Systems Curriculum virtual event series

Principles and practical applications of systems thinking in the investment industry

Session 5. Measurement | 11 December 2024 | Pre-reading

"What gets measured gets managed"
- Peter Drucker

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Systems curriculum: understanding the power and practice of systems thinking

5. Summary & Measurement – 11 December 2024

Pre-reading
- 60 minutes hybrid
- Includes expert inputs
- Includes Q&A

0. Systems primer – the key features of systems thinking and systems design and the different lenses to see systems through

1. Systemic risk - Systemic risk concepts. Deepening understanding

Adapting our practices

2. Systems leadership – *the use of systems leadership models* which recontextualise problems as shared problems and use systems thinking to explore and solve the problem

3. Beliefs – *the use of system patterns* to understand the present landscape and plan for the future

4. Sustainability – Sustainable investing and *systems-level investing* in which the three dimensions of risk, return and impact are integrated

5. Summary & Measurement - the whole systems story, theory, data; *the use of scorecards* in which measuring and incentivisation is addressed more systemically

Source: TAI Systems Curriculum: June – December 2024

Copernican turn

A compelling trio of engaging story – intriguing theory – significant figures

- Ptolemus' theory had the sun revolving around the Earth, visually plausible, but more accurate measurements by Copernicus disproved the theory and changed our understanding of the cosmos
- This was part of a shift in scientific progress, and a deeper exploration of our cognitive processes and was the start of a large paradigm shift
- Is systems thinking in investing something similar? The change here is smaller, and it's more evolutionary because we are building on top of a narrower paradigm (MPT) which is not so much wrong as incomplete

Preface | systems thinking

Define your terms

Systems thinking is about…

Connecting dots - *seeing wholes as inter-connected not isolated parts*

Recognising patterns - *seeing moving patterns not static pictures*

Socialising solutions - *seeing solutions through a collective not individual effort*

Systems thinking asks you to…

Complicate to understand, simplify to act

Think Ahead. Gretsky's principle – go where the puck will be

Use the power of 'and' and 'awe'

The definition of systems thinking in Arnold & Wade (2015)

Systems thinking is a set of synergistic analytic skills used to improve the capability of identifying and understanding systems, predicting their behaviours, and devising modifications to them in order to produce desired effects.

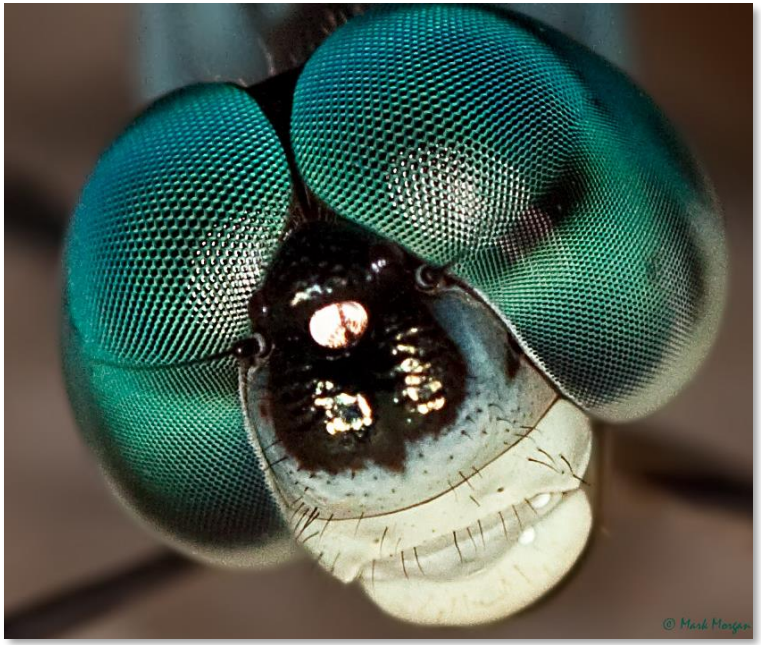
The system is defined as a collection of elements that are inter-connected and fulfil a certain purpose or function.

1. The measurement lens

Multiple lenses
What gets measured gets managed
Risk 2.0

Multiple lenses – dragonfly eyes

- The challenge is to build better perspectives and take better decisions by reducing blind spots and enhancing the accuracy of our vision
- The best way to reduce our blind spots is to change our perspective
- Think of each new perspective as a model and a lens through which you can see the world
- Models simplify the world into useable chunks



Dragonfly eyes have 30,000 lenses

Systems thinking patterns – joined-up ways of thinking and working

If you torture the data, it will confess to anything	We respond to incentives, the rest is commentary
Measurement gives a subject a respect. What gets measured gets managed	Progression & regression are hard to see eg the boiling frog
Performativity can work short-run, but can't outrun authenticity	Looking good means feeling good
What is claimed is going on is not the same as what is really going on	In a tragedy of the commons, free riders are paid well
Complex systems have influences and correlations but rarely causes and effects	Reason is the slave of passion. Feelings first, socialising second, thinking third
We measure what we do because we can. We can measure more than what we do	Quantifications need qualifications

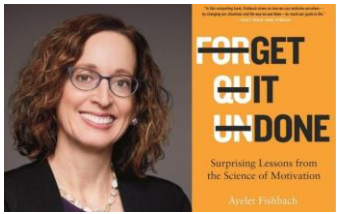
Getting it done – better framing of measurement

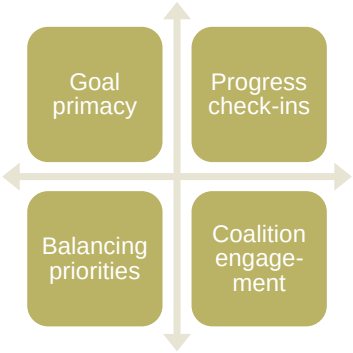
Management by objectives and key performance indicators only take us so far

There are certain inconvenient truths of measurement: complexity & performativity

The need for multiple comparators to see results in wider context

The need for clear goals, holistic check-ins, open accountabilities





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Applying ‘systems leadership’ to measurement in change processes

Framework

- Start with a strong framework which sees things in systems[1] terms with joined-up[2] views.
- Consider means (enablers) and ends (ultimate outcomes)
- Co-creation, deep thinking and engagement play their part producing a systems leadership approach

Goals

- ‘SMART goals’ are *specific, measurable, achievable, realistic and time-bound*
- But they should also be *systemic, multiple, agile, reflexive and transparent;*
- And they should be agile over time and adapt based on progress and system changes

