THE LEVERS OF CHANGE

SYSTEMATIC RISK

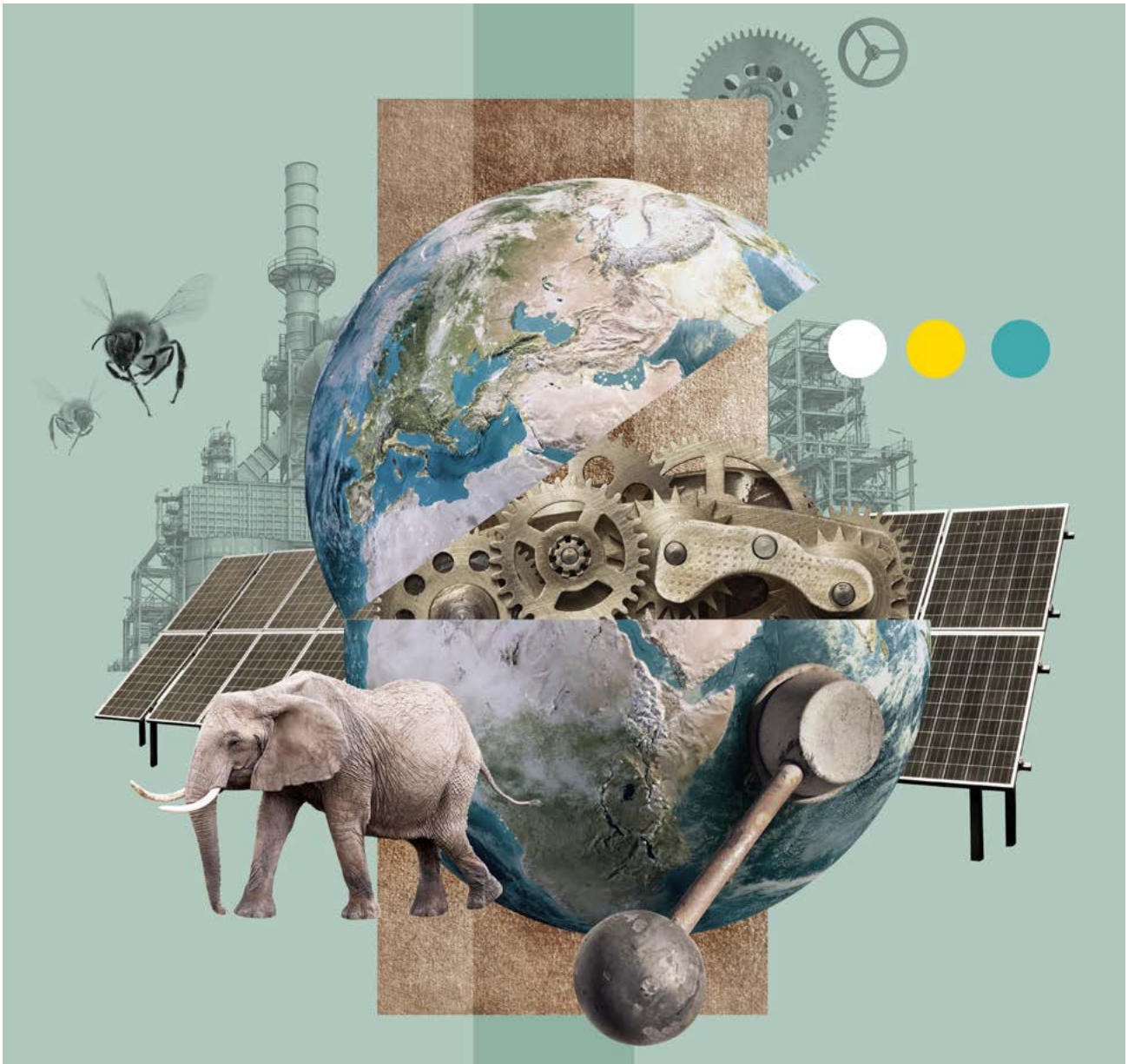
FIXING ESG BLIND SPOTS

KATE RAWORTH

NIGEL TOPPING

AIQ

THE MACRO STEWARDSHIP EDITION



FROM MICRO TO MACRO

The new frontier of investment stewardship

AVIVA INVESTORS

IMPORTANT INFORMATION

THIS IS A MARKETING COMMUNICATION

Except where stated as otherwise, the source of all information is Aviva Investors Global Services Limited (AIGSL). Unless stated otherwise any views and opinions are those of Aviva Investors. They should not be viewed as indicating any guarantee of return from an investment managed by Aviva Investors nor as advice of any nature. Information contained herein has been obtained from sources believed to be reliable but, has not been independently verified by Aviva Investors and is not guaranteed to be accurate. Past performance is not a guide to the future. The value of an investment and any income from it may go down as well as up and the investor may not get back the original amount invested. Nothing in this material, including any references to specific securities, assets classes and financial markets is intended to or should be construed as advice or recommendations of any nature. Some data shown are hypothetical or projected and may not come to pass as stated due to changes in market conditions and are not guarantees of future outcomes. This material is not a recommendation to sell or purchase any investment.

The information contained herein is for general guidance only. It is the responsibility of any person or persons in possession of this information to inform themselves of, and to observe, all applicable laws and regulations of any relevant jurisdiction. The information contained herein does not constitute an offer or solicitation to any person in any jurisdiction in which such offer or solicitation is not authorised or to any person to whom it would be unlawful to make such offer or solicitation.

In Europe this document is issued by Aviva Investors Luxembourg S.A. Registered Office: 2 rue du Fort Bourbon, 1st Floor, 1249 Luxembourg. Supervised by Commission de Surveillance du Secteur Financier. An Aviva company. In the UK Issued by Aviva Investors Global Services Limited. Registered in England No. 1151805. Registered Office: 80 Fenchurch Street, London EC3M 4AE. Authorised and regulated by the Financial Conduct Authority. Firm Reference No. 119178. In Switzerland, this document is issued by Aviva Investors Schweiz GmbH.

In Singapore, this material is being circulated by way of an arrangement with Aviva Investors Asia Pte. Limited (AIAPL) for distribution to institutional investors only. Please note that AIAPL does not provide any independent research or analysis in the substance or preparation of this material. Recipients of this material are to contact AIAPL in respect of any matters arising from, or in connection with, this material. AIAPL, a company incorporated under the laws of Singapore with registration number 200813519W, holds a valid Capital Markets Services Licence to carry out fund management activities issued under the Securities and Futures Act 2001 and is an Exempt Financial Adviser for the purposes of the Financial Advisers Act 2001. Registered Office: 138 Market Street, #05-01 CapitaGreen, Singapore 048946. This advertisement or publication has not been reviewed by the Monetary Authority of Singapore.

The name "Aviva Investors" as used in this material refers to the global organisation of affiliated asset management businesses operating under the Aviva Investors name. Each Aviva investors' affiliate is a subsidiary of Aviva plc, a publicly- traded multi-national financial services company headquartered in the United Kingdom.

Aviva Investors Canada, Inc. ("AIC") is located in Toronto and is based within the North American region of the global organisation of affiliated asset management businesses operating under the Aviva Investors name. AIC is registered with the Ontario Securities Commission as a commodity trading manager, exempt market dealer, portfolio manager and investment fund manager. AIC is also registered as an exempt market dealer and portfolio manager in each province and territory of Canada and may also be registered as an investment fund manager in certain other applicable provinces.

Aviva Investors Americas LLC is a federally registered investment advisor with the U.S. Securities and Exchange Commission. Aviva Investors Americas is also a commodity trading advisor ("CTA") registered with the Commodity Futures Trading Commission ("CFTC") and is a member of the National Futures Association ("NFA"). AIA's Form ADV Part 2A, which provides background information about the firm and its business practices, is available upon written request to: Compliance Department, 225 West Wacker Drive, Suite 2250, Chicago, IL 60606.

274900 - 30/06/2025

Macro stewardship: An introduction

The investment industry is currently dominated by three letters: E, S, and G. Yet for all the attention, a backlash is building. This is not all bad, though. Amidst the grand claims and grandstanding, greater scrutiny of responsible investing is welcome.

A pragmatic response to challenge is to listen – and up your game where critics have a point. Neatly packaging up morals and ethics into investments is fraught with danger; communication and transparency are key. But we also need to be far more ambitious, creating new paradigms and goals for the economic and financial systems we have haphazardly created.

This special edition of *AIQ* explores the world of *macro stewardship* – the idea market participants have a responsibility to help preserve the integrity of the whole financial system, keeping it in healthy service of society and the planet. This should be done by engaging with regulators, policymakers and many other changemakers. It is complementary to the more familiar practice of micro stewardship, which focuses on engagement with companies and issuers.

Macro-level reform requires systems-level thinking – an ability to step outside of your narrow purview and see as much of the 'whole' as possible. It requires an understanding that every system has leverage points where targeted interventions can have an outsized impact.

In the pages that follow, our CEO Mark Versey clarifies what we mean by macro stewardship, and draws out the key concepts and practical tools for making it work. I consider why a narrowness in perception has led us to collectively overlook sustainability in markets and economics. We look at what it means to take a systems-led approach to problem solving and interview some of the leading thinkers on the subject, including Nigel Topping and Kate Raworth.

We also challenge financial market theory and lay down an ambitious gauntlet of moving towards a *sustainable market hypothesis*. Last, but by no means least, Abigail Herron looks at the dangers of ESG burnout and fatigue among practitioners.

Having worked in responsible investing for over three decades, I can't deny there have been moments where I was close to losing faith in the cause. That was then, this is now. I am excited and hopeful we can move towards a sustainable financial system capable of supporting the needs of everyone without destroying the planet and its natural ecosystems.

My team has an unofficial motto: *"Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has."* This quote from Margaret Mead reminds us however small and inconsequential we may feel at times, we can all make a difference and change things for the better.

I hope you enjoy the issue.

Steve Waygood,
Chief responsible investment officer,
Aviva Investors
steve.waygood@avivainvestors.com

AWARD-WINNING CONTENT

Since its launch in 2016, *AIQ* has covered the big themes influencing financial markets and the global economy. We aim to give our clients in-depth analysis of the issues that affect their investments, from demographics to big data, from climate change to China's growth. We also offer insights on more specialised topics, such as portfolio construction and cashflow-driven investing.

We don't profess to have all the answers. *AIQ* actively seeks the views of independent experts as well as Aviva Investors professionals, and regularly features contributions from world-renowned policymakers, authors and academics.

Too often, the content produced by the asset management industry is bland, jargon-heavy and self-serving. Open to fresh perspectives and committed to strong editorial principles, *AIQ* stands out.

After all, it's good to be different.

VISIT US ONLINE

Your hub for in-depth analysis and commentary

www.avivainvestors.com/aiq

SUBSCRIBE

To receive our AIQ thought leadership content

www.avivainvestors.com/subscribe

A TRAGEDY OF PERCEPTION

FIXING THE ESG BLIND SPOTS IN BUSINESS, FINANCE AND ECONOMICS

A distorted sense of reality has caused us to disregard sustainability concerns when modelling economies, companies and finance. We can no longer ignore such material issues just because they are too hard to fathom. This is where systems thinking comes in, explains Steve Waygood.

I recently read a quote that left me reeling. Within the space of a few words, physicist Geoffrey West managed to convey what I had known in my heart for years but had no clear way of expressing.

"I once did a little exercise: I took about half a dozen economics books, the big fat ones like Samuelson's, and so on, and I looked up in the index: do the words 'energy', 'entropy', or 'thermodynamics' ever occur? Not once in any of them."

I knew instantly he was right, save for a few pioneers like the *Limits to Growth* authors and Herman Daly, who have (so far) failed to turn the tide of mainstream thinking. I began to wonder whether the same was true for finance and corporate strategy. Though I heavily suspected the answer, I needed to validate my impulse.

Sustainable firms?

Let's look at corporate strategy first.

Academic theorists have always played catch-up with innovative practitioners like Henry Ford and Alfred Sloan who, among many other achievements, invented the production assembly line and organisational chart respectively. Business leaders had to take leaps of faith, plunging their economic ventures into the unknown as there was no sure-fire academic model capable of predicting whether their bets would pay off.

Many would argue not much has changed and the theory of the firm still lags the practice. However, where theory tends to meet practice most acutely today is on the campuses of business schools and within the meeting rooms of management consultancy firms. Questions of how a firm should be organised, the role of management, and other strategic considerations have all been hotly debated and codified by thought leaders from these professional vantage points for decades.

Management gurus like Michael Porter, Tom Peters and Peter Drucker all cut their teeth in these institutions and found riches in blending the newfound science of management with the art of business. Save for an enlightened few – such as John Elkington of Triple Bottom Line fame (although he has since 'recalled' that concept[1]), George Serafeim at Harvard Business School and Bob Eccles at Oxford's Saïd Business School – the legacy of leaving sustainability out of management thinking lives on through the everyday business decisions inspired by Messrs Porter, Peters and Drucker.

As for the enlightened few, while their work has not been given the prominence it deserves within their institutions, they would all also likely decline the 'management guru' moniker.

> *"In modern society there is no other leadership group but managers"* **Peter Drucker**

A recent article by Sarah Murray in the *Financial Times* emphasised the gaping flaw in the most influential management frameworks. She wrote: "Between 1998 and 2012, the Aspen Institute's Beyond Grey Pinstripes ranking, which every two years assesses the sustainability content in schools' curricula, routinely found that environmental topics were covered as separate modules or elective courses but were missing from core MBA programmes."[2]

The same article highlighted comments made by a group of academics in the February edition of the *Harvard Business Review*: "Although evidence of climate change has been emerging for more than four decades, business schools have been late in acknowledging and responding to this urgent and existential issue."[3] A UN Global Compact report we funded found similar results.[4]

On reading this, I dug out my *Harvard Business Essentials* 2005 edition on *Corporate Strategy*. I flicked to the index and found no reference to words like 'responsible', 'sustainability', 'stakeholders' or 'energy'. The edition is admittedly quite old, which makes the academic in me uneasy.

