, but it's possible.

These are the lessons Winnie-the-Pooh once carried in the Hundred Acre Wood. But rather than coming from a kindly bear, they came from glowing screens and late-night play sessions. Gen Z's philosophy wasn't handed down by a single author; it was assembled collaboratively by a generation of creators who wanted to say something true in a chaotic world.

So perhaps Strauss and Howe were right after all. Gen Z is an Artist generation – reflective, morally attuned, and wary of easy answers. But instead of one towering children's classic, they got a constellation of small, interactive fables scattered across the internet. These weren't bedtime stories to be read by parents; they were moral journeys to be walked alone, headphones on, screen glowing in the dark.

In that sense, Gen Z's "Winnie-the-Pooh" isn't a bear at all. It's a controller. It's a keyboard. It's the player themselves – learning to make kinder choices in a world that often feels hostile, one decision at a time.

Biology – Paper Birch

Canadian paper birch trees have a problem. There's not enough sun during the winter, so they shed their leaves as the 'cost' of retaining them doesn't match the energy they will be able to generate if they did. Even then, the winter is long and it's difficult to survive the season without any incoming source of energy. Here's what the problem looks like when mapped onto the Contradiction Matrix:
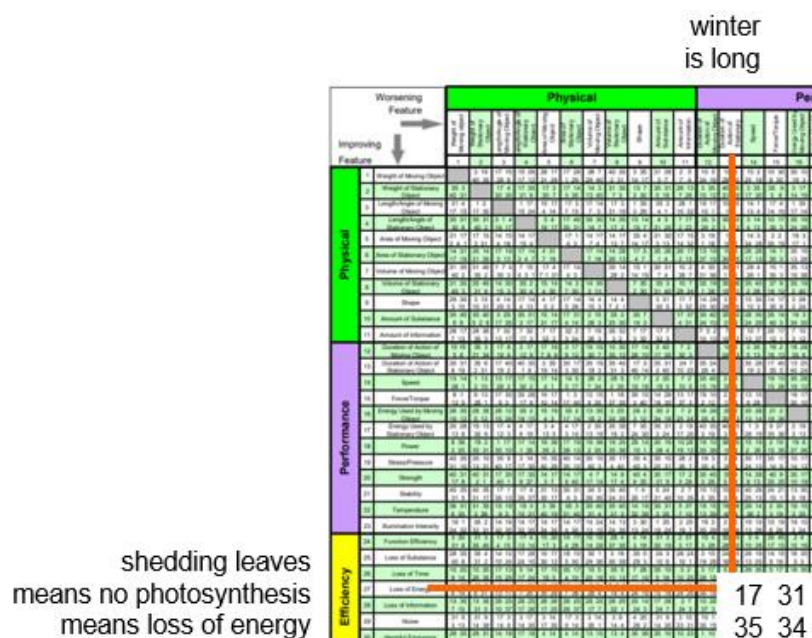
And here's a rather lovely example of how the paper birch as deployed Inventive Principle 34 to solve the winter contradiction:

Trees in a forest are usually thought of as fierce competitors, each struggling for control of available light and soil moisture, usually at the expense of neighbouring trees. But Canadian research Suzanne W. Simard and her colleagues found that Douglas firs come to the aid of paper birches during the winter.

Through carefully-controlled research, Dr. Simard has documented the transfer of carbon (sugar) from Douglas firs to nearby paper birches. The transfer takes place through tiny underground strands of beneficial fungi called ectomycorrhizae. These appendages are common on most tree roots. They illustrate a classic symbiotic relationship in that both the host and the fungus benefit from the close association. The fungus obtains a small amount of carbohydrates and vitamins from the tree and in turn greatly increases the absorptive surface of the root. This increases the flow of water and essential elements into the tree roots, especially phosphorous.

Dr. Simard discovered that the mycorrhizae on birch trees and Douglas firs in her research plots interconnected. Sugars flowed between the tree roots, with a net gain for the paper birches.

