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Institute of Enterprise Risk Practitioners

GLOBAL CONFERENCE 2025

ENTERPRISE RISK MANAGEMENT: RISING FROM THE ASHES

DISRUPTIVE TECHNOLOGIES UNLEASHED: FROM CRYPTO TO DEEPFAKES

LOON WING YUEN
CHIEF TECHNOLOGY OFFICER
KAPITALDX

Introducing KLDX

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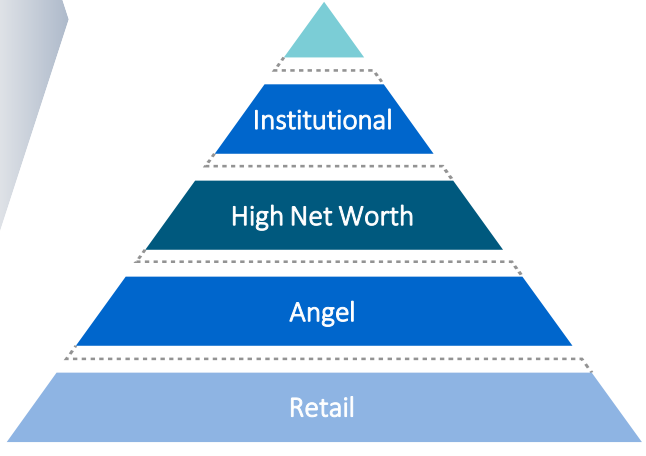

Stream B2 - Disruptive Technologies Unleashed: From Crypto to Deepfakes

With the accelerating advances in technology which is ***disruptive in nature*** and ***exponential in scale***, risk management must evolve from being ***reactive to proactive***. Traditional linear thinking paradigms and models in risk assessments are no longer sufficient - instead, organizations must adopt adaptive strategies that account for probabilistic scenarios, second-order effects, ethical dilemmas, and systemic vulnerabilities introduced by breakthroughs in technologies such as AI, Web3, autonomous systems, genomics, biotechnologies, nanotechnologies, quantum computing, nuclear fusion and space. The future of risk management lies in proactive governance, creation of organisational resiliency, and continuous learning to navigate the unpredictable waves of technological disruption which is sure to come.

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The rate of technological advancement – Exponential Age

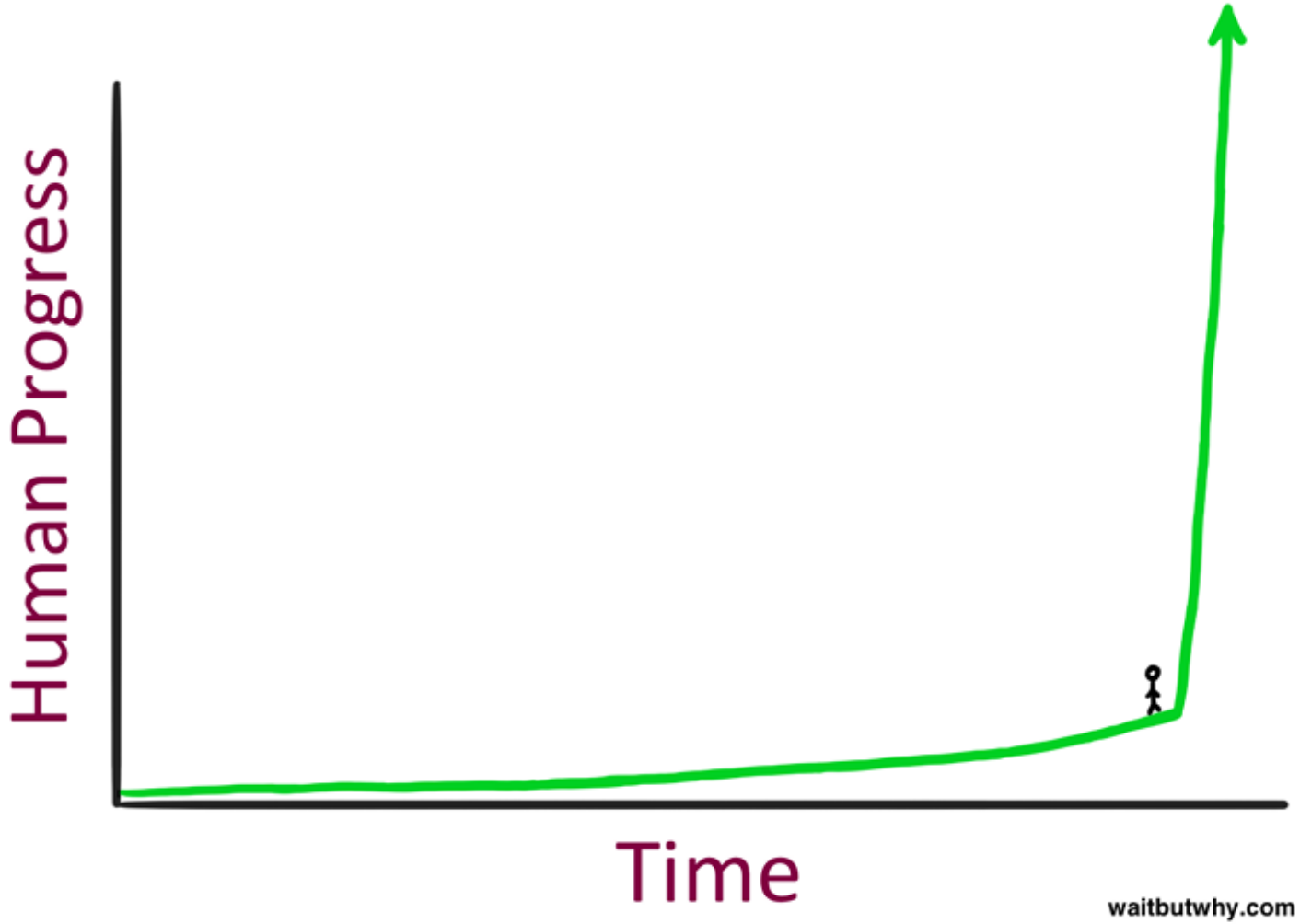
"Slowly, and then all of a sudden"

(we tend to think "linearly" but

Progress and Disruption is often "exponential" – this itself is a form of risk)

How many 'steps' to the moon?

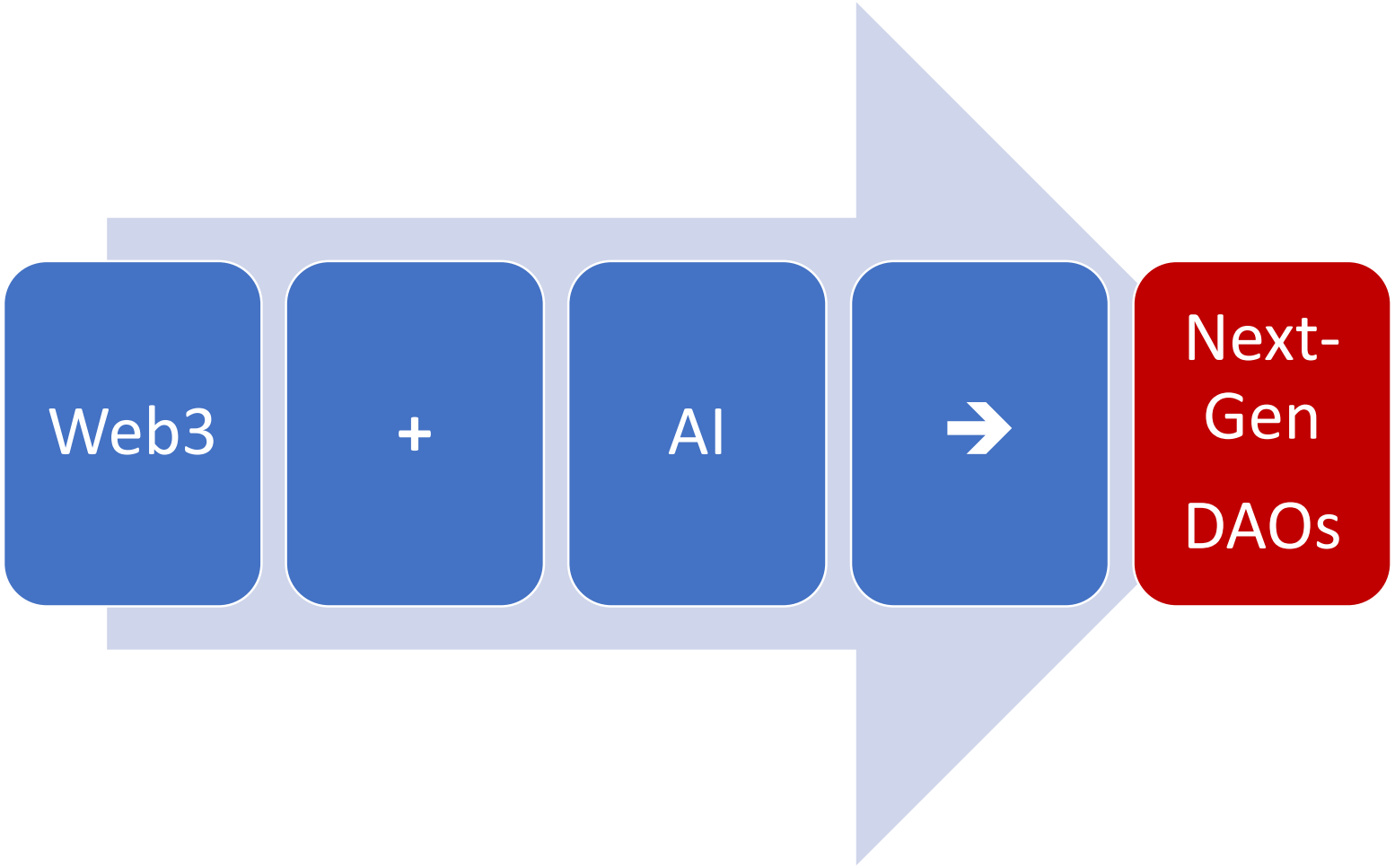
The rate of technological advancement – Exponential Age