And while the situation will clearly have improved, how frequently do business leaders update their corporate strategy library stock? Sadly, the sustainability story of the firm feels eerily familiar to that of economics.

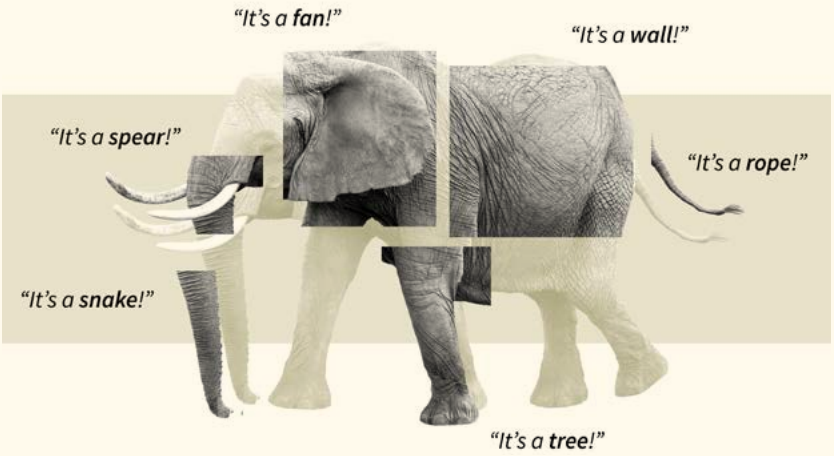
In fairness, both Porter and Drucker have made attempts to weave sustainability into their grand theories.

However, Porter's attempt – *Green and Competitive*[5] – seems to have both fallen flat and been too little, too late. Similarly, Drucker's belief all institutions have a responsibility to the whole of society fell on deaf ears. In his 1973 *Management: Tasks, Responsibilities, Practices*, Drucker wrote: "In modern society there is no other leadership group but managers. If the managers of our major institutions, and especially of business, do not take responsibility for the common good, no one else can or will."

Until the recent ESG boom, there has been scant evidence of Drucker's more expansive definition of managerial responsibility in boardrooms across the world. Increased engagement, voting, corporate disclosures and regulation are helping to turn the tide and shift mindsets – but there is still a long way to go.

> *"Business schools have been late in acknowledging and responding to climate change"*

Figure 1: **The blind men and the elephant parable**



Source: Aviva Investors, August 2022.

Sustainable finance?

Finance is slightly different in that mathematical theories portrayed an illusion of precision, resulting in an almost immediate transfer of knowledge from theory to practice.

Harry Markowitz, Bill Sharpe, Eugene Fama, Kenneth French, Myron Scholes, Fischer Black and Robert Merton have been key personalities in 'professionalising' finance. Their respective works on modern portfolio theory, efficient-market hypothesis, capital asset pricing model and derivatives pricing have come to shape and define risk and portfolio management in finance and investing. Add in discounted cashflow analysis, and you have all the major theories and thinkers covered.

One of my colleagues has studied their work extensively and found references to sustainability distinctly lacking in their models and equations. Without exception, they are brilliant intellectuals: among the best minds ever to turn their attention to finance. Yet they also suffered from a narrowness in perception, and the false assumption the system (or market) itself cannot be influenced.

Their beautifully neat equations missed a crucial point about market integrity – that alpha means nothing if beta implodes. Over the long term, chasing alpha is pointless if you completely ignore systematic risks. Existential threats like climate change jeopardise the very foundations of society. If society starts breaking down, markets will too. After all, unwavering faith in the idea the market (the aggregated view of its participants) is always right got us into this mess in the first place.

> *We tend to claim absolute truth based on our limited and subjective life experience*

The same *FT* article referenced earlier pointed out the myopia around sustainability at universities and other academic institutions is not limited to MBAs and corporate strategy. "Failure to integrate climate change into courses such as finance, accounting, marketing and operations has long been a cause for complaint among those pushing for management education to focus on climate change," wrote Murray.

Even now, the Chartered Financial Analyst course mainly bolts ESG onto the curriculum rather than integrating it throughout. The feedback loop between corporate activity and how companies and assets are valued mean that this will inevitably change over time but, given the scale of the problem, it needs to happen soon.

Elephant in the room

These mainstream failings across finance, companies and economics represent staggering oversights. To build models of the world so far removed from reality, which ignore planetary boundaries, social injustice and the value of life-giving natural ecosystems, is nonsensical.

It is logical to wonder how and why this has occurred. An ancient Indian parable can help us understand why.

As the story goes, a group of blind men stumble across an elephant. Unaware of what they have found, they try to piece together the full picture by touching it. They each feel a different part of the elephant's body and describe it based on their narrow experience. Unsurprisingly, their descriptions vary wildly, and they even come to suspect dishonesty in the group members.

> *Capitalism systematically extracts short-term value regardless of the long-term consequences*

The moral of the story, I hope, is clear. We tend to claim absolute truth based on our limited and subjective life experience. In search of peace of mind and clarity, we conveniently ignore the perspectives of others, as well as the simple fact we can never see the 'whole' picture.

In true siloed form, while all the influential papers and thinkers in finance, corporate strategy and economics lack the perspective of sustainability, the opposite is also true: all major texts on sustainability lack any real depth of reference or understanding of business, finance and economics. It is a tragic case of intellectual and spiritual tribalism – one group feeling the elephant's leg while the other pulls on its tail.

Bridging the gap

With this in mind, I recently re-read *Limits to Growth*, a ground-breaking piece of systems thinking. It was the first serious scholarly attempt to think of the global economic system through the lens of planetary and resource boundaries. In doing so, it incorporated sustainability into its economic analysis.

Commissioned by the Club of Rome, this 1972 work – updated in 1992 and 2012 – has inspired many within the sustainability movement, despite having no discernible effect on the global economic system. Yet on re-reading it, I was struck by how little finance and investment features. Even the best systems thinkers have biases and blind spots.

As with corporate strategy, there are a handful of books and papers that attempt to bridge the gap between economics and sustainability. Economists like Mariana Mazzucato and Kate Raworth are two leading lights. But when you dig into their work, although economics and, to some degree, business are covered, finance – particularly banking, insurance and investment – receives little attention. And given its pivotal role in allocating capital across the global economy, this must be addressed.

This lack of general understanding of the financial componentry humanity has placed at the heart of its growth machine is a problem. Capitalism systematically extracts short-term value regardless of the long-term consequences for future generations. There is nothing within capital markets that values future generations. Quite the opposite. Markets discount their interests and ignore the consequences of our current consumption on their very existence. As for capturing nature's true value – of a mangrove, say – we are a long way off.

We don't necessarily do any of this intentionally; we just don't understand the system we have built or our impact. Fritjof Capra – a physicist, systems theorist and deep ecologist – believes we need a new way of looking at the world:

"The more we study the major problems of our time, the more we come to realise that they cannot be understood in isolation. They are systemic problems, which means that they are interconnected and interdependent. … Ultimately these problems must be seen as just different facets of one single crisis, which is largely a crisis of perception."

Building on Garrett Hardin's and Mark Carney's respective tragedies (of the *commons* and *horizon*), I have come to agree with Capra's bigger, more pervasive and pernicious tragedy: of perception.

Maybe if we heed Capra's advice and take a systems view of the world, working with others to help fill in our blind spots but recognising finance as the lifeblood of the economy, we can create a more desirable and sustainable system.

Macro stewardship and changing the system

Systems thinking is the *only* proper starting place for attempting to solve the planet's climate, nature and social crises. The interlinkages are profound and highlight why I have become particularly obsessed with what we now call *macro stewardship*.

I see macro stewardship as the only way finance can become sustainable, or even deserve to call itself responsible. It can help remove a blind spot in pure ESG integration, overcome some of the limits to which ESG engagement can push companies and potentially become the litmus test of whether a financial institution is greenwashing or not. Conducted transparently, it can and should be a support function to democratic processes and policymaking.

Mark Versey, our CEO, sets out in detail in *Redefining stewardship*[6] what we mean by this. In essence, it means taking a more holistic view of our stewardship responsibilities and actively engaging with policymakers, industry bodies and peers, regulators, standard setters and other influential parties to advocate and push for changes that will help create a more sustainable economic system.

The (albeit imperfect) client signals we have indicate there is real demand for this work and approach. We are also running a consultation to further validate this and welcome feedback from all corners of the industry and beyond – most importantly, from our clients.

Combined with micro stewardship (active corporate engagement) and capital allocation, macro stewardship can make a real difference. A recent initiative of ours was to convene a collaborative group of global industry stakeholders and public policymakers to call for an International Platform on Climate Finance (IPCF). The goal is to put robust plans behind Article 2.1c of the Paris Agreement and ensure that "finance flows are consistent with a pathway towards low greenhouse gas emissions and climate-resilient development".

We are also announcing a partnership between Aviva Investors and Forum for the Future on a *School of Systems Change* to help financial practitioners and other changemakers educate and learn from each other on how and when to influence the economic system in the face of market failures. We will continue to support PhD research programmes in this area too – in particular, to help find ways to best judge and further enhance macro stewardship's impact and effectiveness, but also with an aim to supplement finance theory itself.

Lean in and work together

We must all start to lean in and empathise with others and place sustainability at the heart of all our efforts. Only then we will better understand the intended and unintended consequences of our actions on other disciplines and parts of the system.

Economics is not the same as finance and vice versa. However, the severing of the two disciplines is partly responsible for this situation as few economists truly understand how finance works. Equally, corporate strategists and sustainability activists need to work harder to understand each other's respective worlds.

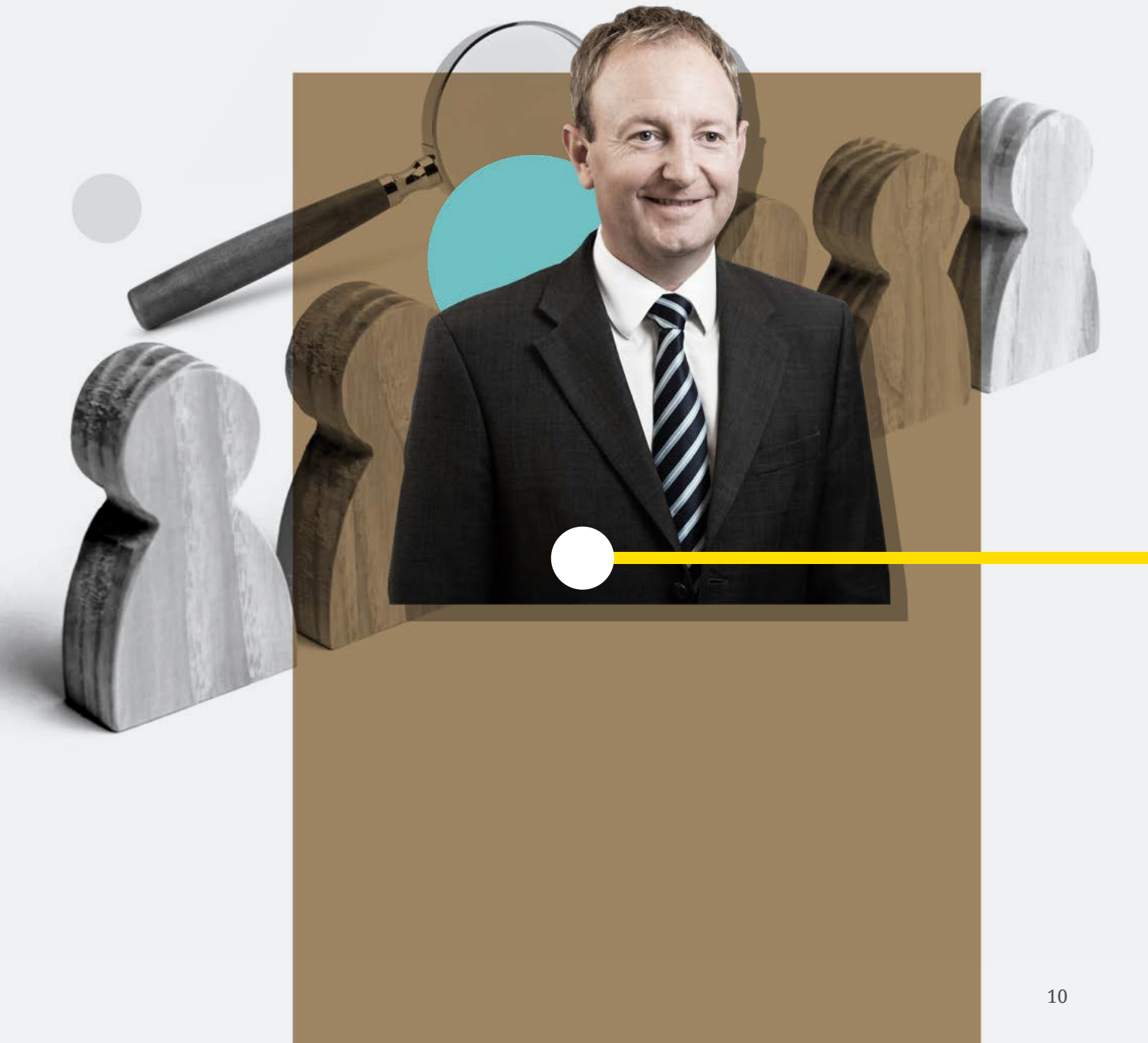
We *have* to work together to build a more sustainable future. The alternative is a reversal of the enormous progress that economics and finance has delivered since the Industrial Revolution. In other words, systems collapse that brings an end to civilisation as we know it

> *We have to work together to build a more sustainable future*

1 John Elkington, 'Recalling the triple bottom line', Harvard Business Review, July 9, 2018.
2 Sarah Murray, 'Climate change climbs the business school curriculum', Financial Times, June 12, 2022.
3 Concepción Galdón, et al., 'Business schools must do more to address the climate crisis', Harvard Business Review, February 1, 2022.
4 David Pitt-Watson and Dr Ellen Quigley, 'Business school rankings for the 21st century', United Nations Globa Compact, January 2019.
5 Michael E. Porter and Claas van der Linde, 'Green and competitive: Ending the stalemate', Harvard Business Review, 1995.
6 Mark Versey, 'Redefining stewardship: Why stakeholder capitalism needs to wake up', Aviva Investors, August 31, 2022.