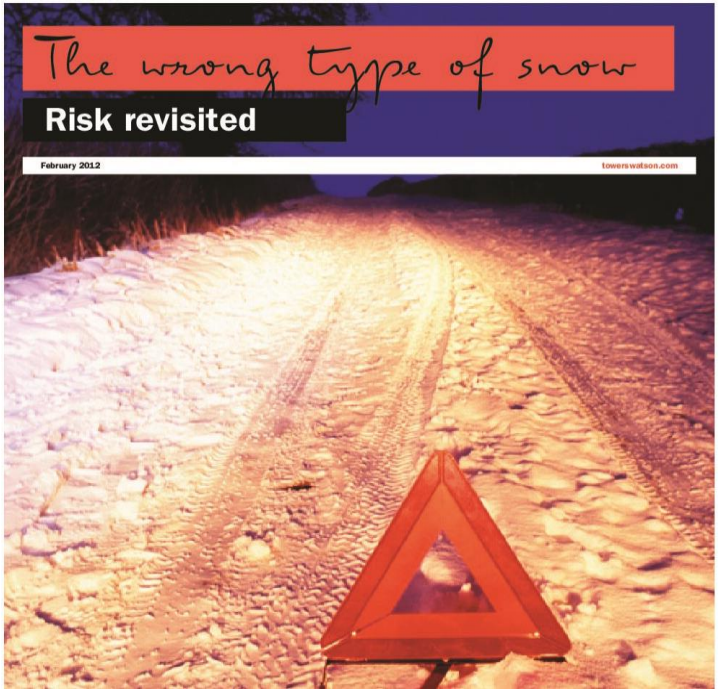
Hygiene & motivation

- Get good feedback. Be multi-faceted in the monitoring process in a balanced scorecard[8] of progress.
- Avoid biases, use scaffolding[4].
- Frequent check-ins help accountability, motivations and agility
- Apply clear accountability for desired outcomes with incentives attached [5]
- Measure and reward fairly

1. *The issues are framed in a systems way, allowing for the multiple connections and for the feedback and complexity in the ecosystem.*
2. *Joined-up is where key stakeholders are aligned in their thinking on mission and goals, thinking and actions, and strategy and priorities, and connected measurement*
3. *This balanced scorecard brings together a **scorecard** of relevant measures and indicators of performance compared to objectives within a **balanced** framework*
4. *Scaffolding is documented beliefs and principles and other governance as frameworks to advance critical thinking*
5. *Bookend OKR – objectives and key results - with overall goals and authenticity ie GOKRA*

Risk 2.0 | risk being seen wider, softer, longer

Wider risk – many sources of risk lie outside traditional models. Softer – many risks cannot be measured, need assessment and commentary. Especially sustainability. Longer - more can be done on long-term risk



The right type of thinking

Risk in the investment system

Wider risk The whole risk is greater than the sum of parts	**Softer risk** What can't be measured can still be important	**Longer risk** Long-term funds should study long-term risks
Measurement What gets measured gets managed	**Provenance** Quantification needs qualification	**Hysteresis** Cause & effect are rarely close together

Use of portfolio quality scorecard

Illustration of scorecard comparing SAA version vs TPA version

	Dimension	Metric	XYZ SAA	XYZ TPA	SAA illustration	TPA illustration
Prime factors	Return	Expected return vs cash (% pa)	3.0%	4.6%	The SAA Model is based principally on these 5 factors	The TPA Model is based on more factors
	Risk	Volatility (% pa)	7.5%	7.3%		
	Efficiency	Sharpe ratio	0.40	0.63		
	Relative risk	SAA/TPA relative risk	1% - 3%	3% - 5%		
	Low cost	MER	0.23%	0.54%		
Ancillary factors	Sustainability	ESG risk exposure (/100)	33	23		
	Climate	Implied Temperature Rise	2.8°C	2.5°C		
	Flexibility	% daily liquid	10%	26%		
	Access to skill	% contribution from skill	6%	31%		
	Governance	Oversight complexity	4/5	3/5		
Resilience factors	Diversity	Equity beta	0.63	0.37		
	Tail risk	Expected tail risk (% TCE)	26%	18%		
	Systemic risk factor	Systemic tail risk – 10Y % TCE*	x	x		
	Climate risk factor	Climate tail risk – 10Y % TCE*	x	x		
	Systems-stewardship	Systems-stewardship governance (%)	x	x		

The evolution of investment theory from Risk 1.0 to Risk 2.0

Some marked differences at the high level, but possible to build from Risk 1.0 to Risk 2.0 incrementally

	Risk 1.0	Risk 2.0
Theory	▪ SAA is central asset allocation model ▪ Aligning the SAA with meeting long-term strategic goals ▪ Optimising return relative to SAA benchmark return ▪ Thinking is focused on sub-portfolios vs the whole portfolio	▪ **TPA** (Total Portfolio Approach) is the central asset allocation model ▪ Maximising absolute return relative to long-term strategic goals ▪ Optimising total portfolio returns ▪ **Total portfolio thinking** is applied based on holistic principles
	▪ Narrower risk framework with single lens for considering risk ▪ Work in market values with allowance for illiquid assets ▪ The mean variance framework in risk versus return ▪ Expected returns, risks and co-variances are central assumptions ▪ Assumptions required including one view of risk = volatility, stable distribution, rational expectations, markets efficient ▪ The assumptions for illiquid assets are problematic	▪ **Broader risk framework** with risk considered through multiple lenses. ▪ Can work in cash flows and discount rates – using a term structure ▪ Macro factors – rates, growth, inflation, central banks, energy prices ▪ Systemic risks and regime shifts ▪ No fundamental constraining assumptions are required and so the aim is for a more realistic model without relying on these restrictive concepts ▪ Can deal with illiquid assets by reference to cash flows and discount rates
	▪ Portfolio decisions based on mean-variance optimisation	▪ Portfolio decisions based on **portfolio quality**
	▪ Accepting the market and the system as an outside factor ▪ Beta as a given ▪ 2D investing – risk and return	▪ Expanded scope in **integrating sustainability** and building better beta ▪ Working on the system to improve financial and real-world outcomes ▪ 3D investing – risk, return and real-world impact
Methods	▪ Modelling from past data where the issues are with its relevance ▪ Reliance on quantitative modelling	▪ Modelling from future thinking and data ▪ Quantitative models and qualitative scenario analysis
	▪ Investing portfolios under MPT precepts with stewardship based on single issuer considerations	▪ Investing and stewarding are more integrated with stewardship including more systemic considerations
Outcomes	▪ Alpha is, in total, a zero sum	▪ Outcomes can be positive sum with better beta
	▪ No clear net positives to society given unmanaged externalities	▪ Potential to achieve net positive for society impacts on real world outcomes

Risk 2.0 | wider, softer, longer assessment incorporated in portfolio allocation process

Wider	Taken account of five macro factors: growth, rates, inflation, central banks, energy prices
	Built returns from cash flows and discount rates, not just total return
	Allowed for regime changes in scenarios for supply/demand/central bank credibility/inflation
	Built and explored other possible future macro scenarios
	Allowed for systemic risks – adverse geopolitics, climate change, etc
Softer	Allowed for the future not aligning with the past, under different this time conditions
	Filled in gaps in past data for systemic risk/regime changes
	Allowed for likelihood of time varying correlations given macro sensitivities
	Where soft data used, clearly flagged any provenance qualification
	Where hard data is used, clearly flagged any materiality qualification
Longer	Have built in term structure to risk over time
	Allowed for regression versus regime change outcomes to cash flows and discount rates emergence
	Allowed for growth accretion/ dilution factor over longer horizons
	Allowed for reflexivity and fallibility in market responses to market outcomes
	Capital market assumptions are different between shorter-term (1-y) and longer-term (20-y) periods