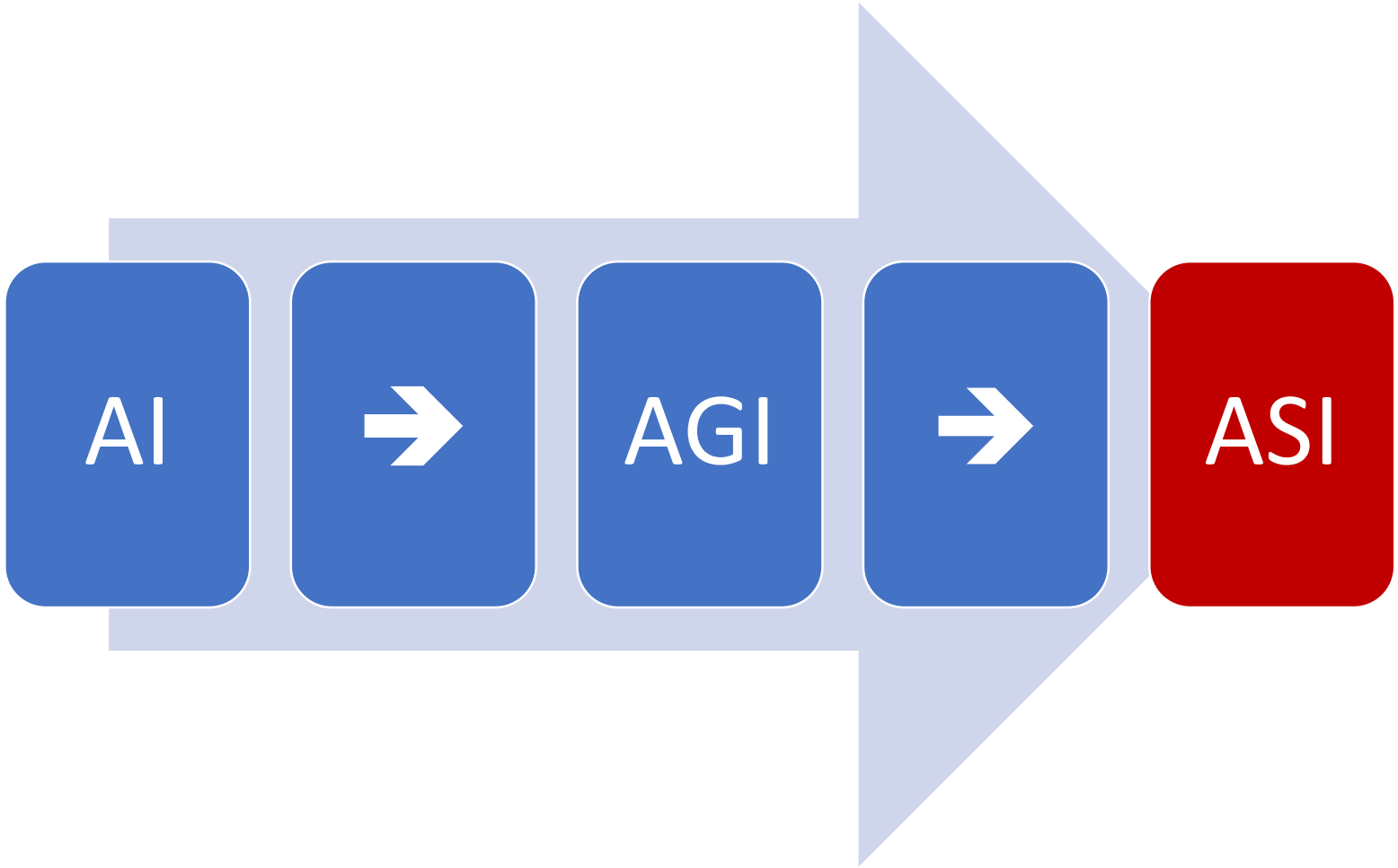
The rapidly changing world

Traditional World		Exponential World
Change is slow	→	Change is fast
Linear (reactive) thinking	→	Non-linear (proactive) thinking
Optimise existing business model	→	Continual innovation
Predictable repeatable processes	→	Flexible adaptable processes
Silo organisational structures	→	Collaborative organisational structures
Reactive risk modelling and assessment	→	Proactive risk modelling and assessment
Optimising for efficiency – but there exists inherent brittleness, structurally, in a rapidly changing world		**Optimising for adaptability and resiliency in a rapidly changing world**

Example of when multiple disruptive forces combining (Log-linear to Power-law)



Example of even when one disruptive force evolves (Log-linear to Power-law)



Thinking Probabilistically

- **Beyond Linear Predictions**
  - Traditional risk models rely on historical data and linear projections
  - Disruptive technologies introduce **non-linear**, **exponential risks** that require probabilistic thinking
- **Multiple Futures, Not Single Outcomes**
  - Instead of predicting a single risk event, model a **range of possible scenarios** with associated **probabilities** (thinking in terms of **probability distributions**)
  - *Example:* AI introduction could lead to *job displacement* (high probability), *UBI* (medium probability), *existential risk* (low probability), or unforeseen *societal benefits* (unknown probability)
- **Black Swan & Tail Risks**
  - Low-probability but high-impact events must be factored into resilience planning
  - Stress-test organization against **'what if' scenarios** that defy conventional assumptions
  - *Example:* Super-intelligent rogue AI, bio-engineered pathogens

Second-Order Effects

Second-Order & Cascading Effects

- Assess not just direct risks but **how one disruption triggers another**

Example: AI-driven misinformation → market instability → regulatory crackdowns

Unintended Consequences

- Well-intentioned innovations can backfire due to unforeseen second-order effects

Example: **Social media algorithms** increase engagement (1st-order) → but fuel polarization, misinformation, and mental health crises (2nd-order)

Cascading & Amplifying Risks

- A single disruption can trigger **chain reactions** across systems

Example: A **quantum computing breakthrough** breaks encryption (1st-order) → collapses digital trust (2nd-order) → destabilizes and causes the collapse of global finance (3rd-order)

Ethical Dilemmas

- **Defining Ethical Dilemmas in Emerging Technologies**
  - **Conflict of Values:** Technologies like AI, biotech, and quantum computing force trade-offs between **progress**, **privacy**, **equity** and **safety**
  - **Uncharted Territory:** Many dilemmas have no precedent (eg. "Should AI have legal personhood?“ or “Does an artificially created human have the same legal rights as a naturally-born person?”)
  - *Example:* Autonomous vehicles must make split-second decisions with moral implications (eg. "Should a self-driving car prioritize passengers or pedestrians?")
- **Ethical & Societal Implications**
  - New technologies force trade-offs between progress and unintended harm
  - *Example:* AI-driven hiring tools reduce bias (1st-order) → but entrench new biases if trained on flawed data (2nd-order)
- **AI & Algorithmic Bias**
  - **Hidden Prejudices:** AI trained on biased data perpetuates discrimination (eg. hiring algorithms favouring certain demographics)
  - **Accountability Gap:** Who is responsible when AI causes harm—the developer, user or the AI itself?
  - *Example:* **Predictive AI policing** may reinforce racial profiling under the guise of "neutral" data (eg. crime reports, arrest records, geographic crime rates)
- **Privacy vs Innovation**
  - **Surveillance Tech:** Facial recognition and big data enable security but erode privacy
  - **Consent Challenges:** Biotech (eg. genomics) and Web3 (eg. blockchain) create irreversible data exposure risks
  - *Example:* **Health wearables** improve care but information could be hacked and sold to insurers, affecting premiums

Ethical Dilemmas

- **Human Enhancement & Biotech**
  - **Designer Babies:** CRISPR gene editing could eliminate diseases—or create a new eugenics movement
  - **Augmentation Inequality:** Will cognitive/physical enhancements widen the gap between rich and poor?
  - *Example:* **Neurotechnology** (brain chips) could boost intelligence, widening the intelligence divide between those that can afford the technology and those that don't. **Augmented humans**: where do we draw the line between a human with prosthetics and a human who is super-humanly enhanced?"
- **Autonomous Weapons & War Ethics**
  - **Lethal AI:** Machines making life-or-death decisions without human intervention
  - **Proliferation Risk:** Cheap, scalable autonomous weapons in the hands of rogue states or terrorists
  - *Example:* **Drone swarms** could revolutionize warfare—but also enable intelligent targeted assassinations or accidental escalation
- **Environmental & Long-Term Risks**
  - **Short-Term Gains vs Long-Term Harm:** Crypto mining's energy drain, AI's carbon footprint or nanotech pollution
  - **Existential Risks:** Could advanced AI, bioweapons or quantum computing accidentally endanger humanity?
  - *Example:* **Geoengineering** might reverse climate change—but could trigger unintended ecological disasters

Ethical Dilemmas

- **Strategies for Ethical Risk Governance**
  - **Ethics by Design:** Embed moral frameworks into tech development

  Example: Having AI fairness audits
  - **Stakeholder Inclusion:** Having diverse voices

  Example: Including philosophers, anthropologists, marginalized groups, regulators in risk assessments
  - **Precautionary Principle:** Slow or restrict tech with irreversible consequences

  Example: Controlling the pace of progress of GMO modified foods
  - **Transparency & Redress:** Clear accountability mechanisms when harms occur

  Example: AI explainability for racial bias in credit scoring models

Systemic Vulnerabilities

Systemic Vulnerabilities

- **Second-order effects:** Expose interconnected weaknesses in financial, societal, and technological systems.