REDEFINING STEWARDSHIP

WHY STAKEHOLDER CAPITALISM NEEDS TO WAKE UP



Asset managers and other financial institutions have a duty to act in the best interests of their customers and society. Macro stewardship will be crucial to meeting these responsibilities, argues Mark Versey.

Stakeholder capitalism has come under fire from multiple directions recently. Caught up with a rising backlash against ESG investing, some hard-line commentators argue it is vague and lacks teeth.

They claim grand business commitments are nothing more than disingenuous PR statements – undermining the whole movement. Others invoke the term "woke" capitalism and argue ethical governance should be left to politicians. In the now infamous – but often narrowly quoted – words of Milton Friedman, they believe the role of business should be simply "to increase its profits".

The critics are wrong: in my view, a more nuanced and inclusive form of capitalism will lead to much better outcomes for societies and economies than a model that pursues profit alone. However, stakeholder capitalism must become more substance than slogan if it is to help tackle the biggest issues we face, from the climate crisis to rising social inequality.

The primacy of shareholder primacy

The first "Davos Manifesto," published by the World Economic Forum in 1973 (or European Management Forum as it was then), sought to codify stakeholder capitalism and declared "the purpose of professional management is to serve clients, shareholders, workers and employees, as well as societies, and to harmonize the different interests of the stakeholders".[1]

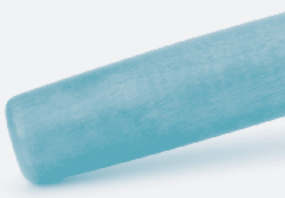
Part of the disparity in views and lacklustre take-up relates to the broad definition of stakeholder. Edward Freeman arguably characterised this best when he defined a stakeholder as "any group or individual who can affect or is affected by the achievement of the organisation's objectives".[2] The net result is an accountability void: where no one feels agency or pressure to make changes, the resulting paralysis leaves the global commons to rot in the process.

In recognition of the failure of stakeholder capitalism to wrestle control from shareholder primacy, Klaus Schwab (WEF's founder and chair) issued a new manifesto in late 2019.[3] And while much progress is being made to try and plug the gaping hole emerging between the aspirations of those seeking to shift the economy to a fairer footing, we lack a common vision in finance of where we are heading.

From almost nowhere, we are buried in a tidal wave of consultations on sustainable finance taxonomy, labelling standards, definitions and regulatory concerns of greenwashing. This is critical work and shows all the classic hallmarks of a system at the outset of a transition.

Indeed, initiatives like the Taskforce on Climate-related Financial Disclosures and the Taskforce on Nature-related Financial Disclosures – both of which we strongly support – are important step changes in this process. Enhanced disclosures will create greater transparency around ESG-related issues that are increasingly recognised as 'material' to businesses' bottom line.

But more needs to be done for a workable form of stakeholder capitalism to take hold. After all, 1.5°C of warming is not just a 'least-worst' option, it represents a "planetary boundary".[4] Once crossed, we risk not only setting off negative feedback loops that dramatically increase the pace of warming, however quickly we cut emissions, but also crossing "tipping points" and moving to a different "system state" from which there is no return.[5]



> *While we can and have recovered from financial crises, a collapse is irretrievable*

We are already experiencing the effects of around 1.2°C of warming and are currently heading for in excess of 2°C of warming by 2100. The physical impacts by the end of the century could undermine the financial system as we know it, with finance crossing its own tipping points to trigger a chain reaction of negative feedback loops like toppling dominos.

The financial system stores up significant systemic risk and interdependencies between its three limbs of insurance, banking and investment. If one element were to fall, it could bring the whole system crashing down. This would not be a financial crisis; it would be a collapse. While we can and have recovered from financial crises, a collapse is irretrievable.[6]

Tariq Fancy, former BlackRock chief investment officer for sustainable investing turned whistleblower, argues responsible investment efforts undermine the sustainability agenda as they distract governments from intervening in existential threats like climate change.

His frustrations are understandable, but he misses a key point: the latent power lying dormant in investor portfolios to create real and lasting change, as well as a requirement for asset managers and consultants to try to maintain the integrity of markets and protect clients' capital in the process.

At the heart of the challenge is a complex and delicate dance between consumer and end-investor demand on the one side, and governments and regulators on the other. Asset managers and investment intermediaries are wedged in the middle – the appointed agents and stewards in capitalism's great game.

It is a crucial role. If done well, the investment industry can ensure greater accountability and transparency on the sustainability issues investors care about.

Unfortunately, the incentives for asset managers and other key financial institutions to actively push for positive systems change and sustainable market reforms – such as stewardship codes, regulations correcting market failures, and transparency for end-customers – are weak at best. This needs to change. Something we call *macro stewardship* can help ensure it does.

Financing green, and greening finance

In an environment where people can easily express their views via the ballot box and wallets, it seems strange that, aside from impact investing (which accounts for a tiny proportion of overall investment assets), we have no clear way of capturing clients' sustainability values in mainstream funds. As an industry, we need to do a far better job of incorporating this information into clients' investment profiles and our own engagement activity to make sure it aligns with the issues they care about most.

MACRO STEWARDSHIP DEFINITION

We define positive macro stewardship on sustainability issues as:

"Financial institutions actively engaging governments, policymakers, non-governmental organisations, academics and other key influencers to correct material market failures on sustainability issues."

Macro stewardship actively seeks to change the incentives in the financial system to harness the profit motive and drive more sustainable outcomes. It addresses issues that are material to the delivery of the UN Sustainable Development Goals (SDGs) and long-term economic growth (GDP). In other words, it seeks to promote long-term sustainable development.

It should be conducted transparently wherever possible, and include initiatives on which an institution has taken a clear leadership role and those that result from collaboration between others in finance and the real economy.

If we get this right, it will take us much closer to democratising finance. Shifting the power from the firm to the customer could be a real force in the investment community.[7]

MiFID II – though only applicable to the European Union – is changing the rules on capturing sustainability preferences within financial advice, but the behavioural minefield of framing biases and potential return versus values trade-offs make accurate assessments and conclusions tricky. The training gaps for advisers (both real and robo) are huge.

Terminology makes life even harder, and ensuring we are all on the same page is no easy task.

Take the term ESG, which has become a catch-all for a hugely complex and nuanced area of investing. It is no wonder some people are calling for it to be retired. The issue, however, is not with the term, but with us. We can replace the term with another one – but fast-forward five years or so and, just like its predecessor, the newly anointed term will also mean different things to different people. The devil is in the detail.

First and foremost, there are different types of sustainable investing. We need to be clear about the differences between *integration, screening* (including positively screened thematic funds, such as impact) and *engagement* – accepting they are not necessarily discrete endeavours.

However, the extent to which a product provider is advocating for a more sustainable system should also be one of the factors consumers consider when choosing someone to manage their money. Education and clear signals are required to support such value judgements.

Improvements can come not only from governments in enhancing transparency and financial literacy to promote more informed choices, but also through civil society campaigns like Make My Money Matter and NGOs like ShareAction. As the former campaign points out so clearly: "Having a green pension could be 21 times more effective at reducing your carbon footprint than stopping flying, going veggie and switching to a green energy supplier."[8] Technological aids like Tumelo will be essential to navigating the murky world of end-investor preferences.

Despite all this great work and momentum, I still worry the vast sums of ESG-related money will fall short of their intended goal.

We need to redeploy existing capital at scale, and the faster we stop financing the bad stuff, the easier it will be. We don't need more sustainable finance as though it were a separate category of money; *all* of finance needs to become sustainable.[9]

This is a subtle, but *massive* distinction – one many investment professionals, practitioners and market commentators have yet to grasp. To be clear, we need green finance and as much of it as possible to help with the transition to net zero and other key sustainability targets. The same goes for effective corporate stewardship; holding the polluters and societal abusers to account is needed now more than ever.

Yet on their own they will not come close to being enough. Thematic investing and corporate engagement represent micro nudges when we also need macro-level, systemic change. To put it another way, it is like taking a pea shooter to a gun fight. We need to be far more ambitious and innovate the system itself, including the supporting multilateral architecture that sits around it.

"Improvements can come not only from governments, but also through civil society campaigns"

Re-defining engagement and stewardship

The market does not always have the answer and consumer preferences do not always react fast enough to market failures. We do not have time to wait for demand to right-size and see how things turn out. That is one point I agree with Mr Fancy on.

As already alluded to, we need to improve and correctly interpret standards, investor norms and regulation.

Principle 4 of the Financial Reporting Council's 2020 UK Stewardship Code, which Financial Conduct Authority (FCA) rules requires all asset managers to adhere to on a comply or explain basis,[10] expects signatories to "identify and respond to market-wide and systemic risks to promote a well-functioning financial system". Similarly, stewardship is defined in relation to its capacity to lead to "sustainable benefits for the economy, the environment and society".[11]

We also see the FCA increasingly referring to its statutory market integrity objective. For example, in its discussion paper on its forthcoming SDR and policy statement on enhanced climate-related disclosures, it states the desired outcome of these interventions is protecting and enhancing the integrity of the UK financial system. This is through improved assessment of sustainability and climate-related matters across the market, resulting in more informed pricing and capital allocation decisions.

According to the EU's Sustainable Finance Action Plan (SFAP), financial market participants are required under SFDR to articulate how they take action to mitigate against principal adverse impacts (and if they do not, why not). Similarly, they must explain how they integrate sustainability risks into investment decisions. Under SFDR, while sustainability risks are deemed to be already or potentially financially material to investments, "principal adverse impacts" are characterised by their material impact on the environment and society.

Mitigating these kinds of impacts often requires systems-level thinking. And macro stewardship could help bring about the corrections needed for the market to price in externalities that are not yet internalised. These include the true cost of carbon, the threat of antimicrobial resistance, water or air pollution and the hidden costs of curtailing talent through diversity and inclusion failures – along with many others.

To truly act in the best long-term interests of our customers, we need to not only advocate for a sustainable system, but also ensure – to the extent we have tools at our disposal – the financial system is one that has integrity and is not undermined by market failures. Stewardship in the fiduciary sense is being redefined and re-written in response to these sustainability concerns.[12]

The main tools we have are our voice, expertise and authority to support and influence policymakers. For while it is they who have the authority and mandate to address these failings, it is market participants who have the resources, access to information, and expertise to identify them and suggest appropriate corrections.

Examples of interventions we have made include helping to draft the precursor to the EU's SFAP through its High-level Expert Group, as well as convening a group of industry experts and public policy officials from around the world to discuss how to best harness finance to meet the goals of the Paris Agreement.

More recently, we launched a climate manifesto that outlines the leverage points and changes required across the entire international financial architecture.

To reiterate, stewardship cannot and should not be limited to engagement with individual companies. The biggest risks cannot be mitigated through action by any single entity.

Aligning and assessing macro stewardship

That the debate sparked by Friedman about shareholder primacy continues to rage to this day is partly because his comments have frequently been taken out of context. In a forgotten part of the article referenced at the start of this piece, he also said the responsibility of a corporate executive is to "make as much money as possible while conforming to their basic rules of the society; both those embodied in law and those embodied in ethical custom".[13]

> *Stakeholder capitalism and ESG investing should be mutually inclusive and reinforcing*

Where I disagree with Friedman is over his definition of what it means to be a socially responsible company. He was wrong to define it as doing things other than the core business. Meeting basic rules of society, whether on labour standards, environmental protection or good governance standards, are fundamentally important to all businesses.

Stakeholder capitalism and ESG investing should be mutually inclusive and reinforcing; the former cannot work without a properly functioning latter. And for stakeholder capitalism to work – or stick – incorporating macro stewardship into everyday ESG activity is essential.

As well as systems thinking and a holistic mindset, it requires close alignment between micro and macro engagement. Engaging with companies, sovereigns, state-owned enterprises, policymakers and other influential changemakers in a considered and coordinated way will ensure maximum impact from minimal resource deployment. People, time and money are always constrained. Alignment for us comes in the form of three pillars – people, climate and Earth – that link closely to the UN Sustainable Development Goals.

Take climate change, for example, an issue on which we advocate for policy and systems change on multiple fronts.

As new standards of stewardship emerge, judging asset managers on their ESG promises at a fund level will not be sufficient. Scrutiny at a firm level – on genuine commitments and action to correct market failures to improve public welfare – will be critical. Consultants and fund selectors have a pre-existing model for incorporating firm-level assessments and these should be expanded and updated to include macro stewardship ratings. Other key investment gatekeepers will need to adjust their thinking accordingly. Macro stewardship could also form a useful shield against accusations of greenwashing.