Case study | systemic risk measurement is problematic

Expert opinion *Do a Delphi method Horizon scan of the climate shock at a 10-year horizon*	▪ Expert opinion surveys aim to harness the very best judgement in an abductive process– see Superforecasters below ▪ Judge 10-year return probability distribution P{no change climate} and read the 10Y VaR stat or TCE stat ▪ Judge 10-year return probability distribution P{current climate outlook}. This blends climate risk with market risk as a joint distribution and read out 10Y shock stat as above ▪ Note that P in current pricing should be between the two distributions and between the two 10-year tail stats ▪ The 10Y climate shock ~ the difference in the two shock/ tail stats. This is a statistic for the dashboard
Problem *This is highly speculative data*	▪ P{current climate outlook} is massively overfitted – its provenance or pedigree is poorer than the market risk ▪ Can we live with this shock stat. The choice is RAG or BET (Red-Amber-Green or Ball-park Estimate of Truth) ▪ Given the materiality is very high, and figures give a number respect, I would rather have the figure
Qualify the shock estimate *Use a provenance score*	▪ eg the 10Y shock is a ball-park estimate of 10% with *high materiality and low provenance. The whole statement is needed.* A dashboard should be made up of decision-useful data. All data has to be high-quality but not all data has good provenance
Adapt as new data emerges *Bayesian adjustment*	▪ Adjust the shock estimate as new information emerges. Again, this is an abductive process ▪ This can be at timed intervals – probably quarterly
Superforecasters *Process and personal characteristics of good judgement*	▪ The Philip Tetlock Good Judgment Project had forecasters given training on how to translate their understandings into a probabilistic forecast, summarised into the acronym "CHAMP" for Comparisons, Historical trends, Average opinions, Mathematical models and Predictable biases ▪ Other features of good forecasts: think probabilistically; update beliefs based on new evidence (Bayesian principles); remain open-minded; breaking down complex problems into manageable pieces; seeking out diverse perspectives.

2. The measurement lens

Examples

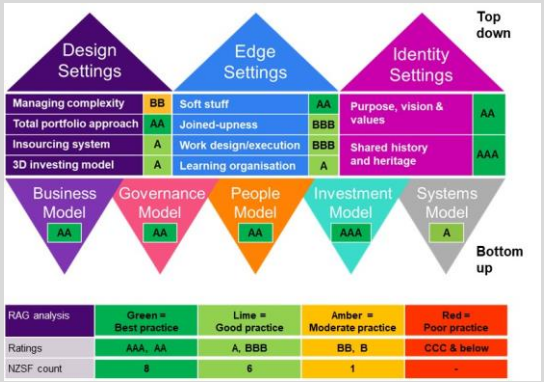
Case study | balanced scorecards & organisational alpha

USS Balanced scorecard *- evolving*

Next challenges

- Building a culture around this
- Tying in incentives and remuneration

NZSF organisational alpha using WTW dual lens method



Source: WTW and NZ Super Fund
[Independent review]

Next challenges

- TPA & Risk 2.0
- 3D investing & sustainable finance

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Case study | net zero investing measures

WTW commentary

There are significant governance challenges. The complex issues make reaching aligned conclusions difficult given the dependence on detailed review and understanding, robust processes and long-term consistency

There are a range of motivators for climate reporting. These include risk management, monitoring progress against net zero, wider stakeholder interest and regulatory compliance.

Climate reporting involves different users/audiences. There are both internal and external parties to be considered and different levels of communication required

There are significant data and methodology challenges. The data and information needed is of variable quality – estimates and models are everywhere, standards are limited; interpretation is shallow

There is the need for a total assets solution. There are particular challenges in some asset classes, notably sovereign bonds and private equity. There are fundamental issues with aggregation

There is a need to act collectively. The resolution of systemic challenges will ultimately require collective action in which various collaborative groups develop standards around net zero investing and measurement

Net zero metrics - *developing*

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Category	Dimension	Current metric
Impact of the portfolio on climate change	Carbon	Financed emissions – emissions / $ invested
	Alignment	% of portfolio aligned with a WB2C pathway
	Transition Finance	Exposure to climate solutions (EU Taxonomy, IIGCC)
Impact of climate change on a portfolio	Transition Risk	Climate Transition Value-at-Risk
	Physical Risk	Proportion of assets exposed to physical risks
Cross-cutting	Engage-ment	% financed emissions subject to direct or collaborative engagement

Next challenges

- Streamlining data capture
- Evolving the weightings

Climate reporting principles

Climate metrics are very, very different from other reporting metrics

Principle 1: The purpose of the report should be stated clearly
Implication: There may be several motivations.

Principle 2: The milestones or interim targets should be clearly defined (level and timescale)
Implication: Specific and measurable interim (eg 5/10 year) targets should be set to complement long-term climate goals.

Principle 3: The actions taken to achieve the targets should be documented
Implication: In addition to reporting the metrics and the targets it is important to include details of the actions taken by the investor to make progress towards the stated targets.

Principle 4: The metrics / evidence reported should allow a simple assessment of progress, or not, towards targets
Implication: Climate reporting should contain a clear indicator of whether the current reading represents positive or negative progress towards the interim and long-term climate goals of the investor and an explanation of how this assessment was formed.

Principle 5: The complexity of the subject requires multiple, complementary metrics to be shown
Implication: Climate reporting should take the form of a dashboard or balanced scorecard containing metrics from each of the key categories that are relevant to the use case/purpose in question.

Principle 6: Be transparent about any limitations/challenges inherent in what is being reported upon
Implication: Climate reporting should include details of the limitations of any metrics used and the data used to represent the portfolio (eg incomplete coverage, proxies applied).

Principle 7: Reporting is incomplete without a supporting narrative
Implication: The metrics and targets presented in climate reporting should be accompanied by a narrative that informs the reader on how to interpret the outcomes.

Principle 8: Be open to evolving reporting over time
Implication: Climate metrics and data quality are evolving and will improve over time so it is useful to define a practical current state, an aspirational future state and actions to reach the latter.

Case study | how systemic climate risk is easy to underestimate

How we are wired considerably hinders our understanding and assessment of climate change

- We are not joined-up in our thinking across the social, environmental, economic systems
- Many biases are heuristics where we over-simplify to conserve energy, many are emotional stress responses where we delude ourselves for our own personal protection
- This clash of systems here pits economic beliefs against human values with inevitable trade-offs and conflicts
- The iceberg model takes the climate beliefs, processes them into finance and then pinpoints several patterns – that produce alternative realities away from accurate realities

Patterns	Scientific system reality	Social system reality
Long-term bind	Climate change is a very long-term problem	People are most interested in the present and don't think so much about the long-term – we are unimaginative
Boiling frog	Climate change effects emerge with a long lag	People extrapolate and expect the good times to continue – without good data we lack judgement
Inaccessible truth	Climate change has a highly complex scientific explanation	People have simpler stereotypes for climate change that miss the scientific realities – we are inaccurate thinkers
Inconvenient truth	Climate change has a complex solution with extremely unattractive shorter-term elements	People can live in an echo chamber in which the truth is distorted – we have feelings that trump our rationality
Change hurts	Climate change is beyond our individual agency to control or influence	People lose their motivation in the face of the challenge's size -- we see plenty of evidence, but we don't see the crime