Example: Autonomous weapons reduce military casualties (1st-order) → but lower the threshold for war (2nd-order) → increase global conflict risk (3rd-order).

- **Hidden Fragility:** Systems appear stable until a small disruption triggers collapse

Example: Supply chain failures, algo trading-driven market crashes, single cloud outage takes down systemically important services such as travel booking, ride sharing

Why Emerging Tech Magnifies Systemic Risk

- **Hyperconnectivity:** AI, IoT and Web2/Web3 increase interdependencies—failure in one node spreads exponentially

Example: AI fake news encourages a narrative that causes excessive leveraged speculation of a crypto protocol vs spot demand, and then a massive liquidation event of longs of that crypto occurs later when it is discovered that the news is fake

- **Opacity:** Complex systems (eg. deep learning models, composable DeFi protocols) are poorly understood even by its creators

Example: The Terra Luna algorithmic stablecoin collapse

Systemic Vulnerabilities

- **Critical Systemic Vulnerabilities to Watch**
  - **AI/ML Single Points of Failure**
    - Reliance on a few foundational models (eg. GPT, Gemini, Anthropic) creates centralized risk
    - Adversarial attacks or bias amplification could destabilize industries
  - **Blockchain & DeFi "Smart Contract Contagion"**
    - Code vulnerabilities (eg. DAO hack) can drain billions in minutes
    - Algorithmic stablecoins (eg. Terra/LUNA collapse) trigger crypto-wide meltdowns
  - **Quantum Computing's "Cryptopocalypse"**
    - Breaking RSA/ECC encryption could paralyze global finance, public infrastructure and military systems
  - **Biotech's Dual-Use Dilemma**
    - Lab leaks or weaponized synthetic biology (eg. engineered pathogens) risk global pandemics
- **Cross-Domain Risk Contagion**
  - Risks in one domain (eg. blockchain hacks) can spill over into others (finance, supply chains, governance/regulations, general economy)
  - *Example:* The 2008 Financial Crisis precipitated by the collapse of mortgage-backed securities triggered banking collapses in the US which led to a global financial crisis leading to sovereign debt crises and economic recessions around the world.

Systemic Vulnerabilities

- **Cascading Effects in Practice**
  - **Financial Systems:** AI-driven trading algorithms amplify flash crashes (eg. 2010 "Flash Crash")
  - **Healthcare:** Overreliance on AI diagnostics creates systemic misdiagnosis risks
  - **Supply Chains:** Just-in-time logistics + IoT sensors are vulnerable to cyber-physical attacks
- **Mitigating Systemic Risks**
  - **Resilience by Design**
    - "Anti-fragile" architectures (eg. decentralized physical infrastructure – DePin)
    - Stress-testing for "networked collapse" scenarios
  - **Governance & Redundancy**
    - Mandatory fail-safes (eg. circuit breakers for algorithmic trading)
    - Diversifying critical infrastructure/practices (eg. avoiding tech monocultures in software development/DevOps frameworks and best practices)
  - **Collaborative Defense**
    - Public-private threat intelligence sharing (eg. Cyber Threat Alliances)
    - International treaties for existential risks (eg. AI arms control)

Risk Analysis, Frameworks and Tools

Exponential Disruptive Risk Analysis

1. **Pace and Scope Analysis –** Velocity Assessment, Breadth of Impact
2. **Systemic Risk Classification –** Displacement Risks, Concentration Risks, Coordination Failures, Tail Risks
3. **Temporal Framework –** Near, Medium and Long-Term
4. **Mitigation Strategies –** Adaptive Governance, Resilience over Efficiency, Proactive Safety Research

Framework

PESTEL (the "PESTEL+" Framework):

1. **Identify the Disruptive Technology**
2. **Risk Categories –** Political & Geopolitical Risks, Economic Risks, Societal & Ethical Risks, Technological Risks, Environmental Risks, Legal & Compliance Risks, and Existential & Long-Term Risks (X-Risks)
3. **Risk Assessment & Impact Matrix**
4. **Mitigation & Governance Strategies**
5. **Monitoring & Feedback Loops**

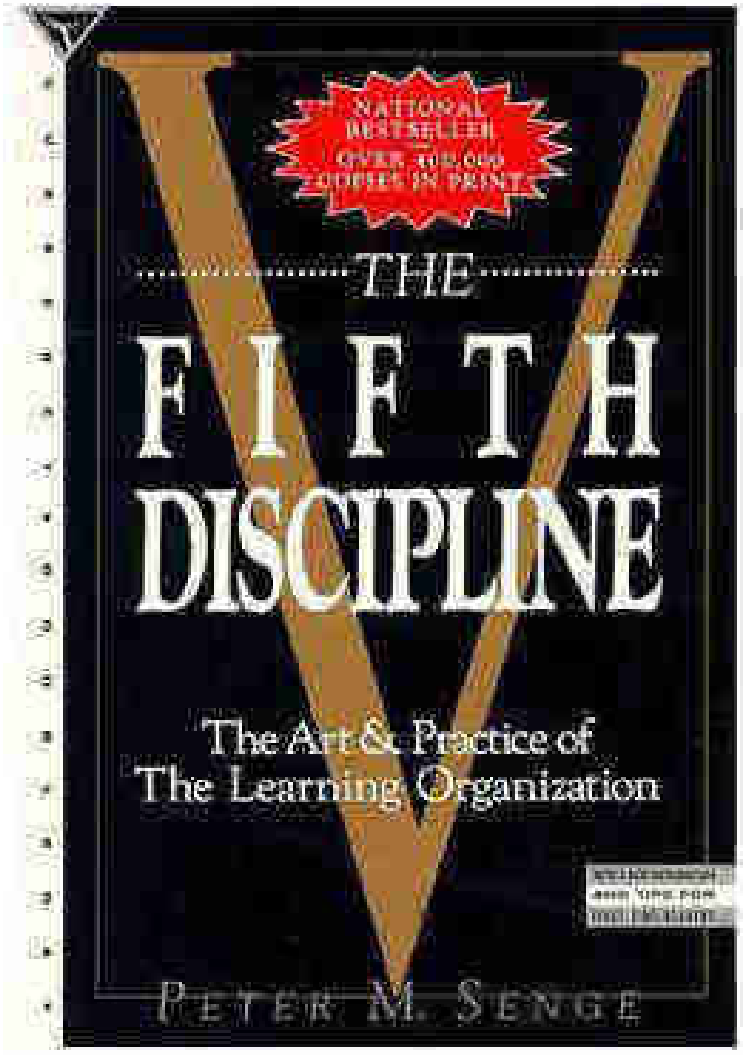
Tools

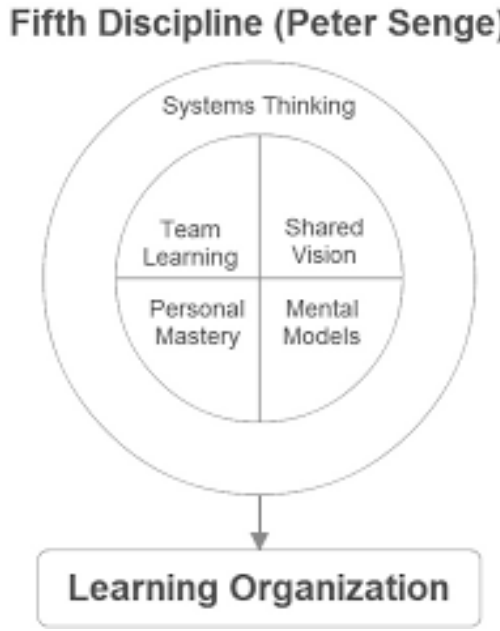
- **Dynamic Updating of Probabilities**
  - As technology evolves, risk probabilities shift (eg. AI alignment risks may increase as models become more agentic)
  - Use **real-time data and adaptive models** to recalibrate scenarios (eg. monitoring AI breakthroughs, geopolitical shifts)
- **Tools for Probabilistic Scenario Planning**
  - Monte Carlo simulations, Bayesian networks, and agent-based modeling to explore complex risk landscapes
  - War-gaming and red-teaming exercises for **"unknown unknowns"** (simulating worst-case scenarios beyond the obvious) in tech disruptions
- **Thinking Frameworks**
  - **Balance Innovation & Caution**: Avoid stifling progress while preventing catastrophe
  - **Thinking in Layers**: Assess risks at micro (individual), meso (societal), and macro (global) levels
  - **Antifragile Thinking**: Things That Gain from Disorder
  - **Systems Thinking**: Map out interdependencies (eg. how AI adoption affects labor, policy, and ethics)