I have seen many phases in responsible investing. This era, where targeted corporate engagement and macro stewardship initiatives combine with the reallocation of capital towards more sustainable investments, is by far the most exciting.

Never has so much interest and, more importantly, capital flowed towards the sector. But if we are to properly harness it to avert environmental and societal disasters, tinkering around the edges will not be enough. We need to start actively changing the system itself

1 Klaus Schwab, 'Davos Manifesto 1973: A code of ethics for business leaders', World Economic Forum, December 2, 2019.
2 Edward Freeman, 'Strategic Management: A Stakeholder Approach', Cambridge University Press, 1984.
3 Klaus Schwab, 'Davos Manifesto 2020: The universal purpose of a company in the fourth industrial revolution', World Economic Forum, December 2, 2019.
4 Fiona Harvey, 'Climate experts warn world leaders 1.5C is 'real science', not just talking point', The Guardian, October 30, 2021.
5 Fiona Harvey, 'Climate experts warn world leaders 1.5C is 'real science', not just talking point', The Guardian, October 30, 2021.
6 James Vaccaro, 'Blip, crisis or collapse: why financial regulators need to prepare for more than a climate crisis', Green Central Banking, May 26, 2022.
7 Steve Denning, 'The triumph of customer capitalism', Forbes, January 10, 2020.
8 'Act now: Question your pension', Make My Money Matter, as of August 2022.
9 Article 2.1.c of the Paris Agreement: 'Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.'
10 'FCA Handbook : COBS 2.2.3 Disclosure of commitment to the Financial Reporting Council's Stewardship Code', Financial Conduct Authority, as of August 2022.
11 'The UK Stewardship Code 2020', Financial Reporting Council, 2020.
12 'Markets', Financial Conduct Authority, as of August 2022.
13 Milton Friedman, 'The social responsibility of business is to increase its profits', The New York Times, September 13, 1970.

RING THE CHANGES

AN INTERVIEW WITH KATE RAWORTH

RING THE CHANGES
continued

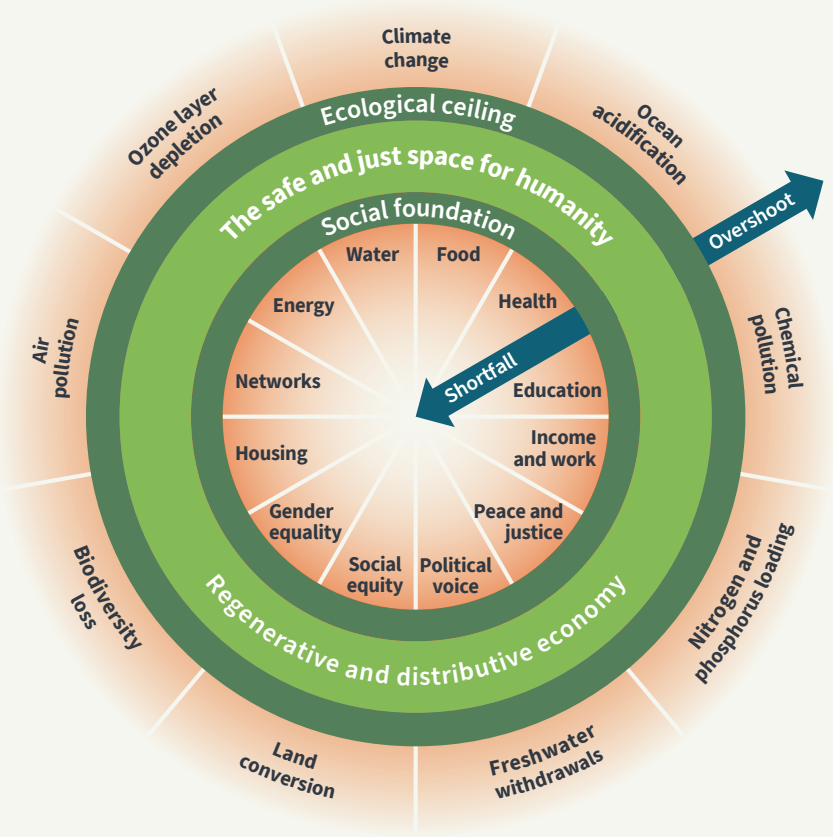
The influential academic speaks to *AIQ* about the flaws in traditional economic thinking and how her revolutionary "Doughnut" offers a fresh approach to solving the world's greatest problems.

As a teenager in Britain in the 1980s, Kate Raworth watched television pictures of crisis and catastrophe – the famine in Ethiopia, the Bhopal gas disaster, the Exxon Valdez oil spill – and resolved to spend her life working to end poverty and environmental destruction.

She arrived at Oxford University to study economics, but soon realised the syllabus had little relevance to these real-world challenges. Working in international development, first at the United Nations and then Oxfam, she saw first-hand how unfair trade arrangements and climate change affect the world's poorest.

Armed with this knowledge, she returned to economics determined to transform it. In a 2012 report, she set out a new way of thinking about the discipline, not as a set of iron laws but as a toolkit to achieve humanity's long-term goals. She drew a picture to convey her ideas and it looked like a doughnut: a pair of concentric circles denoting social and environmental objectives. Between the rings was a "safe and just space" where humanity can exist without falling short on human rights or breaching the planet's environmental limits (see Figure 1). The phenomenon of Doughnut Economics was born.

Figure 1: **The Doughnut of social and planetary boundaries**



Source: Doughnut Economics Action Lab, September 2022.

> *The idea economies are best determined by the movement of markets is utterly wrong*

Later developed in a bestselling book,[1] Raworth's ideas have proved hugely influential. Pope Francis commended the Doughnut in his book *Let Us Dream*; Sir David Attenborough has cited it as a "compass" for the human journey.[2] And Doughnut principles are being put into action by policymakers and grassroots campaigners worldwide. Working with Raworth's Doughnut Economics Action Lab (DEAL), Amsterdam has pledged to bring all its residents "inside the Doughnut" and achieve a fully circular economy by 2050. Other cities in Europe, the US and New Zealand have set similar targets.[3]

Now a senior associate at Oxford University's Environmental Change Institute and Professor of Practice at Amsterdam University of Applied Sciences, Raworth says further progress is needed to put the world on a more sustainable path. In this interview, she sets out the flaws in mainstream economics, the benefits of systems thinking and how the design of companies needs to change to address pressing social and environmental challenges.

Doughnut Economics argues economies should stop fixating on GDP growth and instead target the Doughnut's "safe and just space". What are the key flaws with GDP and how can the Doughnut help us move beyond them?

GDP is an entirely monetary metric; it merely reflects the price given to the goods and services produced in an economy in a year. It doesn't tell you what you really need to know for humanity to thrive on this planet in the 21st century. GDP doesn't reflect household care and other unpaid work, and it ignores what has been destroyed in order to produce goods to sell. In the classic line, it tells you the price of timber; it doesn't tell you the value of the forest you've lost.

Too often, economics starts with market supply and demand. That puts price at the centre of our attention and makes us think of success in terms of increasing the value of bought and sold goods.

By contrast, Doughnut Economics starts with the life-supporting systems of our planetary home and the wellbeing of every person. By taking into account the fundamental social and natural metrics of life, the Doughnut asks how we can design an economy compatible with meeting the needs of all people, within the means of the living planet. The idea that ever-rising GDP is going to meet those needs, within those means, is a complete fallacy. So it's time to replace GDP in the realm of policymaking with a dashboard of social and natural metrics that can far better reflect the essentials of a thriving economy.

You have written about the "heroically simplifying assumptions" in economics that derive from its emulation of Newtonian physics. What are key problems that result from this?

When 19th century economists were desirous to make economics appear to be science – and the science of the day was Newtonian physics – they went down that route and inadvertently led us into all sorts of problems. We ended up with economic analysis that is predominantly static. As John Maynard Keynes pointed out, economists set themselves too easy a task if they can merely tell us that after a storm the ocean will be flat: what matters are the storms and waves that hit us along the way.

One of the dangers of this way of thinking is the idea there is such a thing as an equilibrium; that markets will come to a natural point of balance in the same way a ball will roll to the bottom of a bowl. In the 1970s, Eugene Fama's *efficient market hypothesis* claimed the actions of financial markets take on board all available information, bringing about an equilibrium. But the idea economies are best determined by the movement of markets, apparently bringing things into balance, is utterly wrong.

Hyman Minsky's work addressed this fallacy. He brought in systems thinking to reveal that there is an inherent instability in financial markets because they incorporate expectations which create inherent cycles. This has been borne out in analyses of financial crises, and it makes sense more widely, because life occurs in cycles. Like all living beings, we are born, we grow, we may mature and thrive, we die. So too for whole communities, societies and civilisations. Equilibrium analysis does not reflect the dynamic reality of the living world. We tend to destroy the fragile and delicate balance of Earth's life-supporting systems when we use an analytical framework which in no way reflects this fact. That is why systems thinking is such an important starting point for creating economies that enable life to thrive on this planet.

What other advantages does systems thinking offer over mainstream economic analysis?

There is a quote I live by, from the statistician George Box: "All models are wrong, but some are useful." Let's recognise systems thinking is itself a model. So while it is not 'true' or correct, I believe it is a far more useful heuristic device for understanding the world than traditional economic analysis.

Systems thinking interprets the world through the lens of feedback loops. There are reinforcing feedback loops that spiral up or down – the more you have, the more you get, or the less you have, the less you get – leading to virtuous or vicious cycles. There are also balancing or dampening feedbacks that hold things in balance – the more you have, the less you get.

My epiphany came when I read Donella Meadows's book *Thinking in Systems*.[4] It transformed the way I saw the world. It also made me incredibly frustrated. When I thought back to my economics education, I realised we had barely broached systems thinking. It only came up as the advanced concept of hysteresis, or path-dependency. But this should really be a starting point for Economics 101 if we want students to understand economic realities. As Meadows writes, "Let's face it, the universe is messy. It is nonlinear, turbulent and chaotic… it self-organises and evolves…that's what makes the world interesting, that's what makes it beautiful, and that's what makes it work."

RING THE CHANGES
continued

> *The nature of a company's ownership will profoundly shape how it operates*

How can systems thinking help solve the key issues of our time: climate change, social inequality, financial crises?

Thankfully, due to systems thinking, we now know far more about the dangers of tipping points in Earth's climate and ecological systems. But since we have a generation of policymakers whose education didn't include systems thinking, it is rarely translated into policy and practice. Amid the daily cut-and-thrust of politics and events, it's a challenge to get the media, general public and politicians to respond at speed to the irreversible climate tipping-point effects we are on the verge of causing.[5]

This is also an issue when it comes to addressing social inequalities. It is now clear many social systems are dominated by reinforcing feedback loops. The more you have, the more you get, whether in terms of privilege, income, opportunity, networks. Such reinforcing feedbacks tend to drive wider social inequalities; governments need to take a systems-thinking approach to design and intervene effectively with policies that serve to rebalance those dynamics.

More systems thinking is also needed in finance. Policymakers such as Gordon Brown and Ben Bernanke admitted they thought economies had entered a "great moderation" before 2008. They, and regulators, did not see significant risks within any particular bank; the problem – they later realised – was they weren't looking at the risky connections *between* the banks. The resulting financial crisis brought greater recognition of Minsky's work and introduced systems thinking into the heart of financial regulation, thanks to analysts such as Andy Haldane at the Bank of England. But the financial system still hasn't been reformed sufficiently.

Drawing on Meadows's work, you have argued stewardship focused on "leverage points" is important in managing complex systems. How could financial markets be stewarded in a more sustainable direction, and where might the leverage points be?

We need to develop what's known as "right relationship". In the simplest terms, we need a financial system that, by design and ethos, is in service of an effective economy, which in turn is compatible with reproducing the conditions conducive to life on Earth.

What does that look like? Not the system we've got. The financial system still wields influence and power in service of itself. It is designed to pursue endless returns; there is no sense in which it will ever mature. As Meadows would say, if there is a subsystem that seeks to optimise itself by growing endlessly, it poses a threat to the health of the whole. We know what that looks like in biological systems: we call it cancer.

One of the highest leverage points Meadows names is to address the purpose or goal of the system. At the moment, the goal of the financial system is to maximise its own returns. Instead, we need finance to support an economy that meets the needs of all on a thriving planet. How we do that is a big question – I don't have the answer, but it certainly goes far beyond today's environmental, social and governance (ESG) discourse.

There has been a lot of talk among major corporations of moving towards a more sustainable, multi-stakeholder, purpose-led model, but little evidence of this in action. Why is this?

A lot of people talk about corporate purpose and leadership, but that is just the surface layer of what needs to change. For a deeper redesign of enterprise, you also need to ask how a company is networked; to examine its relationships with suppliers, industry associations, customers and employees. Do these networks strengthen or undermine its purpose? Which alliances are holding the company back? Likewise, ask how the company is governed: who has a voice in decision-making, what are the rules and norms at work, and what are its metrics of success?

You also need to look at ownership. Because the nature of ownership – whether a company is owned by a family or by its employees, its founding entrepreneur, or by shareholders, by venture capital or by the state – will profoundly shape how it operates. And how the company is financed, and what that finance expects or demands, extracts or reinvests, is in turn strongly determined by how that company is owned and governed.

We have seen two very powerful stories from the markets in recent years that illustrate this point. Under its former CEO Paul Polman, Unilever set out an ambitious vision for the future of the company. But in February 2017, the firm faced a hostile takeover bid by Kraft-Heinz, and from that point the markets began to pull Polman back from that stakeholder-focused direction [Polman stepped down as CEO in November 2018]. Similarly, Danone CEO Emmanuel Faber was removed in March 2021 after taking innovative steps towards making the company a mission-led enterprise that acted on climate change.