3. Conclusion on measurement

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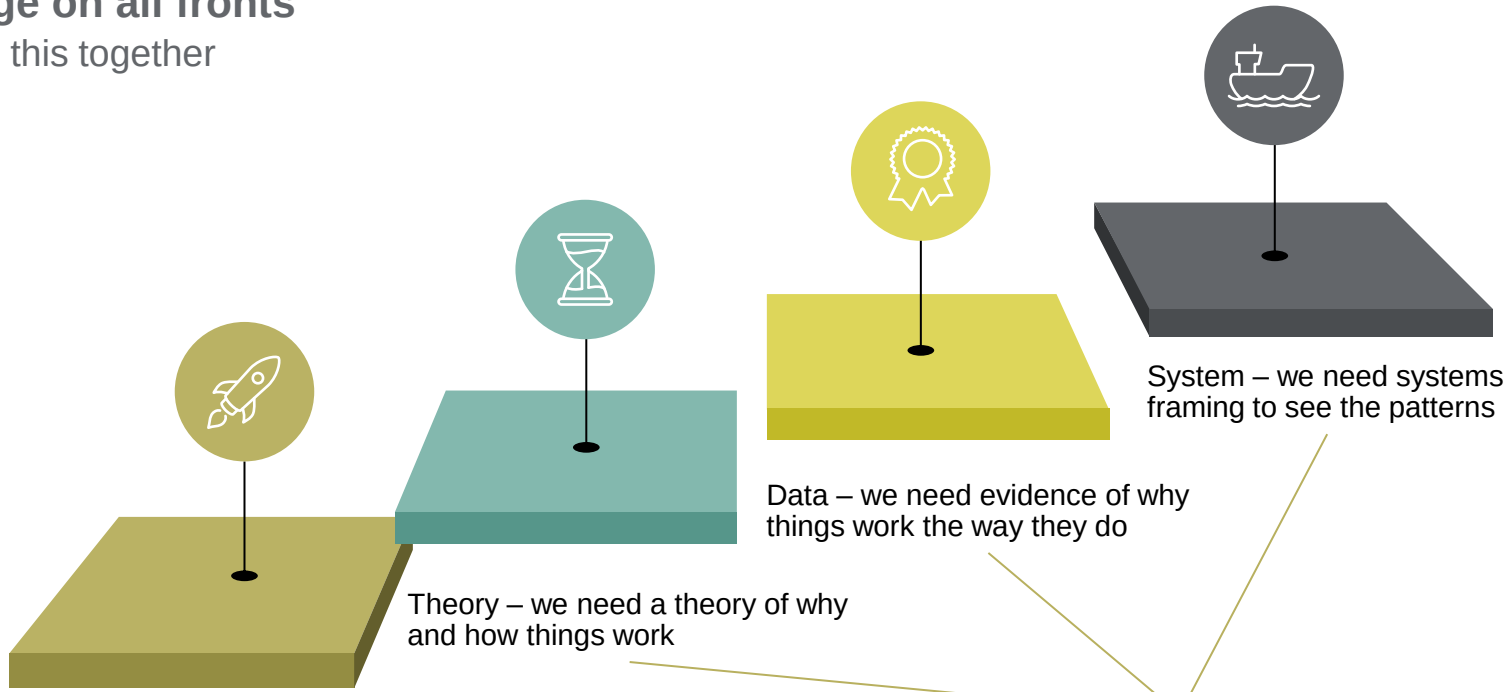
Change on all fronts

Adding this together



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Takeaways from measurement

Deeper inferential quality

BaU – Business-as-Usual	BbU – Business-beyond-Usual
1. Use the systems thinking SMART v2 framework to add a new view to current reporting: - do you see measurement **s**ystemically? - are you looking at **m**ultiple metrics? - have you the **a**gility to adapt goals and targets? - is there **r**eflexive feedback in your process; making the target but missing the point? - how **t**ransparent is your governance?	2. Introduce provenance thinking into your reporting. Make sure all quantification is qualified
	3. Build the measurement system around the multiple metrics-check-ins
	4. Build Risk 1.0 into Risk 2.0. Take it in stages, the leap is a big one

Some changes are needed

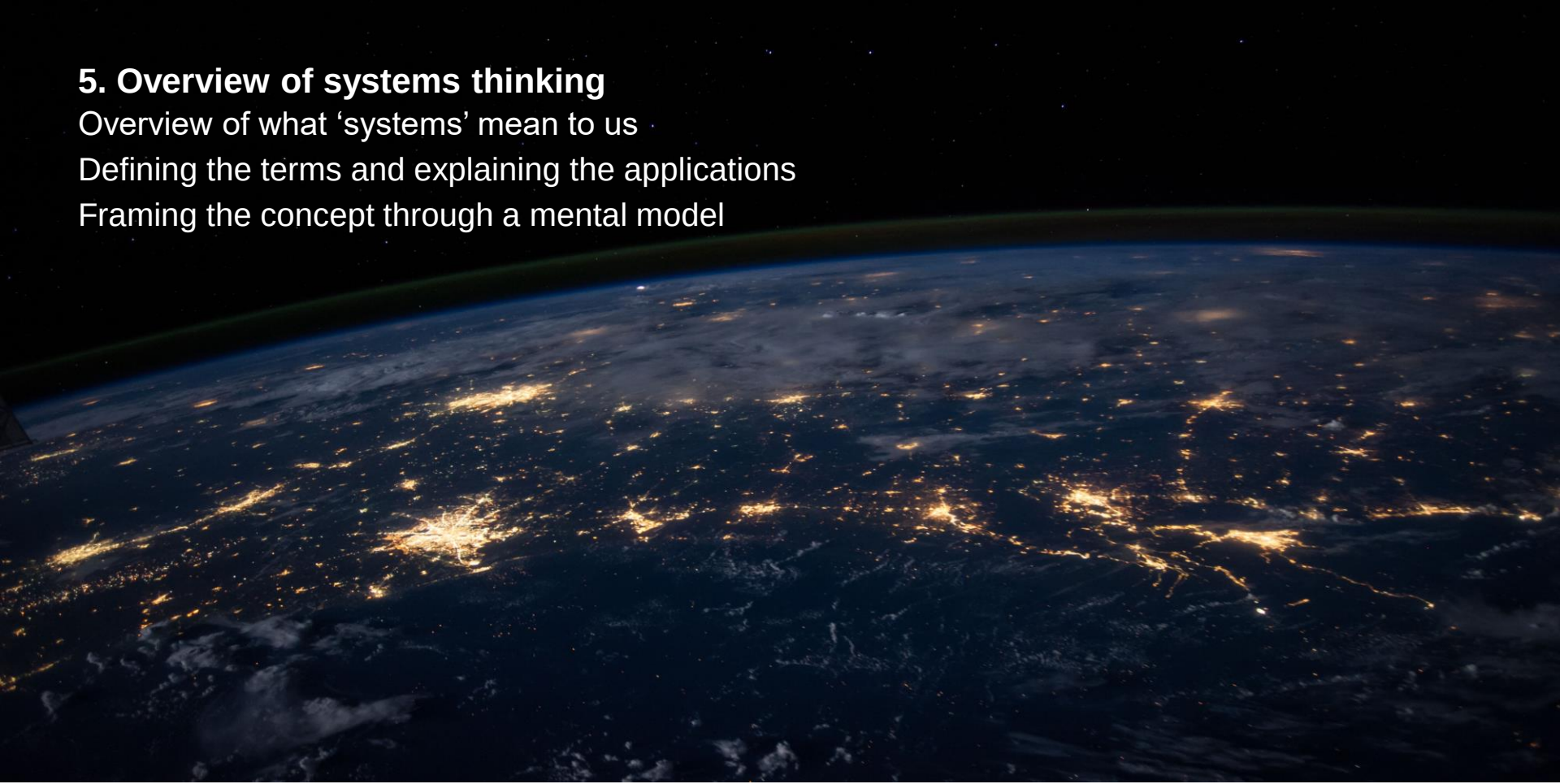
Measurement. Changes to reporting	
Including SMART v2.0 reporting	Systemic. Multiple. Agile. Reflexive. Transparent
Increased narrative	Putting qualitative commentary to work to bridge the gap from the figures to the inferences
Adopt dashboards and scoreboards	Dashboards are ex ante figures. Scorecards are ex post figures. Both reflect the reality that multiple measures are needed to present the full picture