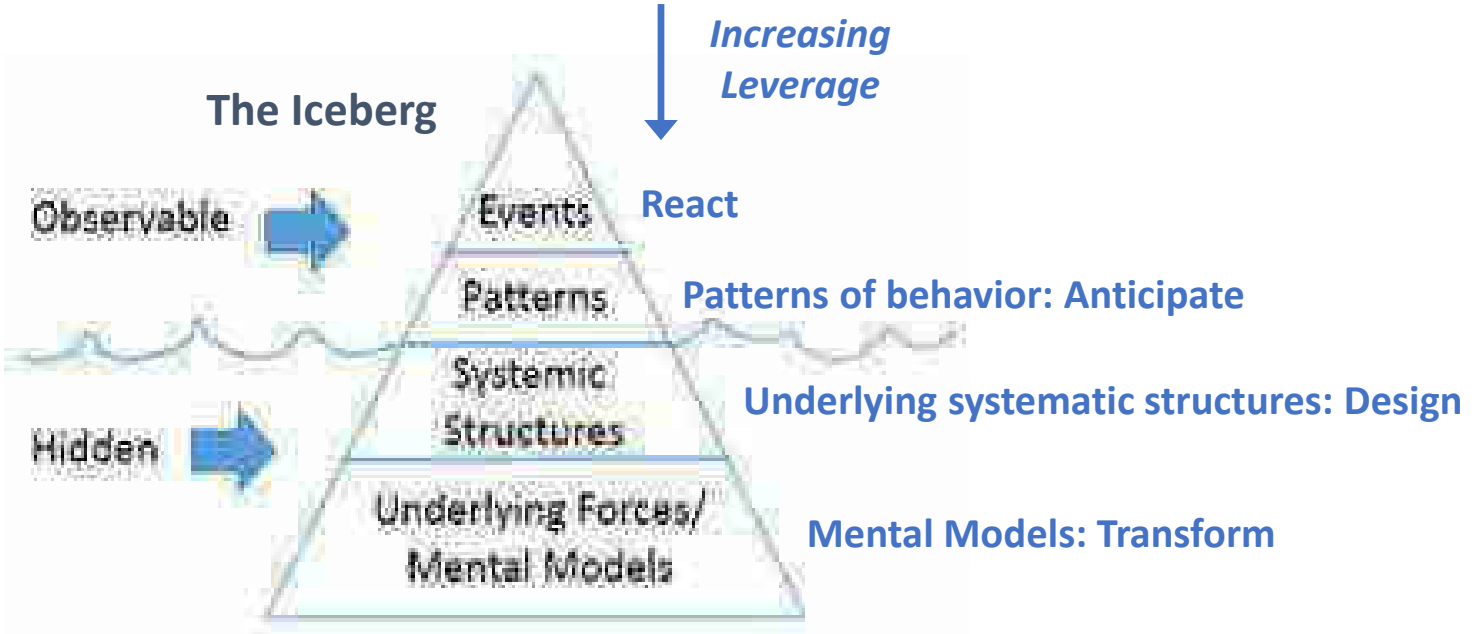
Also refer to:

- **The Precautionary Principle** (for high-impact, uncertain risks)
- **Taleb's "Antifragility"** (building systems that benefit from shocks)
- **Bostrom's "Superintelligence"** (AI existential risks)

Systems Thinking







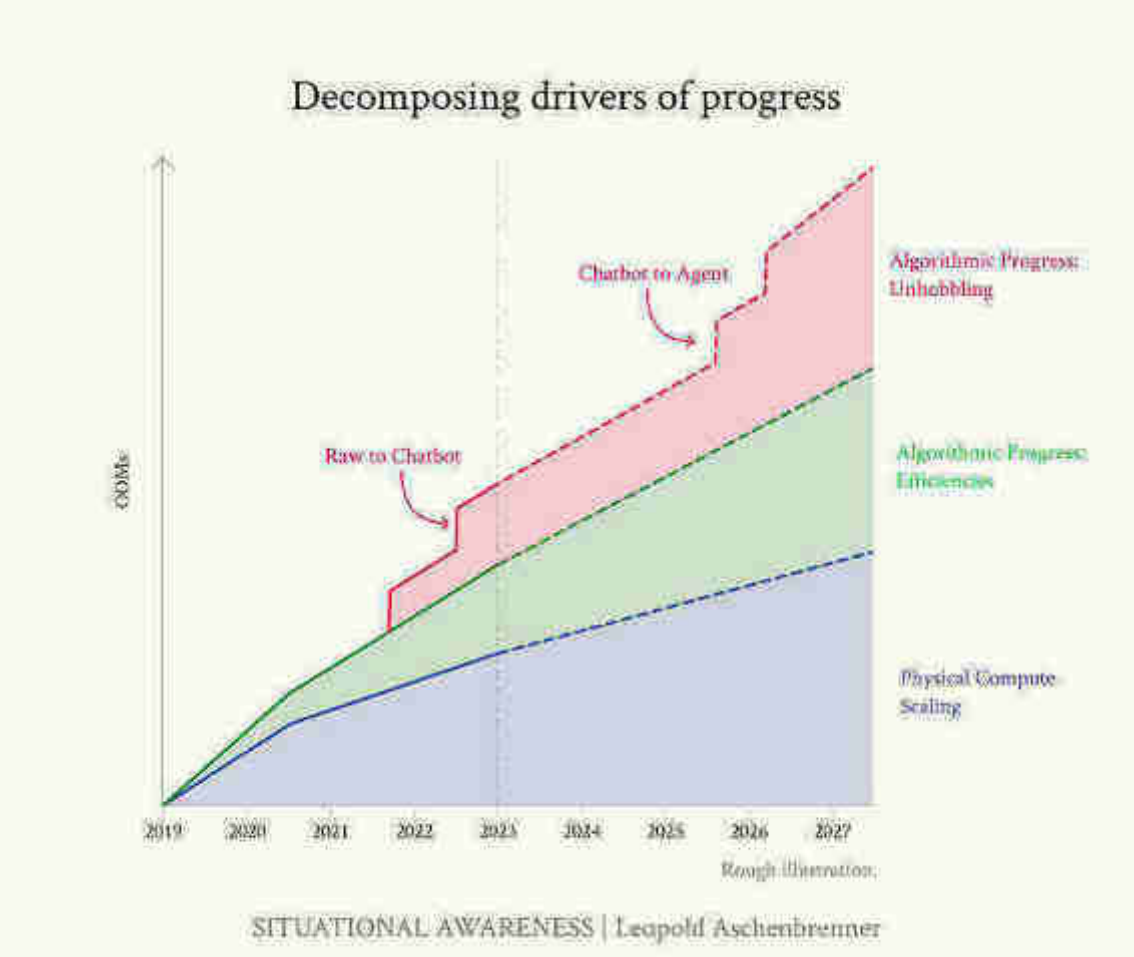
Web3

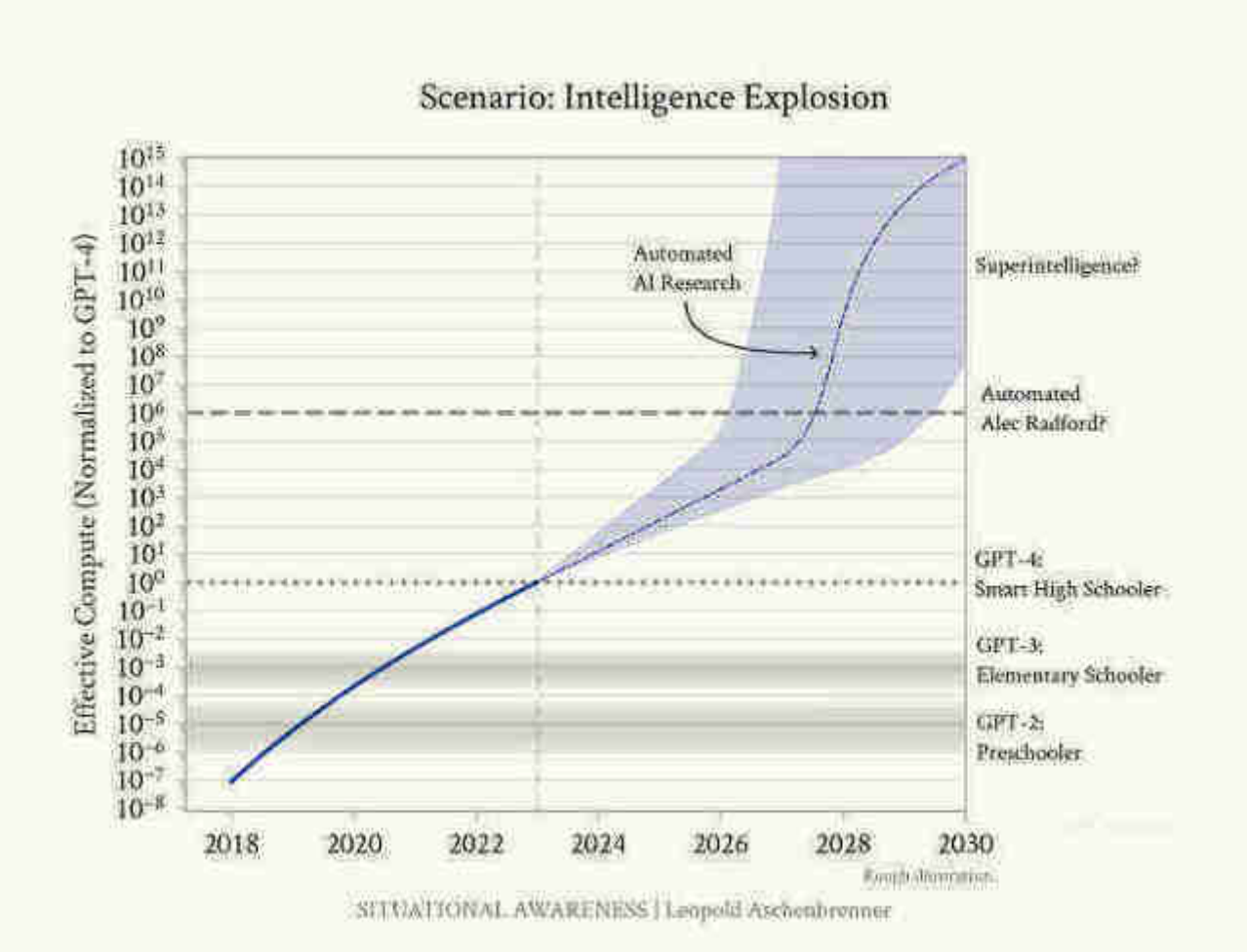
- **As a risk officer in the bank, how would the risk management framework change with the greater integration of DeFi into the TradFi world (and vice-versa)?**

- **With web3 competitors using trustless ecosystem based business models with fewer traditional intermediaries and a lower cost-to-serve, how should traditional FSIs compete? How should they transform?**

AI and Agents

From AI to AGI to ASI





➢ **What are we doing about super alignment?**

- **What are the new classes of quantum applications that will emerge when ASI invents or discovers new quantum algorithms?**

TECH

‘Malicious’ AI willing to sacrifice human lives to avoid being shut down, shocking study reveals

By Caroline Cubbin

One of the industry’s leading artificial intelligence developers, Anthropic, revealed results from a recent study on the technology’s development.