These companies were seen at the time as advertisements for the possibility of major corporate transformation. In both cases, the markets showed they would not tolerate significant change. That really throws down the gauntlet to proponents of the mainstream shareholder-owned model: where are the examples of major publicly traded companies that are becoming regenerative and distributive by design?

> *Far-sighted countries will accelerate their move away from dependence on fossil fuels*

Until such examples exist, there is little reason to believe that today's dominant models of corporate ownership and financing can support the kind of regenerative and distributive enterprises that the future needs.

How can businesses be structured in a way that is more conducive to a distributive and regenerative economic system?

There is no single solution. Whether it is through steward ownership, employee ownership, cooperative ownership or other designs, we need alternative forms of enterprise design that attract financing aligned with, and in service to, the purpose of the company, as opposed to disrupting, diverting and undermining it.

The aim is to have an ecosystem of enterprise design, which will include a range of different kinds of business structures, appropriate to different kinds of companies. DEAL is now working with organisations like Purpose Economy that are supporting people interested in setting up steward-owned companies.[6] Likewise, in the US, where many founder-owned firms soon face the CEO's retirement, the Fifty By Fifty movement aims to work with them to grow the number of employee owners in the nation from ten million to 50 million by 2050.[7] Initiatives such as these demonstrate, we believe, that the enterprise designs the 21st century economy needs are only just being invented. It will take innovations in finance to serve them.

The Ukraine-Russia war has highlighted the fragility of global supply chains and the limitations of our continued reliance on fossil fuels. What are the prospects these shocks could be catalysts for positive change over the longer term?

The energy crisis many countries face is clearly a huge source of near-term stress and suffering for households and businesses. But as the economist Milton Friedman said: "Only a crisis – actual or perceived – produces real change. When that crisis occurs, the actions that are taken depend on the ideas that are lying around."

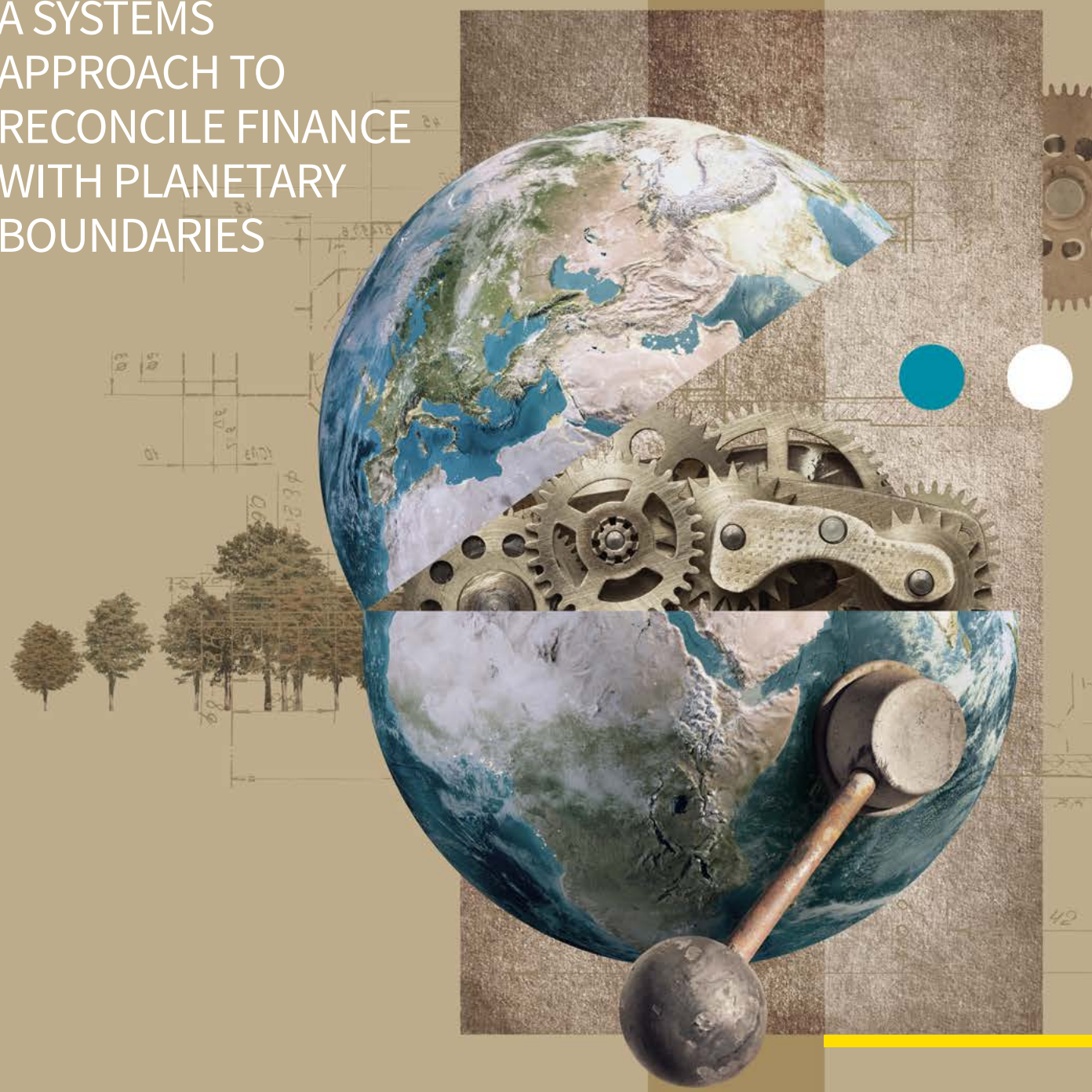
In the face of this crisis, far-sighted countries will accelerate their move away from dependence on fossil fuels and invest faster in renewables and energy-demand reduction, such as through insulation. That route makes sense both now and for the long term. But other countries may simply double-down on producing fossil fuels.

It's long been clear high-income countries have the greatest responsibility to move first and fastest on climate change. A crisis like this is reason to redouble investment in the energy transition, not backtrack to outdated fossil-fuel generation. That path would be devastating to us all ●

1 Kate Raworth, 'Doughnut Economics: Seven ways to think like a 21st-Century economist', Penguin Random House, 2017.
2 David Attenborough and Jonnie Hughes, 'Life on Our Planet: my witness statement and a vision for the future', Penguin Random House, 2020.
3 'Amsterdam city doughnut', Doughnut Economics Action Lab, July 2020.
4 Donella Meadows, 'Thinking in Systems: a primer', Routledge, 2009.
5 Damian Carrington, 'World on brink of five "disastrous" climate tipping points, study finds', The Guardian, September 8, 2022.
6 See Purpose-economy.org.
7 'About Fifty by Fifty', Fifty by Fifty, as of September 2022.

THE LEVERS OF CHANGE

A SYSTEMS APPROACH TO RECONCILE FINANCE WITH PLANETARY BOUNDARIES



Financial services underpin all economic activity, which itself depends on Earth's natural capital. Resolving their interconnected issues to bring about a just transition will require a holistic, systems-thinking approach.

> *Growth has become unsustainable. It has never been equitable in that some live far above sufficiency, while others live far below. And no system that uses resources at a rate that destroys natural life-support systems without meeting the basic needs of all can possibly be considered efficient*
>
> **Herman E. Daly**
> *Beyond Growth*,
> Beacon Press, 1996

The debate around the planetary limits to economic growth has been around for decades, first coming to light with the 1972 publication of the book *Limits to Growth*, commissioned by the Club of Rome and written by Donella Meadows, Jørgen Randers, Dennis Meadows and William W. Behrens III.[1] It was long confined to the sidelines as companies, policymakers and the mainstream economists who advised them ignored the notion of Earth's finite ability to provide resources, absorb waste and sustain economic growth.

"For a long time, we have been in pursuit of exponential growth. This pursuit has been working for a tiny minority of the world's population, but without taking equality, justness or fairness into account. At the same time, that drive is undermining the system itself and could ultimately lead to its collapse," says Natalie Mangondo, finance youth fellow, UN Climate Change High-Level Champions.[2]

"But there is also an incredible opportunity to harness the interrelatedness and interdependence of our economic and financial systems to build something better," she adds.

Indeed, the *Limits to Growth* model shows that "once the population and economy have overshot the physical limits of the Earth, there are only two ways back: involuntary collapse caused by escalating shortages and crisis, or controlled reduction of the ecological footprint by deliberate social choice".[3]

(Over)shooting ourselves in the foot

As highlighted in the most recent report by the Intergovernmental Panel on Climate Change and the fact Earth Overshoot Day fell on July 28 this year, we have been exceeding those limits for some time.[4,5] A landmark 2018 study found that, between 1992 and 2014, the value of natural capital (defined as the world's stock of natural assets, including all living things, but also air, water, geology and soil) per head had declined by nearly 40 per cent across 140 countries.[6]

THE LEVERS OF CHANGE
continued

According to Daly, the key limiting factor of economic growth, which used to be man-made capital, has now become remaining natural capital:

"The production of caught fish is currently limited by remaining fish populations, not by number of fishing boats; timber production is limited by remaining forests; not by sawmills; barrels of pumped crude oil is limited by petroleum deposits, (or perhaps more stringently by the capacity of the atmosphere to absorb CO_2), not by pumping capacity; and agricultural production is frequently limited by water availability, not by tractors, harvesters, or even land area."[7]

Daly argues "economic logic requires us to maximise the productivity of the limiting factor in the short run and invest in increasing its supply in the long run". Today, without changing our economic logic, this means investing in natural capital first and foremost. In other words, we must make the "deliberate social choice" highlighted in *Limits to Growth* to reduce our ecological footprint if we are to avoid economic collapse.

According to a recent paper by thinktank Volans and EU initiative Climate-KIC, the state of the planet has thrown the current economic paradigm into deep crisis, as we can no longer ignore what mainstream economists term "externalities". Thinking in terms of "planetary boundaries" is gaining traction, and a tipping point is approaching where economic thinking needs a radical reboot. The question is how.[8]

As Aviva Investors CEO Mark Versey argues, this means no longer treating responsible investing as a niche category but redeploying all capital towards sustainable investments (see *Redefining stewardship: Why stakeholder capitalism needs to wake up*). "Unfortunately, the incentives for asset managers and other key financial institutions to actively push for systems change and market reform are weak at best," wrote Versey. "This needs to change."

And because financial services – investments, banking and insurance – underpin all economic activity, which is itself dependent on natural capital, resolving their interconnected issues requires a holistic, systems-thinking approach, and identifying and activating key levers of change. One way for investors to help redefine the system is to embrace macro stewardship – the practice of actively engaging governments, policymakers, NGOs, academics and other key influencers to correct market failures on sustainability issues.[9]

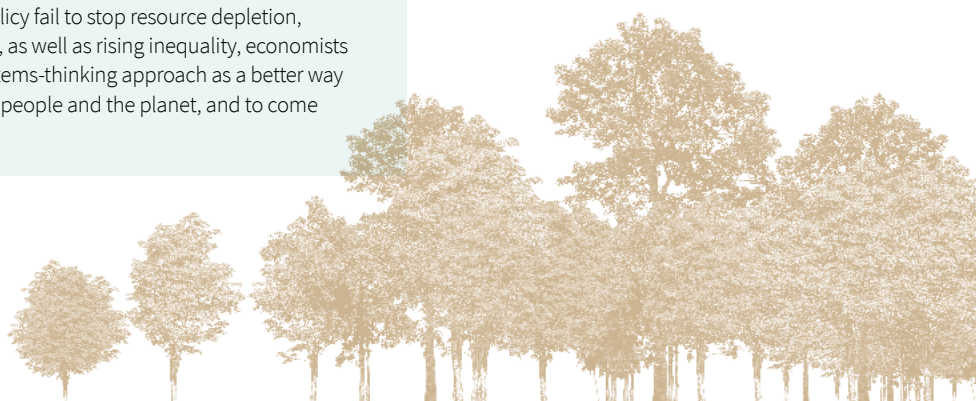
In this article, we give an overview of systems thinking and systems change, discuss the paradigms and feedback loops needed to move to a sustainable financial and economic system, and explore the key levers of change for the financial system.

ABOUT *LIMITS TO GROWTH*[10]

Limits to Growth used the World3 computer model to simulate the consequences of interactions between the Earth and human systems – population increase, agricultural production, non-renewable resource depletion, industrial output, and pollution generation. The simulations showed the planet probably cannot support present rates of economic and population growth much beyond the year 2100, if that long, even with advanced technology.

It has sold over 30 million copies worldwide and sparked much debate but did not break into mainstream analysis until recently.[11]

Today, as traditional economic analysis and policy fail to stop resource depletion, pollution, biodiversity loss and global warming, as well as rising inequality, economists and policymakers are turning to the book's systems-thinking approach as a better way to understand the economy's interactions with people and the planet, and to come up with sustainable solutions.