In summer, when coniferous trees find it difficult to compete with their leafy neighbours for sunlight, paper birches then repay the favour by sending carbon and water they 'borrowed' during the winter back to the Douglas firs via the ectomycorrhizae network. She also found that the more the Douglas firs were stressed by shade, the more of a sugar fix they received from the paper birches.

There may be management applications of this phenomenon. By interplanting the two species, or encouraging natural regeneration of both, the birches may help the longer-lived conifers get a growth boost early in life and at the same time help crowd out competing vegetation in a plantation. Eventually the birch could be harvested when overtopped by the Douglas firs. As an added bonus, scientists have noticed that birches also have an "antibiotic" effect on soil pathogens that cause root rot. But that's another (ecosystem innovation) story…

Short Thort

Every innovator, so the Stoics say, carries 83 problems.

Not all at once. They rotate—funding stalls, team tensions, tech that won't work, a market that yawns. Solve one, and another slides in. That's the rhythm of the Special World—the place you enter the moment you step beyond the familiar and say, "Let's try something new."

This is the phase Joseph Campbell called Tests, Allies, and Enemies—where the road is unclear, the rules are new, and the stakes are rising. Every "problem" is really a test in disguise. Each one asking, "Are you still willing?"

The 84th problem is the one that will break you if you let it: the belief that if you were any good, these problems wouldn't exist.

But here's the truth every innovator must learn, usually during the Ordeal: the presence of problems isn't proof you're failing. It's proof you're in the game.

Drop the 84th. Embrace the 83. They're not in the way of the journey—they are the journey.

News

The 1%ers
Anyone visiting the Workshop booking page on the SI online shop will notice that the planned Hero's Intrapreneur Journey next month has had a title switch to 'The 1%ers This is in line with the new book we've been rushing to finish in the last couple of months. A 1%er is the rare individual able to repeatedly and consistently get new things done. There are no certainties in life, but pre-publication feedback is indicating this project has hit something of a nerve and has an outside chance of going viral. We'll see. The first ebook version of the book is scheduled to be released through Amazon on 25 September. In order to coordinate with that date, we've shifted the date of the workshop to 23 and 30 September. Order a place on the first 1%er workshop at https://si-shop.org.uk/september-2025-the-1-ers-how-new-things-get-done/ and get a copy of the book included.
No doubt more news to come on the project in the coming months – including audio-book, online assessment tools and future workshop dates.

TRIZCON2025
We're happy to announce that Darrell will be a keynote speaker at this year's Altshuller Institute for TRIZ Studies (AI) conference, to be held on the 6th and 7th of October at the University of Latvia in Riga. The Conference Theme this year is: The Resurgence of TRIZ with Artificial Intelligence in support of education, manufacturing and science. As is in effect obligatory, the conference explores the powerful synergy between TRIZ and Artificial Intelligence — two structured approaches to problem-solving that, together, may redefine innovation in the digital age. Darrell's keynote, at the moment, is titled, 'Timing, Timing, Timing: Integrating TRIZ and AI to Navigate the When-To-Innovate Paradox'.
More details of the event at aitriz.org.

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IMechE TRIZ Workshop
We are happy to confirm that the IMecHE one-day 'Systematic Innovation with TRIZ' workshop will go ahead next month, albeit with a slight date change. Book your place at: https://www.imeche.org/training-qualifications/training-details/21st-century-triz

German Business Matrix 3.0
We have signed an agreement with Robert Adunka from the online TRIZ Mastery Hub to create a German translation of the Business Matrix 3.0 book. More details when it becomes available. In the meantime, if you haven't done so already, you'd be well advised to check out the Mastery Hub – it is in effect the long-awaited replacement for the much missed TRIZ Journal.

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

      Education – educator support app development project
      NGO – Creativity Scan Project
      IT – Innovation Leadership Workshops
      Mining – SI Workshops
      FMCG - Innovation Strategy Workshops
      Consulting – 1%er Assessment Project
      Logistics -

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