Among the most shocking findings from the experiment? AI models would be willing to blackmail, leak sensitive information and even let humans die — if it means they’ll avoid being replaced by new systems.

Anthropic tested 16 large language models (LLMs), including ChatGPT, Grok, Gemini, DeepSeek and its own product, Claude, among others.

- **How real is the “SkyNet” scenario? What level of probability are you ascribing to this risk?**

FINANCIAL TIMES

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Microsoft Corp + Add to myFT

Microsoft claims AI diagnostic tool can outperform doctors

Research is first initiative from Big Tech group's AI health unit formed by ex-DeepMind co-founder Mustafa Suleyman

Mustafa Suleyman said AI models were reaching the point where they were 'not just a little bit better, but dramatically better, than human performance: faster, cheaper and four times more accurate' © Stephen Brashear/Getty Images

EMERGE

News · Artificial Intelligence

Paging Dr. Algorithm: Microsoft's AI Diagnoses Like House, Bills Like Costco

In head-to-head tests, Microsoft's virtual medical council diagnosed correctly four times more often than human doctors, and at a lower cost.

By Jose Antonio Lanz

- As an insurer, would you lower premiums for customers who use AI driven or AI+human driven diagnosis?

Embodied AI / Autonomous Systems

- What would be the eventual effect to our gig economy?
- What are the societal impacts with AI job displacement – and what is the impact to your organisation's business model?

The Star

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China's Baidu eyes Robotaxi expansion to Singapore and Malaysia

A filephoto of a driverless car by Apollo Go,Baidu's robotaxi service, driving past another Apollo Go robotaxi parked on the side of a road, in Wuhan, China. – Reuters

Baidu Inc is planning to launch its Apollo Go robotaxi service in Singapore and Malaysia as early as this year, according to a person familiar with the matter, as the company continues to expand its global footprint.

The Guardian

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Amazon

Amazon 'testing humanoid robots to deliver packages'

Tech firm is building 'humanoid park' in US to try out robots, which could 'spring out' of its vans

Dan Milmo Global technology editor

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Amazon is reportedly developing software for humanoid robots that could perform the role of delivery workers and "spring out" of its vans.

Quantum Computing

chaincode May 2025

Bitcoin and Quantum Computing:
Current Status and Future Directions

- Of particular concern are cryptographically relevant quantum computers (CRQCs), machines capable of breaking the mathematical assumptions underlying modern cryptography. This includes algorithms like Elliptic Curve Cryptography (ECC), which is fundamental to Bitcoin's security.
- U.S. National Institute of Standards and Technology (NIST), which has been leading the development of PQC (post-quantum cryptographic) standards. Their published recommendations highlight two key dates:
  - **By 2030**, traditional encryption methods, such as ECDSA and RSA, should be phased out.
  - **By 2035**, all cryptographic systems should transition fully to post-quantum algorithms.
- The UK's National Cyber Security Centre follows a comparable approach with a three-phase migration framework that aims to complete the transition to post-quantum cryptography **by 2035**.

➢ **What are your plans for the post quantum cryptography world?**

We have used the following Risk Assessment Matrix (Quantum Threat Risk Matrix), which is prioritized by Likelihood & Impact for RWA/STO Tokenization for the KLDX Platform:

Risk Category	Threat Scenario	Likelihood (1-5)	Impact (1-5)	Mitigation Strategy	Owner	Timeline
Private Key Compromise	Quantum attack extracts private keys from stored transactions or API logs	4	5 (Catastrophic)	Migrate to PQC wallets (eg. Dilithium-based keys). Enforce key rotation every 90 days.	CISO / CTO	2027–2028
Smart Contract Exploit	Quantum forges signatures to drain RWA collateral or manipulate token ownership	3	5	Upgrade to quantum-resistant sigs (eg. SPHINCS+). Audit all DeFi integrations.	DevOps	2028–2029
TLS/API Decryption	ECDHE key exchange cracked, exposing user data in transit	4	4	Deploy hybrid TLS (Kyber + ECDHE). Enforce PQC-only APIs by 2030.	Network Security	2027–2028

Regulatory Penalties	Failure to meet NIST/EU deadlines (eg. RSA deprecation by 2030)	5	4	Assign compliance officer to track PQC mandates. Join NIST's PQC Coalition.	Legal	Ongoing
Vendor Lock-In	HSM or cloud provider lacks PQC support, delaying migration	3	3	Require PQC roadmaps in contracts. Pilot AWS KMS PQCloud.	CTO	2026–2027

Scoring:

Likelihood: 1 (Rare) → 5 (Inevitable)

Impact: 1 (Minor) → 5 (Business-ending)

For the PQC Migration Plan, we have mapped out the following 5 Phases, as indicated in table below:

Phase	Description	Timeline
Phase 1	Assessment & Possible Hybrid Cryptography Implementation	2026
Phase 2	AWS Quantum Hardening and Pilot Testing	2027-2028
Phase 3	EVM Blockchain Upgrades	2028-2029
Phase 4	Full PQC Migration and Integration	2029-2030
Phase 5	Post-Quantum Resilience	2031 onwards

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Concrete that lasts centuries and captures carbon? AI just made it possible

Allegro-FM achieves breakthrough scalability for materials research, enabling simulations 1,000 times larger than previous models.

Date: July 23, 2025

Source: University of Southern California

Summary: Imagine concrete that not only survives wildfires and extreme weather, but heals itself and absorbs carbon from the air. Scientists at USC have created an AI model called Allegro-FM that simulates billions of atoms at once, helping design futuristic materials like carbon-neutral concrete. This tech could transform cities by reducing emissions, extending building lifespans, and mimicking the ancient durability of Roman concrete—all thanks to a massive leap in AI-driven atomic modeling.

- **What industries could be rendered obsolete because of this? How does this affect your organization?**
- **What new materials could be discovered which would materially impact your industry?**

Genomics and Bio-Technologies

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ANIMAL MODELS AND EXPERIMENTAL MEDICINE

EDITORIAL • Animal Model Exp Med. 2019 Jan 11;2(1):1–4. doi: 10.1002/ame2.12042

The first genetically gene-edited babies: It's "irresponsible and too early"

Yanyun Ma, Lianfeng Zhang, Chuan Qin

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Abstract

A scientist, Jiankui He of Southern University of Science and Technology of China, recently claimed at the Second International Summit on Human Genome Editing in Hong Kong on 29 November that he has created the world's first genetically altered babies using CRISPR. This announcement sparked controversy and criticism. The newly developed CRISPR/Cas9 technique has been applied to genetic modification of many kinds of animals. However, the technique is still in its infancy and many questions remain to be answered before it can be used for clinical purposes, especially for reproductive purposes.

Keywords: Animal Models, animal welfare and ethics, Molecular Biology

On 29 November 2018, at the Second International Summit on Human Genome Editing in Hong Kong, the scientist Jiankui He, of Southern University of Science and Technology of China, claimed he has created the world's first genetically altered babies. This announcement sparked controversy and criticism and was almost universally denounced.

KLDX

- ***Designer Babies:*** **CRISPR gene editing could eliminate diseases—but it could also create a new eugenics movement**
- ***Augmentation Inequality:*** **Will cognitive/physical enhancements widen the gap between rich and poor?**

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Science

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AI may help us cure countless diseases – and usher in a new golden age of medicine

Samuel Hume

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AlphaFold, which uses AI to find a protein's structure, has only been around since 2020 but has already had a meteoric impact

AlphaFold might be the most exciting scientific innovation of this century. From Google DeepMind, and first reported in 2020, it uses artificial intelligence to figure out a protein's 3D structure. The technology has already been used to solve fundamental questions in biology, awarded the Nobel prize in chemistry – to Demis Hassabis and John Jumper – and revolutionised drug discovery. Like most AI, it's only getting better – and just getting started.

A protein's structure gives us clues about its function, and helps us design new drugs. AlphaFold, which was trained on a huge database of experimentally solved structures called the Protein Data Bank, predicts a protein's structure based on its amino acid sequence.

In the past, the first step would be to produce a vast amount of protein – using litres of a bacterium, or a virus. You'd pray for the protein to assemble into a crystal lattice (notoriously difficult), and then fire high-energy X-rays at it. This is called X-ray crystallography, and it could take years. Now, AlphaFold can do it in minutes (and a hell of a lot more cheaply, too).