> *The idea of being able to look outside the box and make connections was pivotal*
>
> **Nafeez Ahmed**
> Director of Global Research Communications, RethinkX

PART 1: SYSTEMS THINKING FOR SYSTEMS CHANGE

Donella Meadows defined a system as "an interconnected set of elements that is coherently organised in a way that achieves something". In *Limits to Growth*, she and her co-authors argued demography, the economy and the environment together embody one planetary system with innumerable interactions.[12]

"The idea of being able to look outside the box and make connections was pivotal," says Dr. Nafeez Ahmed, director of global research communications at thinktank RethinkX, of *Limits to Growth*. "They flagged something very important: that natural limits or constraints can exist in nature, and we need to understand our relationship to these planetary boundaries. They also identified a resource bottleneck between 2020 and 2050, which I believe is broadly accurate." (see *Know your limits: An interview with Nafeez Ahmed*).[13]

This means we can no longer consider the economy as a closed system independent from demography and planetary resources, or to implement policies to change these three areas separately. As Kate Raworth explained in *Doughnut Economics*, they are too interconnected for this to work. We need to see them as a whole, complex system, and apply systems thinking to avoid environmental and economic collapse.[14]

Stocks, flows and feedback loops

Systems do not always do what we want them to.

"Contemporary research attempting to assess the accuracy of World3 [the model used in *Limits to Growth*] suggests we are close to a potential breakdown, decline and collapse scenario, but perhaps not approaching catastrophic worst-case scenarios – although they are still possible," says Ahmed.

In *Systems Thinking for Social Change*, David Peter Stroth defines systems thinking as "the ability to understand these interconnections in such a way as to achieve a *desired* purpose".[15]

As Raworth explained, stocks and flows are a system's core elements – notions familiar to many in the financial realm – while feedback loops are the interconnections between those stocks and flows that influence them. In every system, there are two kinds of feedback loops: reinforcing (or 'positive') feedback loops and balancing (or 'negative') ones.[16]

The terms 'positive' and 'negative' are not used here to convey a value judgment, but a reinforcing or weakening effect. An example of a positive feedback loop is greenhouse gases inducing warmer temperatures, which melt the permafrost, releasing methane, a powerful greenhouse gas.

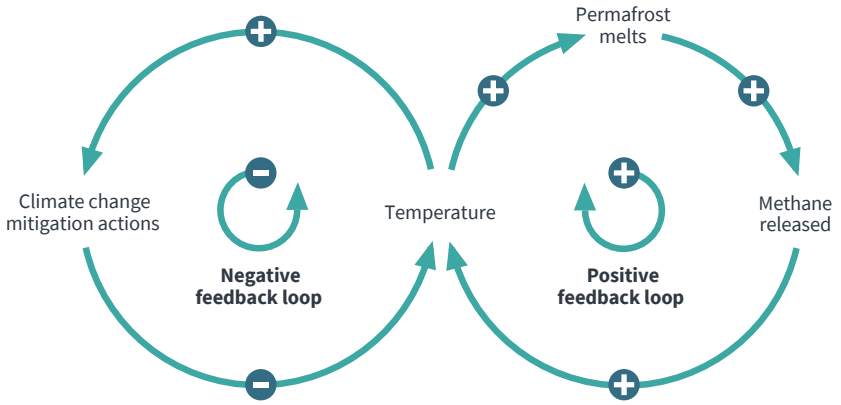
As explained in *Limits to Growth*, changing a system requires changing the structure of those information links: "the content and timeliness of the data that actors in the system have to work with, and the ideas, goals, incentives, costs and feedbacks that motivate or constrain behaviour." The authors explain this can be an extremely powerful catalyst for change:

"The same combination of people, organisations and physical structures can behave completely differently, if the system's actors can see a good reason for doing so, and if they have the freedom, perhaps even the incentive, to change."[18]

Paradigms and leverage points

In *Systems Thinking for Social Change*, Stroth warned against quick and easy solutions that correct the symptoms rather than the underlying causes of issues in a system, as these often have unintended consequences.[19]

Figure 1: **Positive and negative feedback loops**



Source: Aviva Investors, August 2022. Adapted from Rafael Laurenti, May 2016.[17]

THE LEVERS OF CHANGE
continued

The OECD recognised this in a 2020 paper, setting out new economic goals – environmental sustainability, improved wellbeing, lower inequality, and greater resilience. It argued these should be built into the structures of the economy from the outset, alongside integrated policy and performance indicators, requiring extensive institutional innovation.[20]

Tackling the root causes of a problem is often difficult because it takes more time and money and can entail more uncertainty than applying what Stroth calls a "quick fix".[21] It typically requires changing the goals of the system (creating a "paradigm shift" in systems terms).

For instance, the way the OECD paper aims to make its new goals the primary outcomes of the economic system is a paradigm shift in its approach. The authors recognised how challenging this will be:

"We are under no illusions as to how easy or quick policy changes of these kinds will be. They will require significant institutional reform. Many vested interests will stand in the way. So we recognise that this is as much a political as an economic policymaking challenge."[22]

However, as Stroth explained, systems change can be achieved by focusing on a few key leverage points, then learning from experience, expanding the resource pool, and scaling up what works: "The good news is that systems shift not as a result of making many changes, but by sustaining focus on only a few changes over time. These changes are called leverage points because they leverage limited resources for maximum long-term impact."[23]

Using a number of these leverage points will be essential to transform the incentives and behaviours of actors in the financial and economic part of the system. But to identify them, we must first understand the limitations of the paradigms, structure and feedback loops of the current system.

PART 2: FLAWED PARADIGMS

"Currently, the way the economy works is you make more money by exploiting planetary and human resources than you do by doing the right thing. That's a market failure," says Thomas Tayler, senior manager at Aviva Investors' Sustainable Finance Centre for Excellence. "In the face of market failures, companies can only do "the right thing" until it starts to reduce their profitability because they have to answer to their shareholders."

Daly gives two reasons for this. The first is that mainstream models present the macroeconomy as a self-sustaining, isolated system – "a giant perpetual-motion machine", independent from the Earth's resources that can grow forever.[24]

The second reason is that, in economic models based on present-value maximisation, the destruction of resources or ecosystems can be the optimal way to achieve this, making companies that exterminate resources rational.[25]

"There is nothing within capital markets that values future generations," noted Steve Waygood, chief responsible investment officer at Aviva Investors, in a recent article (see *A tragedy of perception*). "Quite the opposite. It discounts their interests and ignores the consequences of our current consumption on their very existence. As for capturing nature's true value – of a mangrove, say – we are a long way off."[26]

Yet it is crucial to change mindsets and the goals of the system to transform the system itself. Without this, economic actors will take a "minimum plausible compliance" approach to new rules and regulations, and changes will not be as effective as they should.

Shifting the paradigm

To move beyond old models into a sustainable era, we will therefore have to rethink our unquestioning confidence in economic growth, instead asking: "Growth of what? For whom? At what cost? Paid by whom?"[27]

As the Volans white paper noted, companies, investors and policymakers need to look beyond shareholder value maximisation, modern portfolio theory and GDP. "It will take courage, creativity and collaboration to overthrow one paradigm – a paradigm based on maximising economic efficiency – and replace it with another based on respecting planetary boundaries."[28]

> *In the face of market failures, companies can only do 'the right thing' until it starts to reduce their profitability*
>
> **Thomas Tayler**
> Senior Manager, Sustainable Finance Centre for Excellence

Although recent debates have questioned the role of the financial industry and ESG investing in the transition to a more sustainable economy, macro stewardship will be central.

"One of the fundamental things missing from any debate that says this is solely the preserve of governments is a recognition of the scale, influence, and expertise of the financial system," says Tayler. "A lot of the answers and ideas lie within the system itself.

> *Companies, investors and policymakers need to look beyond shareholder value maximisation and GDP*

"Yes, governments have the primary levers, but we must use our expertise and insights to ask them to give us the enabling conditions to achieve net zero, biodiversity and social goals, and help make that paradigm shift," he adds.

This also means shifting a paradigm of finance itself: industry players need to understand they don't have to passively accept the level of risk of the system but can instead try to influence it.

"We can affect where risks are concentrated by the way capital is allocated across the system, but we can also take risk out of the system through engagement with governments for policy change that impacts the drivers of systemic risk," says Tayler. "We can advocate for change and governments will listen. We've seen it happen in the past, but it needs to happen on a bigger scale."

How to achieve the shift

To change mindsets in financial services, Jess Foulds, senior manager for global responsible investment at Aviva Investors, recommends an array of approaches to change incentives – embedding long-term value creation in individuals' assessments, for instance – and education, including MBAs and the CFA.[29]

"Academia is another area where we may need to commission further studies," adds Foulds. "However, to get widespread buy-in, we must build on existing frames of reference. It is a case of broadening perspectives rather than refuting everything that has gone before."

This shift is needed in both financial and economic policy. Key policy influencers and actors recognise this, and are now calling for profound change, as well as proposing solutions. For instance, Earth4All is a collective of leading economic thinkers, scientists, and advocates offering a vision for a new economic and social approach.[30]

Sandrine Dixson-Declève, Earth4All project lead and co-president of the Club of Rome, says: "For governments, we recommend moving beyond a singular focus on economic growth to include natural and social capital. The health of the economy should reflect progress in human development and ecosystem resilience."

Similarly, the OECD paper stated that achieving the four goals of environmental sustainability, rising wellbeing, falling inequality and system resilience would require rethinking the dominant approaches to economic policy of the last 40 years. This would involve a new concept of economic and social progress, new frameworks of economic theory and analysis, and new approaches to economic policy.[31]

One arresting idea Kate Raworth – among others – picked up on is the role of economic growth in the race for global power, which Kenneth Rogoff wrote is completely ignored in standard macroeconomic models.

This notion is not much discussed among the solutions proposed to integrate human wellbeing and environmental sustainability into economic theory and policymaking. Yet, as Raworth argued: "This lock-in highlights the need for innovative thinkers in international relations to turn their attention to strategies that could help usher in a future of growth-agnostic global governance."

International relations may be one more facet of the global system we need to integrate in efforts to change the system.[32]

As highlighted, these efforts will have to focus on embedding the new paradigms into the system by transforming its structure – the information flows and feedback loops that maintain it. The good news is there is precedent for this type of profound shift in previous times of crisis and change, for example in the 1940s with Bretton Woods.[33]

> *It is a case of broadening perspectives rather than refuting everything that has gone before*
>
> **Jess Foulds**
> Senior Manager, Global Responsible Investment

THE LEVERS OF CHANGE
continued

> *If global warming reaches 3.5°C, the world becomes uninsurable and the whole financial system fails*

PART 3: TACKLING THE FEEDBACK LOOPS

Unfortunately, the interventions to date have not been of a scale or nature to deliver systemic change.

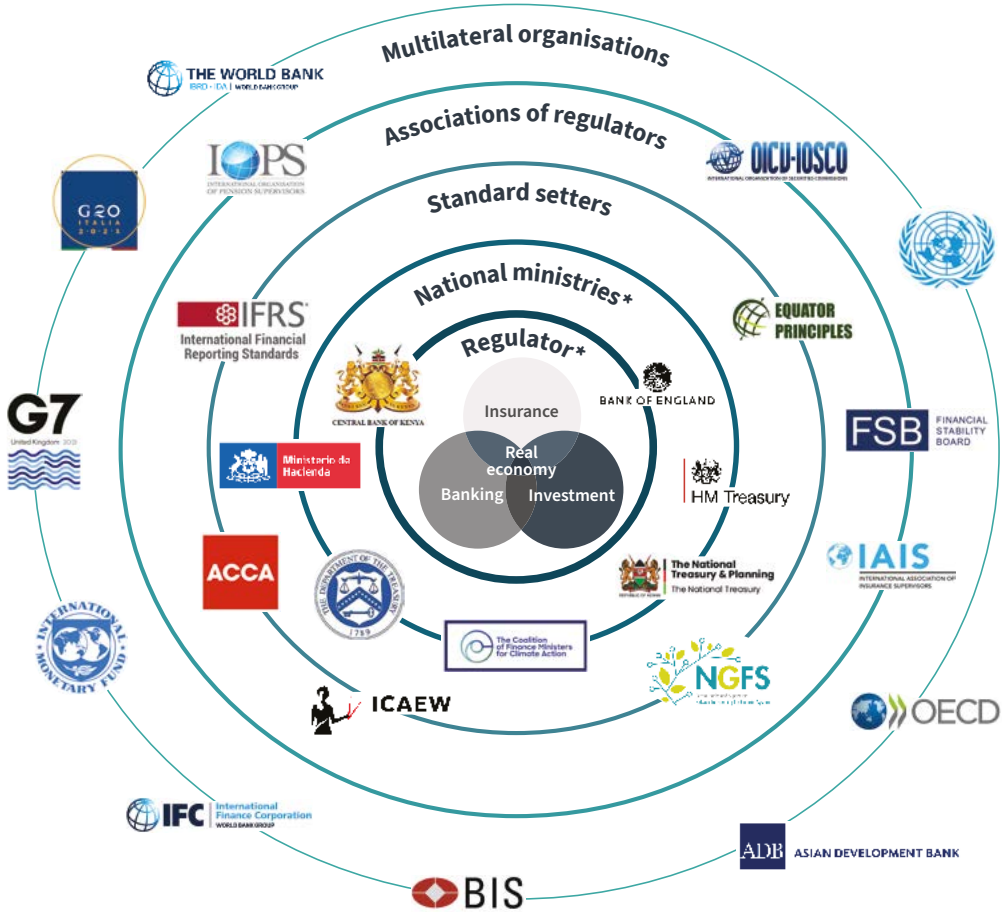
"The finance system is critical because we have built our global economy around it," says Tayler. "We are dependent not just on investment, but there's an absolute reliance on the insurance industry to mitigate risk, and on the banking system to provide liquidity, technical expertise, and to structure projects and infrastructure."

Tayler adds that if the theoretical role of finance – through investment, underwriting and banking – is to allocate capital to where it will best serve society, then the financial system is not working as it should. As long as it is constrained by the current goals and rules, it will continue pursuing outcomes that are damaging for society and the planet until, if global warming reaches 3.5°C (the current implied warming of global stock exchanges), the world becomes uninsurable and the whole financial system fails.