5. Overview of systems thinking

Overview of what ‘systems’ mean to us

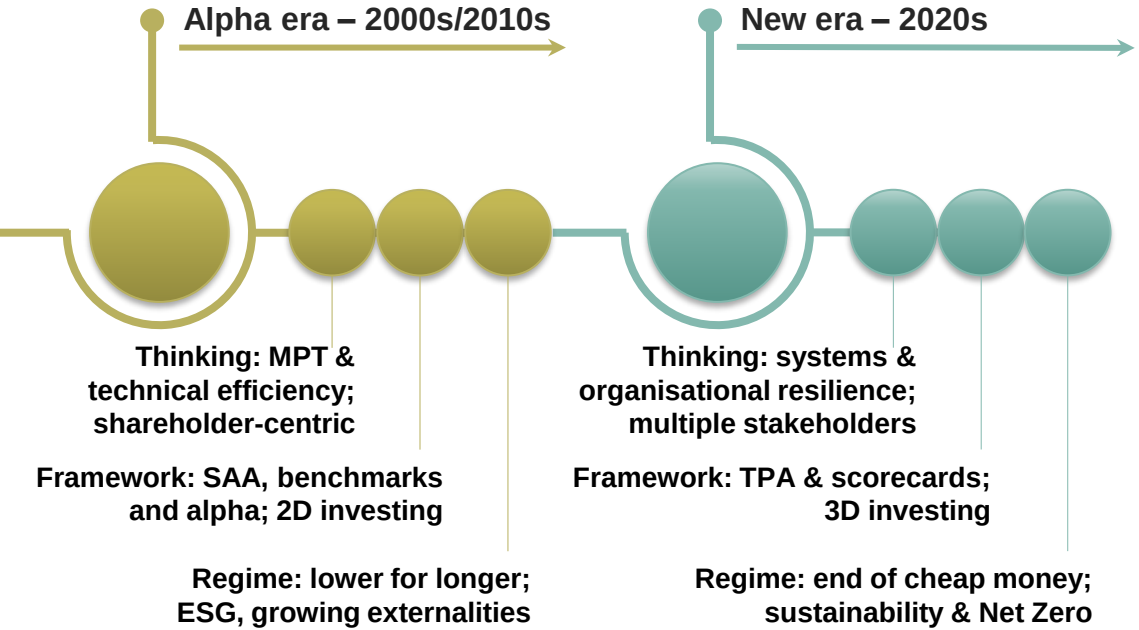
Defining the terms and explaining the applications

Framing the concept through a mental model



Preface: Investment industry era change – thinking, framework and regime

Change on multiple fronts. A new mental model



- **Thinking**. We seem to be moving into a paradigm shift. Notably are we at a major inflexion point in terms of how the world operates? **The world has several crises** to wrestle with. It has geopolitics, it has climate change and the issues of inequality that could collectively challenge capitalism as we know it
- **Multiple stakeholders**. All asset owners retain complex operating models using many third parties. They have always had **multiple stakeholders,** but the reality is that stakeholder management has got harder with more pressure being brought to bear by sponsors
- **SAA and TPA** – SAA very much belongs to the previous era
- **Regime.** Very different investment macro. Very different investment paradigm from net zero and double materiality

Changes occurring in the mental model settings

The purpose(s) of the investment industry

Asset owners have followed the lead of other institutions towards greater stakeholder orientation. But staying very conscious of the financial primacy in fiduciary duty

Fundamental purpose

Contributing to society through increases in societal wealth and well-being

Intrinsic purpose

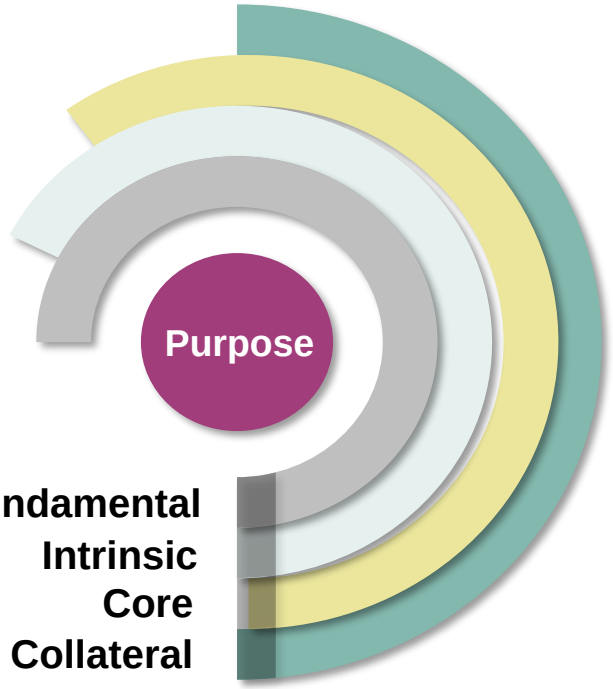
Mobilising the sourcing and allocation of capital

Core purpose

Providing wealth management and risk management for end savers within fiduciary duty

Collateral purposes

Providing opportunities and rewards for investment professionals and organisations



There are natural and designed systems

The investment industry is a ‘natural’ ecosystem, the investment organization is a designed system

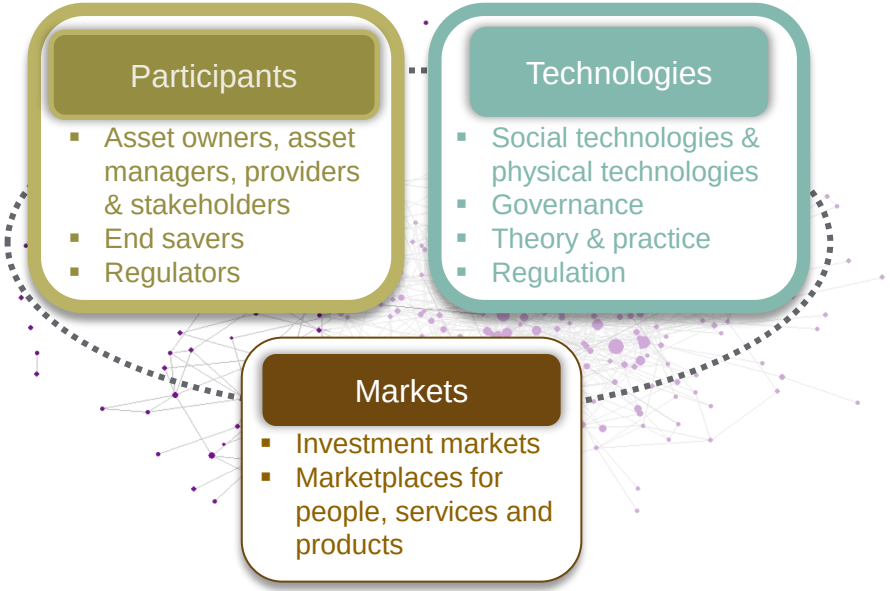
The investment industry as a natural system