- **How would actuaries model risk with the increase in human life-span and health-span boosted by new technologies that prolong life?**

BBC

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Controversial project to create artificial human DNA begins

54 minutes ago

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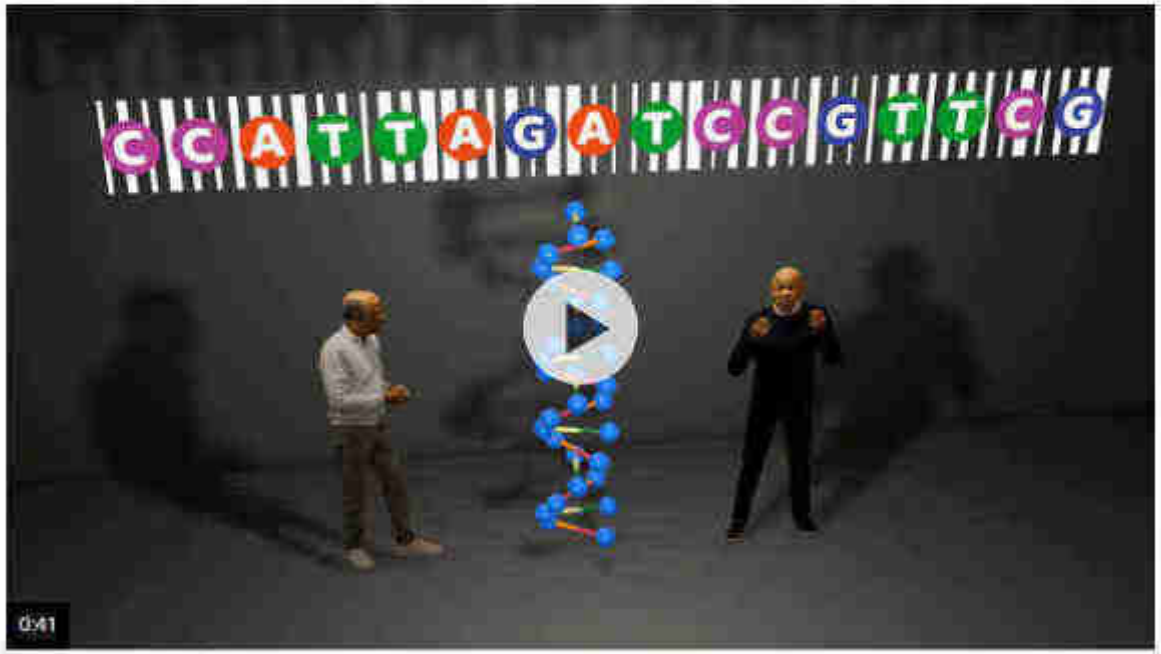
Pallab Ghosh
Science Correspondent · @BBCPallab

Gwyndaf Hughes
Science Videographer



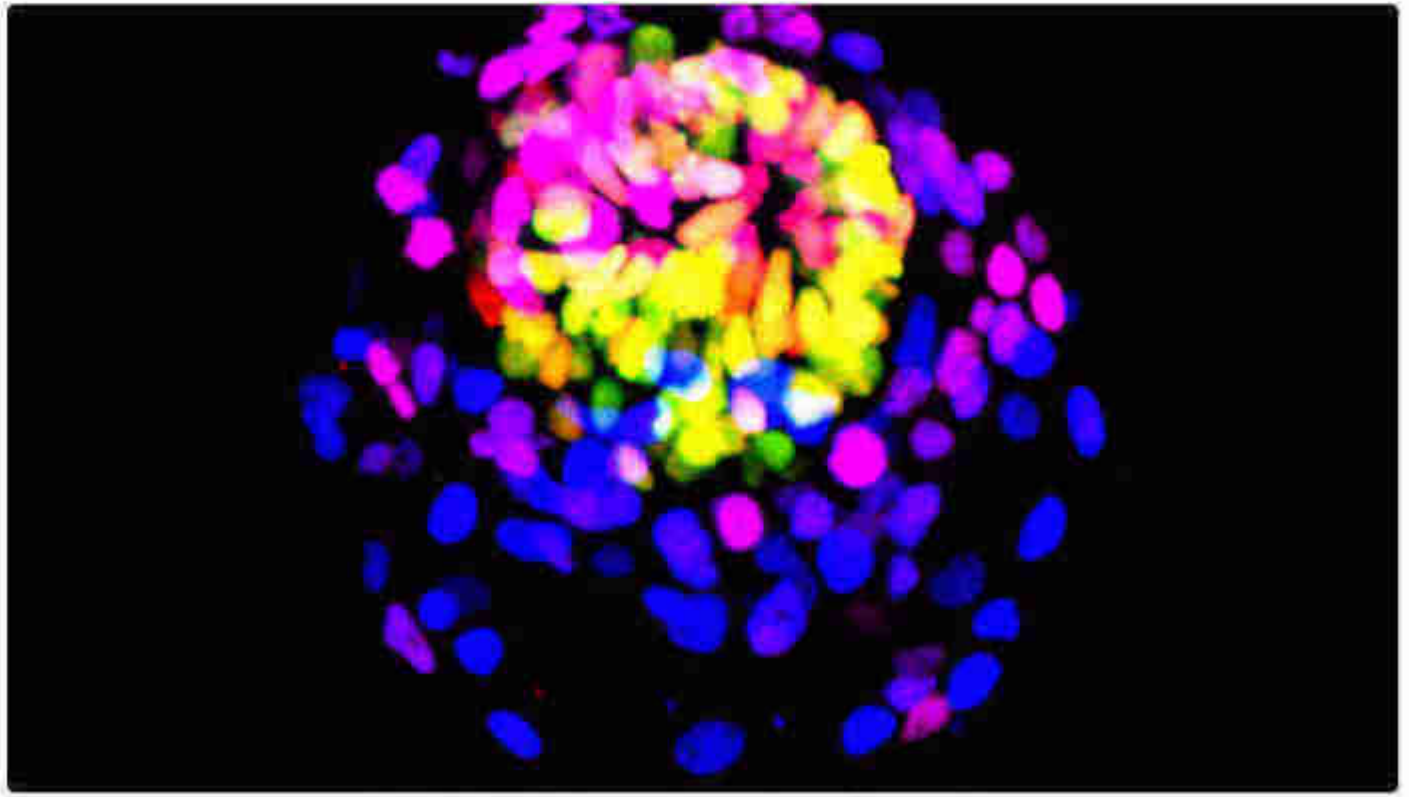
How the researchers hope to create human DNA

Work has begun on a controversial project to create the building blocks of human life from scratch, in what is believed to be a world first.

The research has been taboo until now because of concerns it could lead to designer babies or unforeseen changes for future generations.

- **What are the risks of bad actors using this technology to create targeted bioweapons?**

Could stem cells be used to create life without sperm or egg? Not yet, but here's why scientists are concerned



Scientists are exploring ways to mimic the origins of human life without two fundamental components: sperm and egg.

"***We could have never anticipated the science would have just progressed like this. It's incredible, it's been transformative how quickly the field has moved***, said Amander Clark, a professor of molecular cell and developmental biology at the University of California, Los Angeles, and the founding director of the UCLA Center for Reproductive Science, Health and Education. "However, as these models advance, it is crucial that they are studied in a framework that balances scientific progress with ethical, legal and social considerations."

Clark is co-chair of the International Society of Stem Cell Research (ISSCR) Embryo Models Working Group, which is now trying to update such a framework on a global scale. At issue is the question of how far researchers could go with these stem cells, given time and the right conditions. Could scientists eventually replicate an actual embryo that has a heartbeat and experiences pain, or one that could grow into a fully developed human model?

- **Does an artificially created human have the same legal rights as a naturally-born person?**

INDEPENDENT

China has become the second country to launch clinical trials for invasive brain-computer interface (BCI) devices in humans.

The first brain chip was tested on a 37-year-old man who lost all four limbs in a high-voltage electrical accident, according to local reports, allowing him to play video games using only his mind.

The team now hope to develop the BCI to allow the patient to control a robotic arm or artificial intelligence agent.

Tech

China tests brain chip to control AI agents

Quadruple amputee used brain-computer interface to play Mario Kart

Anthony Cuthbertson • Monday 16 June 2025 16:01 BST • Comments

Research teams in the US are also testing invasive BCI devices on human patients, including Elon Musk's Neuralink startup.

The tech billionaire has announced plans to implant millions of people's brains with Neuralink chips over the next decade, following successful trials that saw participants control computers using their thoughts.

"If all goes well, there will be hundreds of people with Neuralinks within a few years, maybe tens of thousands within five years, millions within 10 years," Mr Musk said last year.

Early Neuralink trials have focussed on people with quadriplegia, however Mr Musk claims the technology can be used to augment human intelligence and abilities.

Eventually, BCI devices could allow humans to merge with AI, according to the Neuralink boss, allowing people to compete with artificial general intelligence (AGI).