"Taking a systems-thinking approach to the role of financial services, our duty to act in the best interests of clients and to promote market integrity should extend to issues that undermine markets and financial stability," says Foulds.

"That is where we come to the review of the international financial architecture, which is one of the key asks of our International Platform for Climate Finance campaigning," she adds.[34] "The bodies that make up the

Figure 2: **The current architecture does not deliver optimal outcomes for society**



Note: This is not a completely exhaustive view – but highlights key global organisations due to their mandate. *Illustrative examples.
Source: Aviva Investors, September 2022.

> *With the right incentives, economic growth can be based on a clean energy system and regenerative food system*
>
> **Per Espen Stoknes**
> Earth4All Project Lead, Norwegian Business School and Member of the Club of Rome

financial system don't have an explicit objective to monitor or carry out the delivery of sustainable development."

What needs to change

To correct those market failures, Foulds argues the financial system must engage with governments, policymakers, and global regulatory bodies to reset the rules and align incentives and penalties with sustainable behaviours.

"The shift of the economic system to be agnostic about growth can help accelerate the turnarounds," says Per Espen Stoknes, Earth4All Project Lead, Norwegian Business School and Member of the Club of Rome, speaking of the five key economic and social turnarounds recommended by the Earth4All initiative.[35] "The poorest countries in the world must have economic growth of at least five per cent per year to end extreme poverty in a generation. With the right incentives, this economic growth can be based on a clean energy system and regenerative food system.

"In wealthy nations, clean energy transformation will drive economic growth in this sector," he adds. "How could it not? But this is directed, sustainable growth with a lower material footprint, rather than unhinged, unfettered growth in resource use. This can be achieved with a shift to circular and regenerative economies. At the same time, some industries need to contract: the fossil fuel industry is the obvious one."

To bring the economy back within planetary boundaries, protect biodiversity and improve wellbeing, markets must be reshaped in pursuit of publicly determined goals. Taking a broad approach, the OECD paper draws up a long list of areas to transform. These include creating new models in finance and macroeconomics; changing governments' approach to trade and industrial policy; incorporating the unpaid work of raising children or caring for family members into economic accounting. There also needs to be recognition of the "inescapably ethical character of economic analysis" to enable a more sophisticated public debate on the justice of economic policies.[36]

"What happens depends on the choices we make," says Ahmed. "If we continue to put up barriers to new technologies, throw money at fossil fuels and engage in conflict, we could accelerate collapse processes. We have brilliant tools that can help solve our problems, but we need to use them in the right way, fast, to get out of the danger zone. That requires big societal choices."

He explains that, given their cost curves and economic benefits, these technologies will inevitably replace incumbents. However, we must remove the negative feedback loops dampening their progress, namely subsidies for incumbent technologies and fuels, as well as regulatory monopolies.[37]

How to change the feedback loops

Systems change typically follows an S-curve: early adopters gradually push boundaries, then comes an inflection point when change becomes self-reinforcing and exponential. The financial and economic system is still in the early adoption phase, but when change takes off, the impact could be game-changing.

"Markets are incredibly powerful," says Tayler. "If you give them the right goal, they can become an enormous accelerator for sustainable action. That is why there is still hope, despite how late we have left it, because we haven't really gone 'all in' on concentrated climate action yet as a society."

A powerful way to do this is to use "ambition loops", whereby governments set clear policies that give businesses the space to innovate and accelerate sustainability practices. When businesses put their financial and intellectual capital to work towards these goals, they often find they can accelerate change and solve problems they didn't think could be solved. This gives governments scope to become more ambitious, and change begins accelerating in a reinforcing feedback loop.[38]

"If you then add finance pushing businesses and governments to do more through engagement and advocacy, that gives governments even more reason to provide a better environment to businesses," explains Tayler.

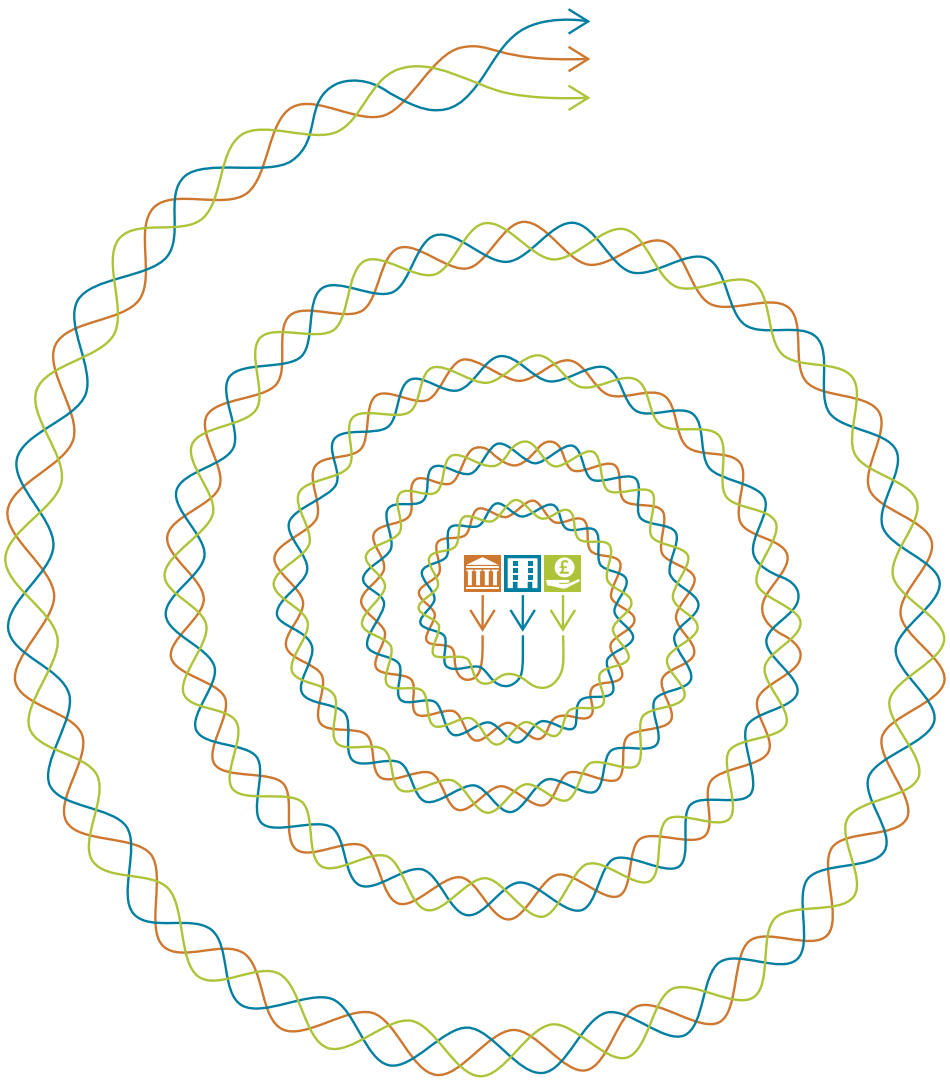
"In addition, financial markets want to allocate capital to businesses that will succeed in the new policy environment," he says. "Instead of it just being a feedback loop, there is an even more powerful 'triple helix' revolving on and reinforcing itself. That is how macro stewardship can be an accelerant to the positive ambition loop."

But to achieve those transformations and create powerful new feedback loops, key leverage points must be actioned.

> *If you give markets the right goal, they can become an enormous accelerator for sustainable action*
>
> **Thomas Tayler**
> Senior Manager, Sustainable Finance Centre for Excellence

THE LEVERS OF CHANGE
continued

Figure 3: **The triple helix of ambition**



Companies

- Ambitious targets and public reporting on progress to meet the opportunity created by the policy environment
- Delivery against commitments creates space for governments to do more and increase ambition as well as attracting investment from finance, rewarding innovation and ambition

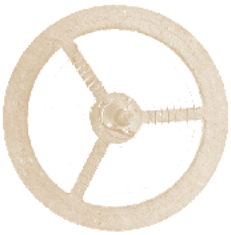
Government policy

- Clear, ambitious, predictable policy sending long-term signals to support investment in and commitment to transition
- Responding to the progress of corporates and finance by filling the space with an ever-increasing regulatory bar to reward leaders
- Public finance utilised to de-risk investment, finance breakthrough innovations and crowd in private investment

Finance

- Setting clear targets for own activity and investment, lending and underwriting; using stewardship and engagement to encourage ambition and delivery from corporates
- Engagement with governments to create enabling environment to deliver on own ambition and pushing corporates to meet ever increasing expectations and policy environment
- Finance mobilisation to leaders and breakthroughs creates more space for public and private sector action and delivery

Source: The Ambition Loop, Aviva Investors, September 2022.



> *The six areas of maximum leverage are fiscal policy; regulation; market mechanisms; standards and norms; consumer awareness and behaviour; and litigation*

PART 4: APPLYING MAXIMUM LEVERAGE

Donella Meadows identified the 12 most effective leverage points in a system.[39]

When mapping them out, Aviva Investors' macro-stewardship team first had to translate them into financial terms (stocks and flows of financial rather than physical resources, for example – see Figure 4).

"At the Club of Rome *Limits to Growth* 50th anniversary dinner, we learned they were doing exactly the same thing at the same time," says Waygood. "It is clearly a useful exercise!"

Through this analysis, the team identified six areas of maximum leverage: fiscal policy; regulation; market mechanisms; standards and norms; consumer awareness and behaviour; and litigation.

"Different people might have more leverage in one particular area or put the fulcrum in a different place to make it more effective," says Tayler. "But we will need to use all these levers."

They will overlap and bleed into each other at times, but nevertheless allow for a clearer breakdown of the necessary actions.

Fiscal policy and regulation

From a climate perspective, implementing a significant carbon tax will be essential, so the biggest emitters pay the price for their contribution to global warming and are incentivised to reduce emissions.

"Strong regulation, for example on fuel efficiency, and incentives such as tax breaks on electric vehicles and solar power, have a big role in shaping the behaviour of companies and consumers," says Earth4All's Stoknes. "This is possibly the single biggest lever for sweeping change. Simply make the most convenient and cheapest option the most sustainable.

"We need governments to become more active in supporting the most innovative companies as part of an overall mission," he adds. "We can see how these types of incentives reshaped car buying in Norway almost overnight so that electric vehicles dominate the market."

To reduce inequalities, the OECD paper recommends wealth taxes among a variety of policy approaches currently under discussion in many places. These include "mechanisms to broaden the ownership of companies, reforms to land ownership and housing markets and the design of 'citizen's wealth funds'", as well as measures "to reverse the decline in the effective bargaining power of workers" and to "steer and manage the processes of automation, ensuring that the benefits of higher productivity do not accrue simply to the owners of capital, but also to employees".[40]

The paper also explores financial regulation and taxation to penalise high-carbon and rent-seeking financial activity and incentivise long-term investment in productive sectors of the economy. This could "include reforms to the 'shareholder value' model of corporate governance and executive pay", which are among the changes Aviva Investors also advocates.

"As a heavily regulated industry, we understand regulation, so we can and do advocate for legal and regulatory changes that help bring more sustainable practices into place," says Tayler. "Regulation can create fair competition, but by bringing the bar up for everyone, rather than down."

It can also help create the ambition triple helix for investors (Figure 3). If the macro-stewardship team communicates with the investment teams on the changes they are advocating for and policymakers' response, the investment teams can look to position portfolios for clients to benefit from the transition – and support companies at the forefront of the evolution. In turn, if the investment teams feed back to the macro-stewardship team on the sustainable changes companies want to make but for which they need regulation to level the playing field, that can inform policy advocacy efforts.

"It will be increasingly important for those who are managing money to understand how policy will change," says Tayler. "Those shifts will transform industries, creating losers but also huge winners. Anticipating them means asset managers can be on the right side of those trends for clients."

Market mechanisms

This will be helped if market mechanisms are used to internalise externalities, so we finally stop counting the consumption of natural capital as income and begin incorporating the cost of pollution and emissions. The *Limits to Growth* authors gave the example of water to illustrate the point:

"One of the best ways to put these good practices into action is to stop subsidising water. If water price began to incorporate even partially the full financial, social, and environmental cost of delivering that water, wiser use would become automatic. Both Denver and New York discovered that just metering city water with a charge that rises with rate of use reduced household use by 30 to 40 per cent."[41]

As explained in the OECD paper, a combination of policy targets, public procurement, innovation spending and patient public investment can also help steer the economy and encourage private spending.[42]

"I see a big disconnect between the infrastructure needs for the future and investors," says Owen Gaffney, Earth4All project lead and communications director at the Stockholm Resilience Centre and Potsdam Institute for Climate Impact Research. "We need to do more work to create missions for massive infrastructure investments that are attractive to long-term institutional investors. Investors often complain there is little to invest in, while offshore wind generation will need to scale rapidly and consistently for the next century and provide ever greater returns on investment."

THE LEVERS OF CHANGE
continued

> *I see a big disconnect between the infrastructure needs for the future and investors*
>
> **Owen Gaffney**
> Earth4All Project Lead and Communications Director at the Stockholm Resilience Centre and Potsdam Institute for Climate Impact Research

Information is essential in using this lever, as illustrated by the increasing scrutiny on companies' carbon emissions now data is improving. "The fact we can now measure these things means they can properly start to be considered in investment analysis," says Tayler.

Foulds believes the general push for greater disclosure of sustainability risks and, more recently, principal adverse impacts, particularly in EU regulation, is playing a key role.