- Here groups of connected participants pursue a self-interested even selfish mode of exploiting their (local) roles – ie responding to a local demand/opportunity
- There is some attempt by regulators and other influential parties to impose some elements of design on the system to harness selfishness for some wider good
- As captured in ‘rules of the game’ that define behaviours
- This natural system has various common properties
  - It evolves over time and exhibits emergence with adding/ subtracting of participants and elements
  - It tends to be stable through time having survived and evolved their stabilising features
  - Most players are selfish, and this helps them maintain stability through their emergent properties
  - The system does not directly ‘try’ to achieve anything; it does what the participants and forces make it do

The investment organisation as a designed system

- Here groups of connected participants pursue a self-organising mode of working with norms of behaviour and operation responding to a designed mission/ opportunity
- The organisation's behaviours are actions performed by purposeful and coordinated agents (1) to do something worthwhile and meaningful; (2) to create value for a segment of society; (3) in a defined space or gap; (4) in a vision that resonates within the organisation; (5) and in areas they are uniquely good at
- There is a playing field and rules of the game defined by regulators and other influential parties to guide the organisation in its vision, mission and strategy
- This designed system has various common properties:
  - It evolves over time and exhibits emergence
  - Participant stability reflects creative destruction
  - The most unstable organisations tend to vanish. The survivors tend to have better design and are more stable

Focus on participants and technologies as the key elements of the investment ecosystem



- Connections increase
- More tipping points may be reached
- Social and physical technologies 'clash'
- Adapting becomes more critical

The investment ecosystem
= elements (participants + technologies + markets) + interconnections + purpose & function

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The big reset

1 **Systems leadership**	▪ Mindset shift, to work in such close collaboration, to find shared benefits in collective solutions ▪ To build traction there needs to be a story, a theory and some figures ▪ Agility to respond to outcomes and other feedback
2 **Aligning purpose, vision, and strategy**	▪ Organisations have weak alignment of purpose ▪ Socialisation is time-intensive but results-accretive ▪ There are periodic moments to relitigate the mix
3 **Evolving board and leadership practices**	▪ Deepening the communications with stakeholders about key issues ▪ Reinforcing the apolitical mandate of the fund but working with the growing likelihood of a bigger political context ▪ Strengthening the diversity in leadership, dialogue and governance design

Some changes are needed

Changes to thinking	
Systems thinking	Recognise systemic risk Apply systems thinking
Extended risk framework	See risk through multiple lenses. Think of risk in wider, softer terms Adopt total portfolio thinking
Narratives & numbers	Balance between data and narrative Respect the limits of data inference

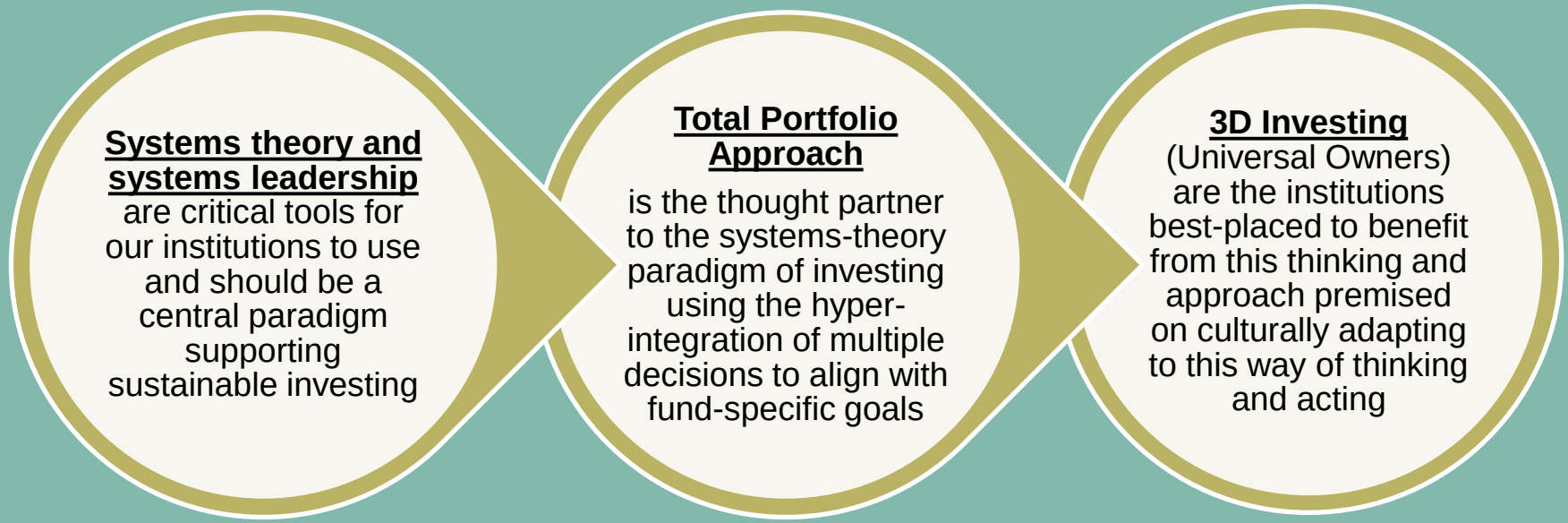
Changes to investment practice	
Adapt to systemic risk	Adapt to lack of meaningful data Incorporate 3D investing
Risk culture	Develop organisational resilience Build resilience from awareness
Build in robust-ness	Extend portfolio-level scope Extend system-level scope

Changes to leadership	
Adapting the mindset	Triaging problems: problems, wicked problems and super-wicked problems
Systems leadership	Applying systems leadership selectively and coherently
Promotion of systems leadership	Socialising the methods and the results of systems leadership

Beliefs. Changes to process	
Use beliefs as scaffolding	Compelling reasons to train, rehearse and prepare - the sports analogy.
Use collective methods	The power of the collective effort to deal with the toughest challenges
Embedding, enablement and empowerment	Embedding - needs socialising Enablement - needs clear policies & processes Empowerment - needs decision matrix clarity and supportive culture