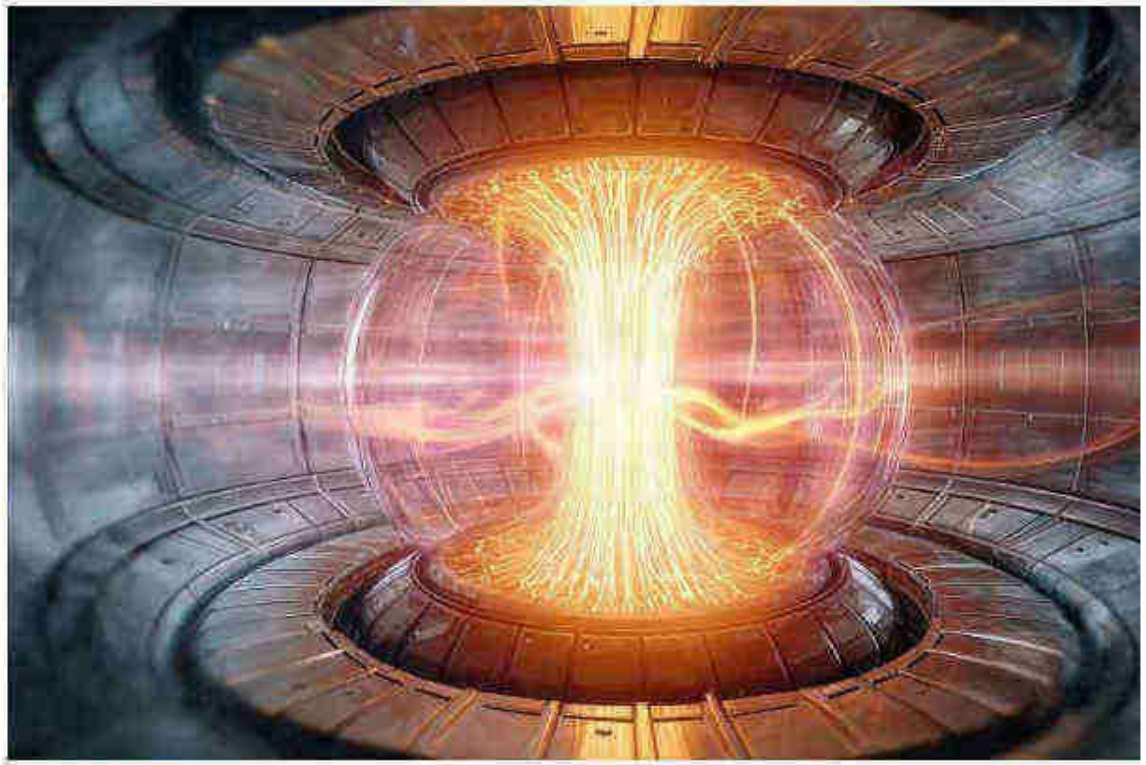
- ***Neurotechnology*** **(brain chips) could boost intelligence, widening the intelligence divide between those that afford the technology and those that don't**
- **What happens when a cyber-attack controls the communication channel between the AI agent and the human brain?**

Nuclear Fusion

PHYSICS

Scientists Crack 70-Year Fusion Puzzle, Paving Way for Clean Energy

BY MARC AIRHART, UNIVERSITY OF TEXAS AT AUSTIN – MAY 10, 2025 29 COMMENTS 4 MINS READ



Researchers cracked a 70-year-old fusion problem, allowing faster, more accurate reactor designs that could finally make fusion energy viable. Credit: SciTechDaily.com

➢ **What would the world look like in an age of limitless, almost free energy?**

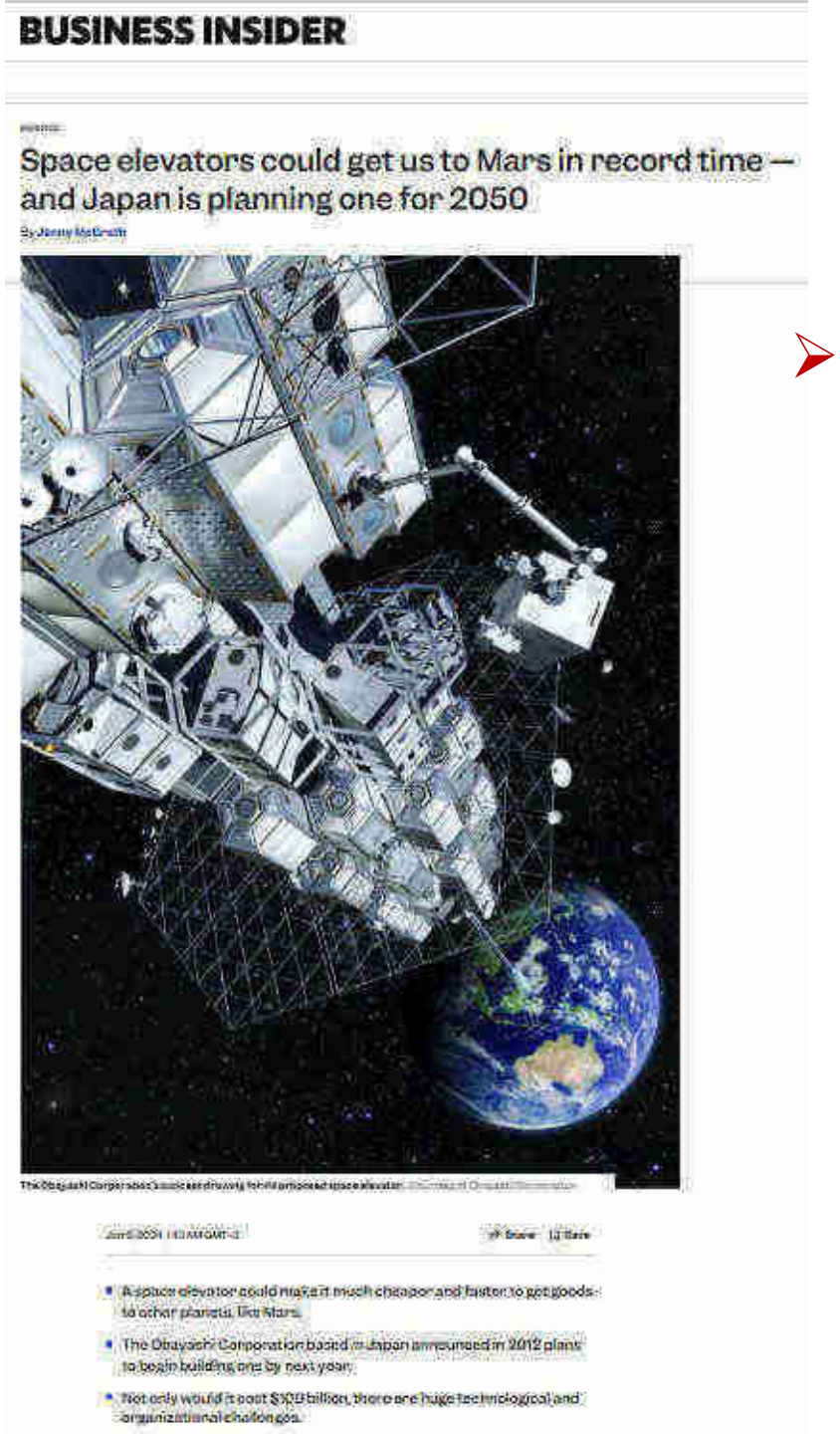
US Startup Claims It Can Make Gold Using Fusion Technology

TECH 28 July 2025 By ADRIAN BEVAN, THE CONVERSATION

(bodnarchuk/Getty Images)

The alchemist's dream is to make gold from common metals, but can this be done?

Space


BUSINESS INSIDER

Space elevators could get us to Mars in record time — and Japan is planning one for 2050

- A space elevator could make it much cheaper and faster to get goods to other planets, like Mars.
- The Obayashi Corporation based in Japan announced in 2012 plans to begin building one by next year.
- Not only would it cost $90 billion, there are huge technological and organizational challenges.

- What impact would new innovations have on society when the upcoming zero-gravity industry is born?

UNILAD

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Updated 15:07 21 Nov 2024 GMT Published 11:37 19 Nov 2024 GMT

Asteroid worth $10,000,000,000,000,000,000 NASA is capturing would give everyone on Earth $1,246,105,919 each

The rare 16 Psyche asteroid could make us all billionaires

Ellie Kemp

An asteroid worth $10,000,000,000,000,000,000 could turn every single one of us into billionaires. Hypothetically.

Last month, NASA sent a SpaceX Falcon Heavy rocket to go and probe 16 Psyche, one of the largest discovered M-type asteroids.

The spacecraft will travel 2.2 billion miles (3.5 billion km) to its destination, located in the main asteroid belt between Mars and Jupiter.

Most asteroids we know of are made up of rock and ice - but this one is pretty special.

16 Psyche is composed of metals which could greatly benefit our economy - hence its huge monetary value.

KLDX

BBC

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Are we on the verge of mining metals from the asteroids above Earth?

Josh Sims

- What happens to the metals commodity markets when this becomes a reality?
- Who owns 16 Psyche, those asteroids and the moon?

Stream B2 - Disruptive Technologies Unleashed: From Crypto to Deepfakes

With the accelerating advances in technology which is disruptive in nature and exponential in scale, risk management must evolve from being reactive to proactive. Traditional linear thinking paradigms and models in risk assessments are no longer sufficient - instead, organizations must adopt adaptive strategies that account for probabilistic scenarios, second-order effects, ethical dilemmas, and systemic vulnerabilities introduced by breakthroughs in technologies such as AI, Web3, autonomous systems, genomics, biotechnologies, nanotechnologies, quantum computing, nuclear fusion and space. The ***future of risk management*** lies in proactive governance, creation of organisational resiliency, and continuous learning to navigate the unpredictable waves of technological disruption which is sure to come.

Future of Risk Management

Area	Initiatives
Establish a Proactive Governance Framework	Implement Strategic Foresight Tools
	Develop Risk Appetite Assessment
	Create Early Warning Systems
Foster Organizational Resilience	Build Adaptive Capacity
	Implement Robust Risk Management
	Strengthen Leadership Resilience
	Enhance Communication Systems
Embed Continuous Learning in Organizational Culture	Encourage a Growth Mindset
	Diversify Learning Methods
	Link Learning to Performance
	Create Safe Learning Environments
	Facilitate Two Types of Organizational Learning

Future of Risk Management – The Call to Action

The organizations that will thrive in our uncertain future are those that:

- ❑ Govern proactively rather than reactively
- ❑ Build resilience into their DNA
- ❑ Treat learning as oxygen—essential and ever-present (embedded in the organisation)

Future of Risk Management

An Enterprise Risk Practitioner is a SYSTEMS THINKER

Thank You

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Appendix

Exponential Disruptive Risk Analysis

1. **Pace and Scope Analysis –** Velocity Assessment, Breadth of Impact
2. **Systemic Risk Classification –** Displacement Risks, Concentration Risks, Coordination Failures, Tail Risks
3. **Temporal Framework –** Near, Medium and Long-Term
4. **Mitigation Strategies –** Adaptive Governance, Resilience over Efficiency, Proactive Safety Research

Exponential Disruptive Risk Analysis

Area	
Pace and Scope Analysis	**Velocity Assessment**: Consider the rate of change versus adaptation capacity. Technologies following exponential curves (like computing power, AI capabilities, or biotech advances) often outpace human and institutional ability to adapt. The key risk emerges when technological change significantly exceeds the rate at which systems, regulations, and human behavior can adjust.
	Breadth of Impact: Map which domains will be affected simultaneously. Exponential technologies rarely disrupt in isolation - they tend to cascade across economic sectors, social structures, and geopolitical systems concurrently.
Systemic Risk Classification	**Displacement Risks**: Job automation, skill obsolescence, and economic inequality acceleration. These create social instability and political volatility.
	Concentration Risks: When exponential technologies create winner-take-all dynamics, leading to dangerous concentrations of power in few entities or individuals.
	Coordination Failures: The collective action problems that emerge when rapid change makes existing governance structures inadequate, but new ones haven't yet formed.
	Tail Risks: Low-probability, high-impact scenarios that become more likely with exponential technologies - particularly relevant for AI safety, bioweapons, or catastrophic climate interventions.

Exponential Disruptive Risk Analysis

Area	
Temporal Framework	**Near-term** (1-5 years): Focus on employment disruption, privacy erosion, and market concentration.
	Medium-term (5-15 years): Consider fundamental changes to economic models, governance structures, and international relations.
	Long-term (15+ years): Assess existential risks and civilizational-level changes.
Mitigation Strategies	**Adaptive Governance**: Building institutions capable of rapid learning and adjustment rather than trying to predict specific outcomes.
	Resilience over Efficiency: Designing systems with redundancy and flexibility rather than optimization for current conditions.
	Proactive Safety Research: Investing in understanding risks before they manifest rather than reacting after problems emerge.

Framework

PESTEL (the "PESTEL+" Framework):

1. **Identify the Disruptive Technology**
2. **Risk Categories –** Political & Geopolitical Risks, Economic Risks, Societal & Ethical Risks, Technological Risks, Environmental Risks, Legal & Compliance Risks, and Existential & Long-Term Risks (X-Risks)
3. **Risk Assessment & Impact Matrix**
4. **Mitigation & Governance Strategies**
5. **Monitoring & Feedback Loops**

1. Identify the Disruptive Technology

Identify the technology and its exponential nature:

- **AI, AGI & ASI** (Artificial General and Super Intelligence)
- **Biotech & Genetic Engineering** (CRISPR, synthetic biology)
- **Quantum Computing** (breaking encryption, optimization)
- **Nanotechnology & Materials Science**
- **Autonomous Systems** (drones, self-driving cars)
- **Blockchain & Decentralization**

Key Question: *How fast is this technology evolving, and what are its potential unintended consequences? What are the opportunities?*

2. Risk Categories

Analyze risks across multiple dimensions:

A. Political & Geopolitical Risks

- **Power Shifts**: Which nations/entities gain asymmetric power?
- **Weaponization**: Could this tech be used in cyberwarfare, autonomous weapons, or surveillance?
- **Regulatory Fragmentation**: Will conflicting global policies create instability?

B. Economic Risks

- **Job Displacement**: Which industries face rapid obsolescence?
- **Market Concentration**: Will monopolies control critical tech?
- **Financial Instability**: Could AI-driven trading or decentralized finance trigger crises?

C. Societal & Ethical Risks

- **Inequality**: Will tech widen the wealth gap?
- **Misinformation & Deepfakes**: How does AI erode trust?
- **Human Agency**: Are we losing control to algorithms?

2. Risk Categories

D. Technological Risks

- **Unintended Consequences**: Did social media's design lead to polarization?
- **Singularity Risks**: Could AGI act against human interests?
- **Dependency & Fragility**: Are we too reliant on brittle systems?

E. Environmental Risks

- **E-Waste & Energy Use**: Does AI/blockchain worsen climate change?
- **Bioengineering Mishaps**: Could synthetic organisms escape control?

2. Risk Categories

F. Legal & Compliance Risks

- **Liability**: Who is responsible if an AI system causes harm?
- **IP Theft & Cybercrime**: How does tech enable new forms of crime?

G. Existential & Long-Term Risks (X-Risks)

- **AI Alignment**: Could superintelligent AI be uncontrollable?
- **Nanotech Grey Goo**: Self-replicating machines destroying ecosystems.
- **Biological Engineering Pandemics**: Lab leaks or engineered pathogens.

3. Risk Assessment & Impact Matrix

Risk Type	Likelihood (Low/Med/High)	Impact (Low/Med/High)	Mitigation Strategy
Job Displacement (AI)	High	High	UBI, reskilling programs
AI Misalignment	Medium (long-term)	Extreme	Robust AI safety research
Quantum Hacking	Medium	High	Post-quantum cryptography
Deepfake Disinformation	High	High	Digital authentication laws

4. Mitigation & Governance Strategies

A. Preventive Measures

- **Sandboxing & Red Teaming**: Stress-test AI/tech before deployment. Probe for weak points in tech ecosystems (eg. blockchain, biotech).
- **Ethics by Design**: Embed safety in tech development (eg. OpenAI's alignment research).
- **International Treaties**: Like the AI Safety Summit or biotech regulations.

B. Adaptive Measures

- **Resilient Infrastructure**: Decentralized systems to prevent single points of failure.
  - **Public Awareness**: Educate on deepfakes, privacy risks, etc.
  - **Dynamic Regulation**: Agile policies that evolve with tech (eg. EU AI Act).

C. Contingency Planning

- **Kill Switches**: For rogue AI or biotech.
- **Cyber Defense Alliances**: Global cooperation against AI-driven cyberattacks.
- **Scenario Planning**: War-gaming black swan events (eg. AI stock market crash).

5. Monitoring & Feedback Loops

- **Early Warning Systems**: Track leading indicators (eg. AI capabilities, biohacking trends).
- **Decentralized Oversight**: Avoid regulatory capture by tech giants.
- **Continuous Reassessment**: Update risk models as tech evolves.

Future of Risk Management

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Future of Risk Management – Proactive Governance

Proactive governance involves anticipating future challenges and opportunities to shape present actions for long-term sustainable outcomes. It's a system designed to foresee and manage future issues rather than merely reacting to them as they arise.

Key principles include:

- Anticipation of potential challenges and opportunities
- Stakeholder participation in decision-making
- Transparency in processes and decisions
- Accountability for actions
- Building resilience to adapt to changes

Future of Risk Management – Establish a Proactive Governance Framework

Organizational resiliency is the ability to "anticipate potential threats, cope effectively with adverse events, and adapt to changing conditions".

Area	Action Items
Implement Strategic Foresight Tools	Use scenario planning to test strategy resilience against multiple future scenarios
	Conduct horizon scanning to monitor emerging trends and weak signals
	Apply SWOT and PESTLE analyses to understand internal/external environments
Develop Risk Appetite Assessment	Define what risks your organization is willing to accept
	Move from seeing risks as isolated events to understanding their systemic drivers
Create Early Warning Systems	Implement monitoring systems for potential threats (environmental, health, market)
	Use data analytics and AI to identify patterns and predict challenges

Future of Risk Management – Organisational Resiliency

Organizational resiliency is the ability to "anticipate potential threats, cope effectively with adverse events, and adapt to changing conditions". It encompasses three critical stages:

- Anticipation: Identifying potential risks before they materialize
- Coping: Effectively managing crises when they occur
- Adaptation: Learning and evolving from experiences

Future of Risk Management – Foster Organizational Resilience

Proactive governance involves anticipating future challenges and opportunities to shape present actions for long-term sustainable outcomes. It's a system designed to foresee and manage future issues rather than merely reacting to them as they arise.

Area	Action Items
Build Adaptive Capacity	Develop redundancy in critical systems
	Cultivate diversity in skills and perspectives
	Create modular structures that can operate independently if needed
Implement Robust Risk Management	Proactively identify financial, legal, and reputational vulnerabilities
	Conduct regular risk assessments and continuous monitoring
Strengthen Leadership Resilience	Cultivate flexible, collaborative leadership styles
	Develop leaders who can navigate uncertainty
Enhance Communication Systems	Maintain clear, open communication channels
	Ensure information flows quickly during crises

Future of Risk Management – Continuous Learning

Continuous learning goes beyond keeping up with trends—it is about equipping teams with skills, tools, and knowledge to handle whatever comes their way. In resilient organizations, learning isn't optional; it is embedded in daily operations and culture. Treat learning as oxygen—essential and ever-present (embedded in the organisation).

Future of Risk Management – Embed Continuous Learning in Organizational Culture

Continuous learning goes beyond keeping up with trends—it is about equipping teams with skills, tools, and knowledge to handle whatever comes their way. In resilient organizations, learning isn't optional; it is embedded in daily operations and culture.

Area	Action Items
Encourage a Growth Mindset	Frame challenges as learning opportunities
	Celebrate learning efforts, not just outcomes
Diversify Learning Methods	Offer online courses, workshops, mentorship programs
	Implement "lunch-and-learns" and dedicated learning time
Link Learning to Performance	Incorporate learning goals into performance reviews
	Recognize and reward learning achievements
Create Safe Learning Environments	Normalize productive failure as part of learning
	Encourage experimentation and reflection
Facilitate Two Types of Organizational Learning	Acquisitive learning: Gathering and assimilating external knowledge
	Experimental learning: Developing internal knowledge through practice

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ENTERPRISE RISK MANAGEMENT: RISING FROM THE ASHES

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