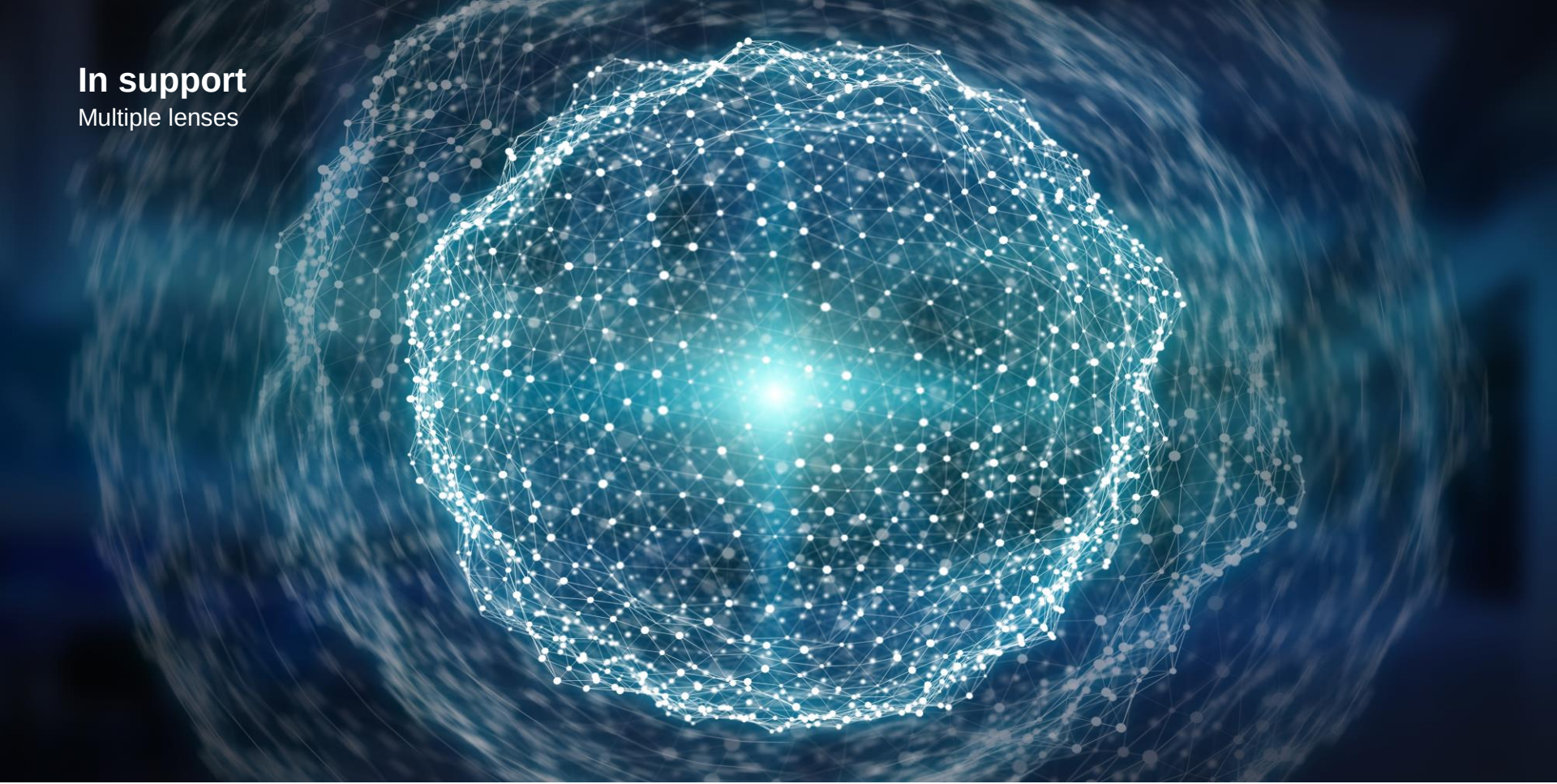
Sustainability. Changes to process	
Rightsizing of goals. Aligning policy with fiduciary duty	Asset owners have choices that reflect the coming together of mindset, skillset and opportunity set
Develop mandates aligned to goals	Sustainability introduces a range of mandates in a spectrum
Embedding, enablement and empowerment	Being joined-up carries a particular advantage with sustainability

There is a quiet revolution coming here…



In support

Multiple lenses



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The iceberg model

Systems thinking in practice in considering outcomes

Iceberg model elements

Visible

Not visible

Observables	The outcomes, situations and events relevant to one particular ecosystem of interest, that are visible manifestations of the ecosystem in a complex adaptive way
Patterns	The trends or patterns of related events and situations that guide our understanding of past and future events
Structures	The ways that a system works and is structured which keep producing the trends or patterns, such as policies, processes, and practices
Mental model	The shared beliefs, mindsets, attitudes, and values that created the system and how it operates – a compression of how something works and can concentrate the ecosystem into understandable and useable chunks

Start here at the bottom

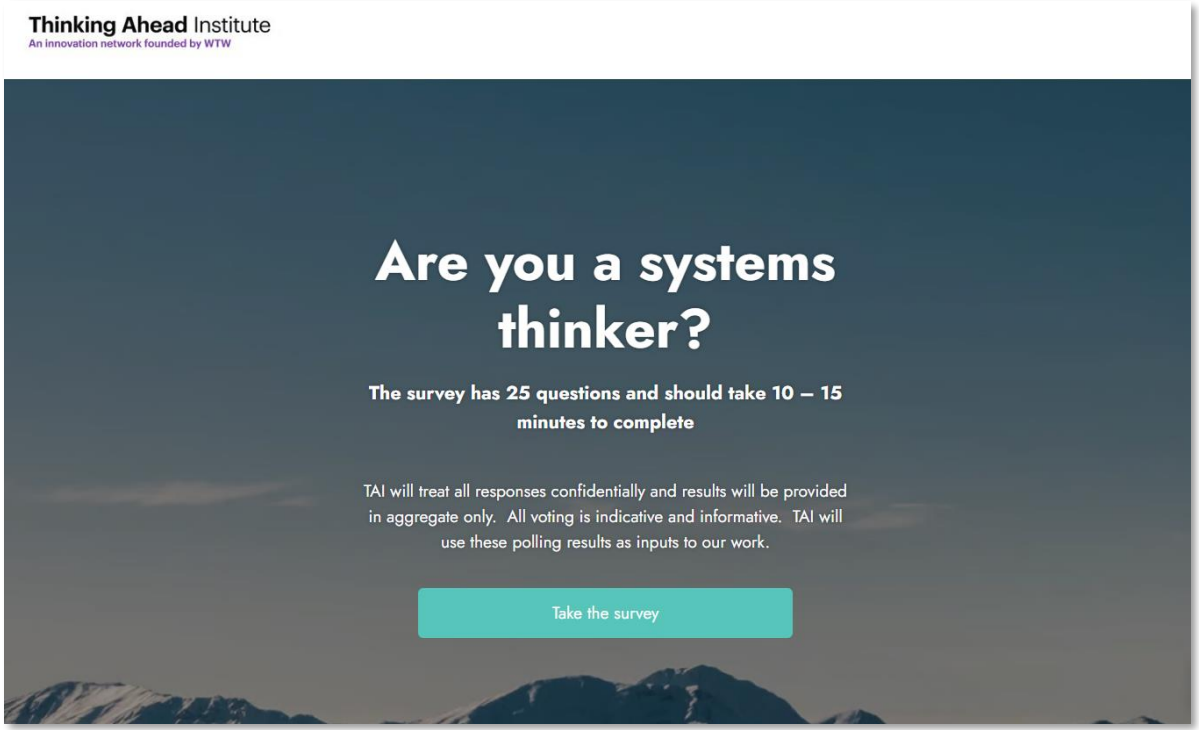
Systems thinking patterns – joined-up ways of thinking and working

Complex systems have motion, flux & feedback	We've seen this movie before	We're better together when we-re in it together	Tragedies of the horizon are failures of imagination	If you torture the data, it will confess to anything	We respond to incentives, the rest is commentary	Quick fixes will usually fail, the easy way out leads back in	The soft stuff is the hard stuff, it's all about the people
It doesn't have to be so complicated. Complicate to understand, simplify to act	Go where the puck is going to be (Gretsky's law)	The power of 'and' thinking and action	Long-term investing is damned if you do, damned if you don't	Measurement gives a subject a respect. What gets measured gets managed	Progression & regression are hard to see, eg the boiling frog	Same as ever and different this time. Yesterday's solutions = tomorrows problems	We hear what we want to hear and disregard the rest
Most investments involve j-curves (eg patient capital)	Systems move from continuous curves to jump-curves in phase transitions	If you've had a hand in it, you'll have your heart in it	Feedback is generally more reinforcing/ vicious than self-correcting/ virtuous	Performativity can work short-run, but can't outrun authenticity	Looking good means feeling good	Going above and beyond produces imbalances eg whack-a-mole	Overconfidence is loud & unshakeable but confidence is quiet and assured
Most successful innovations have s-curve growth (eg net zero investing)	Booms and busts are the results of the interplay of fallibility & reflexivity (Soros law)	All of us are smarter than any one of us	Managing through process beats managing through measurement	What is claimed is going on is not the same as what is really going on	In a tragedy of the commons free riders are paid well	There are simple, quick wrong answer to most problems	You can't solve wicked problems using innocent thinking
Systems don't go in straight lines or in one direction. They are curved and reflexive	When everyone's in charge no-one is in charge	Some interventions can make a real power of difference eg Streisand effect	In a complex system there are always places to hide from accountability	Complex systems have influences and correlations but rarely causes and effects	Reason is the slave of passion. Feelings first, socialising second, thinking third	Power these days is harder to use and easier to lose	Out of great power come great opportunities and great excesses
Models simplify the world into usable bits	*Don't hit the target but miss the point*	*There is power in having skin in the game*	Cause & effect are rarely close together in time, space, provenance	*We measure what we do because we can. We can measure more than what we do*	*Quantifications need qualifications*	*The devil is always in the details*	*To drive effective change reducing the frictions is more telling than adding to the fuel*

*See the Hemingway 'six-word story'. 'Hemingways' summarise the issues in a memorable meme-like six words (or similar numbers)

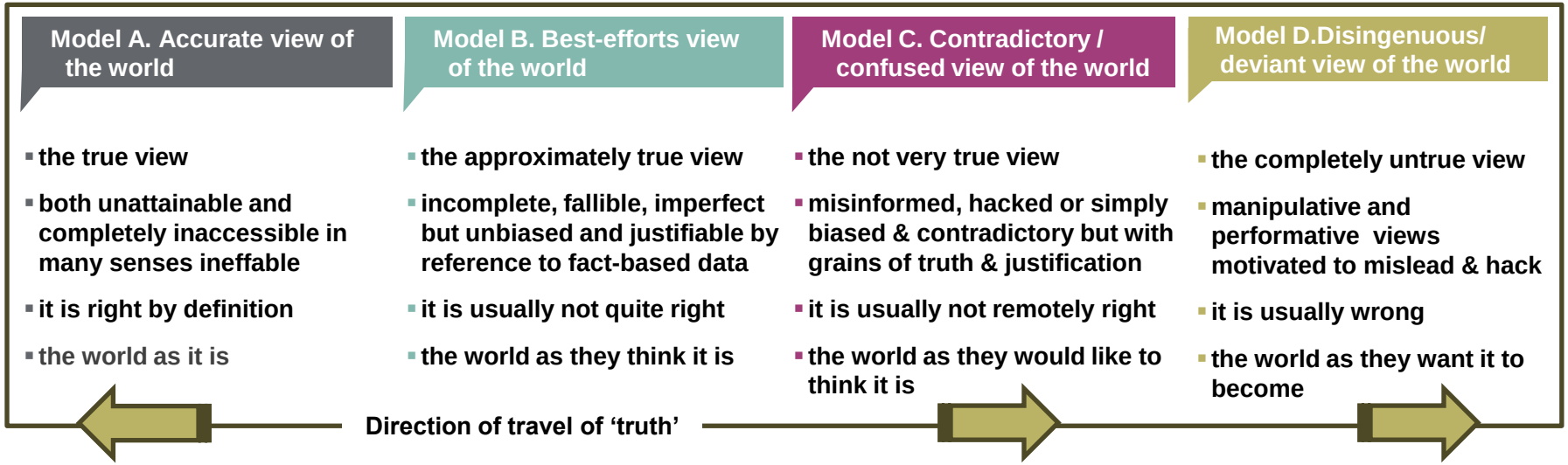
Are you a systems thinker?

Take this Institute survey



https://areyouasystemsthinker.scoreapp.com/

Views of the world through alternative reality models – the slow bleed in truth

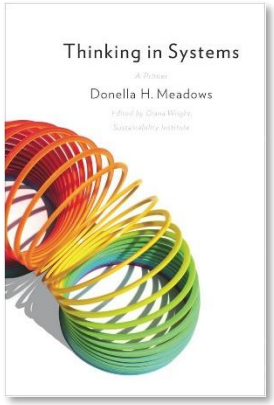


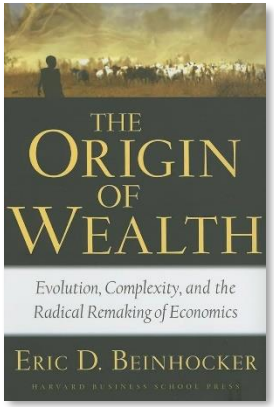
1. Growing uncertainty
The A-B model gap is growing, with increased complexity the world gets more uncertain, and with more systemic discontinuity past histories don't help

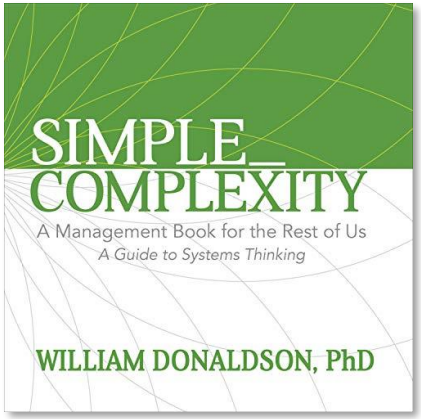
2. Growing hacking
The B-C model gap is growing with more misrepresentations and disingenuous influences sourced by increasingly destructive social media and lower standards in public life

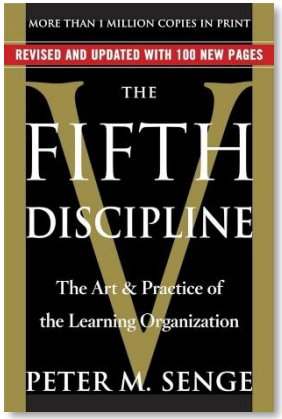
3. Growing HI x AI influencing
AI presents the chance to close the A-B and B-C gaps. But not to eliminate them, there will always be agency and stochastic outcomes, and there will be AI misuses

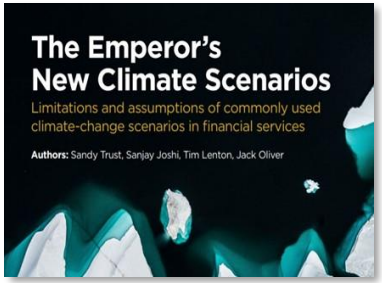
Book list and resources











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