"Sustainability risks are predominantly those that are already financially material, but principal adverse impacts look at the impact investments will have on the environment and society," she says. "It is important for financial services to disclose how they are considering both. When policy mechanisms are enacted to finally align penalties and incentives to sustainability, principal adverse impacts will also become financially material."

Standards and norms

The way we share information will be key to establishing new standards and norms. For instance, to extend planning horizons and base decisions on their long-term costs and benefits rather than short-term profits, Meadows et al wrote of the need to "develop the incentives, the tools, and the procedures required for the media, the market, and elections to report, respect, and be responsible for issues that unfold over decades".[43]

Figure 4: **Leverage points – from least to most effective**

12 Constants, parameters, numbers

- Size of the financial system / global economy and rate of consumption.
- Scale of regenerative ability of the planet.
- As the planetary boundaries work of Johan Rockstrom and the Stockholm Resilience centre shows, we can (and should) change rates of consumption and enhance the regenerative ability of the planet through reforestation, giving space for regeneration, rewetting peat bogs, and so on. But more substantial intervention is needed.[44]

11 Size of buffers relative to their flows

- This is about maintaining key stabilising forces (e.g., ice sheets, rainforests, ocean currents, etc.) and looking at the financial system – i.e., the capital buffers and scale of flows in the system.

10 Structure of stocks and flows

- The way money flows around the financial system (the plumbing).
- Structure and mandates of the international financial architecture (see Figure 2).

9 Lengths of delays relative to the rate of system change

- Short-termism is pervasive. Our 'just-in-time' approach to change means there are sometimes delays between regulatory interventions and their effects becoming visible. However, valuations often react quickly to signals from policymakers and regulators, so are much more volatile.

8 Negative (correcting) feedback loops

- Ratings, rankings, benchmarks (examples: WBA, CHRB, SSE, PRI, CDP).
- Conventional ratings and rankings are often backward-looking and do not sufficiently incorporate issues of sustainability and impact. Use of metrics that incorporate sustainability and impact, as well as forward-looking efforts from companies, must become more widespread.

7 Gains around positive (reinforcing) feedback loops

- E.g., momentum on sustainability.
- Overall momentum on sustainability is building but insufficient to overcome pre-existing incentives and priorities, especially under stress.

Source: Aviva Investors, Donella Meadows, September 2022.[45]

Gaffney says investor engagement with companies is similarly important. "Obviously, the financial services sector has significant influence in corporate decisions," he says. "It should use this influence to push for resilient business models based on circularity, regeneration, as well as gender equity and worker empowerment at leadership levels."

Pushing for industry standards through relevant codes like the UK's Stewardship Code is also important because, even before they become a regulatory requirement, these norms have a significant impact in shaping behaviours. "When you have labels informing consumers about their choices, you are changing the norms and demand," says Foulds.

However, Tayler adds investors engaging in macro stewardship must be transparent to demonstrate they are not using their influence for narrow self-interest. Indeed, companies that advertise their environmental or social commitments but then lobby governments against those same goals pose risks to the necessary systems changes.[46]

6 Structure of information flows

- SFDR, TCFD, traditional financial reporting.
- Information on sustainability and disclosure is increasing, but too slowly, with too much focus on disclosure as an end in itself. Reporting initiatives such as TCFD and SFDR are important, but not as important as the actions being taken by companies to improve their sustainability.
- There is too little information consistency – e.g., net-zero commitments not translating into company accounts and projections in financial reporting.

5 Rules of the system

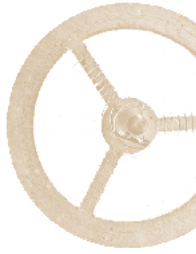
- Rules that govern the financial system.
- This is a key leverage point – not just the rules on disclosure, but the rules that govern the system itself, for example the extent to which transition plans, net-zero commitments etc. become mandated, and the extent to which the bodies of the international financial architecture embed responsibility for monitoring and overseeing the delivery of net zero.
- How can markets be harnessed for a smooth, orderly and just transition to net zero?

4 The power to self-evolve

- This is hugely powerful – and underexploited. Participants in the financial system should advocate for its reform to make sure it has a long-term (sustainable) future.

3 Goals of the system

- Profit maximisation or profit optimisation? Extractive and exploitative or regenerative?
- How to bring the economy back within planetary boundaries?



2 Mindset or paradigm

- What is the system for? Do we serve the system, or does it serve us?
- This is critical: we need mindset shifts to make all the other interventions work. Otherwise, the power of the paradigm makes the system hugely resistant to change and interventions will be insufficient to shift the course.

1 Transcend paradigms

- The power to see the paradigm itself, to be able to understand and change it.
- Global growth at all costs inexorably leads to civilisational collapse.

THE LEVERS OF CHANGE
continued

> *It is going to be an exciting space to work in, as we need to think about power shifts*
>
> **Nafeez Ahmed**
> Director of Global Research Communications, RethinkX

Consumer awareness and behaviour

"The legitimacy of what we are doing is important," says Tayler. "We are doing this for the people whose money we manage. While we can use our expertise to decide what to focus on, we also need feedback on how that aligns with investor preferences."

In a heavily intermediated system like finance, that means improving the flow of information from customers to advisers and, ultimately, asset managers. This is why Aviva Investors has advocated for stronger EU and UK rules requiring advisers to ask customers about their preferences.

It also means showing people the power they have, by supporting campaigns like Make My Money Matter and using technological tools like Tumelo to help them vote on the shares they own, so they can proactively ask their adviser or pension provider to invest their money in line with their preferences.

"We need to let people know what power they have politically too," says Tayler. "If they care about these things, they should tell their elected representatives what they want, and make sure they vote."

The 2022 election in Australia was one of the first in a G20 country where climate was a key issue in determining the outcome. The more politicians believe climate and social justice issues will determine election results, the more they will act to deliver a just transition.

"Citizens' assemblies on economic systems change have the potential to bring political tribes together and find a safe space for discussion," adds Gaffney. "These could help create new alliances around a common agenda."

Litigation

Concerned citizens are also increasingly acting through litigation, against companies and governments.[47]

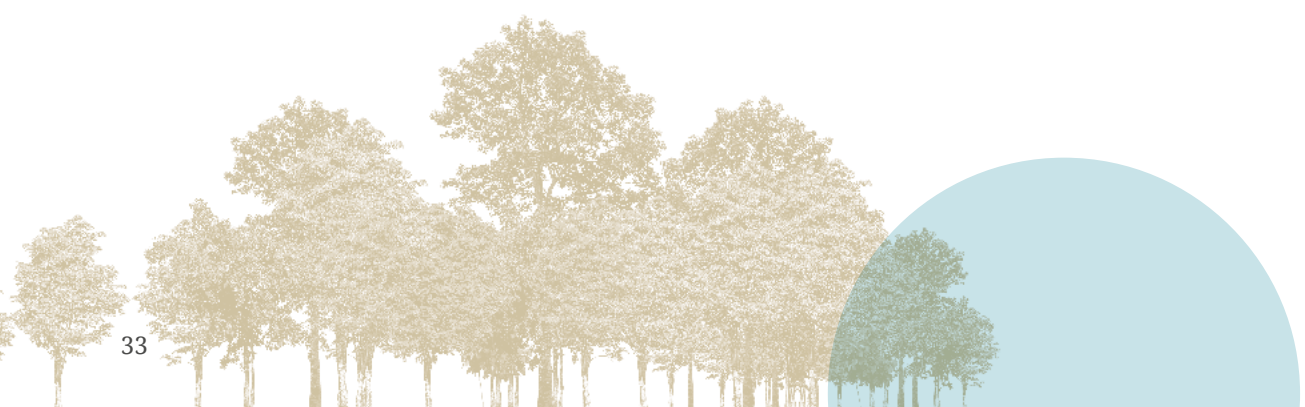
"As macro stewards, we should not rule out using litigation where we think it's the right thing to do. But we also need to understand the environment in which litigation is a material risk for governments and companies," says Tayler. "We can use that changing environment to put pressure on them, in the knowledge that if they don't reform, citizens, customers and NGOs will use the legal system to obtain those changes. It is another tool to change the system."

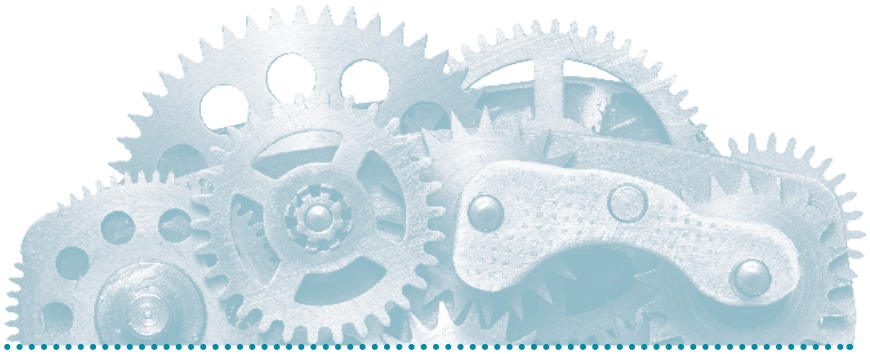
Embracing the possible

Systems change is difficult by definition, requiring us to rewire what are often deeply ingrained ways of thinking and processes and fight against powerful vested interests. It would be easy to fall into passive acceptance of the status quo.

Such acceptance is not only dangerous; it also ignores the huge potential upside of reshaping outdated conventions.

As Nafeez Ahmed puts it: "We are looking at a world that is more networked and decentralised, where many of the old, centralised structures are going to become obsolete quite quickly. It is going to be an exciting space to work in, as we need to think about power shifts. We already have technologies to leverage to make an amazing world and solve our deepest challenges. They also happen to be the technologies where the biggest opportunities for value creation can be found" ●





1 Donella Meadows, et al., 'The limits to growth', Potomac Associates, 1972.
2 'Strategies to change the financial system: An interview with Natalie Mangondo', Aviva Investors, August 16, 2022.
3 Donella Meadows, et al., 'Limits to growth: The 30-year update', Chelsea Green, 2004.
4 'Sixth assessment report', IPCC, 2021 and 2022.
5 Earth overshoot day.
6 Shunsuke Managi and Pushpam Kumar, 'Inclusive wealth report 2018: Measuring progress towards sustainability', Routledge, 2018.
7 Herman E. Daly, 'Beyond growth', Beacon Press, 1996.
8 'Go long: The case for investing in long-termism', Volans and Climate-KIC, February 2022.
9 Mark Versey, 'Redefining stewardship: Why stakeholder capitalism needs to wake up', Aviva Investors, August 31, 2022.
10 Donella Meadows, et al., 'Limits to growth: The 30-year update', Chelsea Green, 2004.
11 Jørgen Stig Nørgård, et al., 'The History of The Limits to Growth', The Solutions Journal, March 2010.
12 Donella Meadows, et al., 'Limits to growth: The 30-year update', Chelsea Green, 2004.
13 'Know your limits: An interview with Nafeez Ahmed', Aviva Investors, August 29, 2022.
14 Kate Raworth, 'Doughnut economics: Seven ways to think like a 21st-century economist', Random House Business, February 2018.
15 David Peter Stroth, 'Systems thinking for social change: A practical guide to solving complex problems, avoiding unintended consequences, and achieving lasting results', Chelsea Green, 2015.
16 Kate Raworth, 'Doughnut economics: Seven ways to think like a 21st-century economist', Random House Business, February 2018.
17 Rafael Laurenti, 'The karma of products: exploring the causality of environmental pressure with causal loop diagram and environmental footprint', May 2016.
18 Donella Meadows, et al., 'Limits to growth: The 30-year update', Chelsea Green, 2004.
19 David Peter Stroth, 'Systems thinking for social change: A practical guide to solving complex problems, avoiding unintended consequences, and achieving lasting results', Chelsea Green, 2015.
20 Michael Jacobs, et al., 'Beyond growth: Towards a new economic approach', OECD, September 11, 2020.
21 David Peter Stroth, 'Systems thinking for social change: A practical guide to solving complex problems, avoiding unintended consequences, and achieving lasting results', Chelsea Green, 2015.
22 Michael Jacobs, et al., 'Beyond growth: Towards a new economic approach', OECD, September 11, 2020.
23 David Peter Stroth, 'Systems thinking for social change: A practical guide to solving complex problems, avoiding unintended consequences, and achieving lasting results', Chelsea Green, 2015.
24 Herman E. Daly, 'Beyond growth', Beacon Press, 1996.
25 Herman E. Daly, 'Beyond growth', Beacon Press, 1996.
26 Steve Waygood, 'A tragedy of perception: Fixing the ESG blind spots in business, finance and economics', Aviva Investors, September 8, 2022.
27 Donella Meadows, et al., 'Limits to growth: The 30-year update', Chelsea Green, 2004.
28 'Go long: The case for investing in long-termism', Volans and Climate-KIC, February 2022.
29 Steve Waygood, 'A tragedy of perception: Fixing the ESG blind spots in business, finance and economics', Aviva Investors, September 8, 2022.
30 Earth4All is as a vibrant collective of leading economic thinkers, scientists, and advocates, convened by The Club of Rome, the Potsdam Institute for Climate Impact Research, the Stockholm Resilience Centre and the Norwegian Business School.
31 Michael Jacobs, et al., 'Beyond growth: Towards a new economic approach', OECD, September 11, 2020.
32 Kate Raworth, 'Doughnut economics: Seven ways to think like a 21st-century economist', Random House Business, February 2018.
33 Michael Jacobs, et al., 'Beyond growth: Towards a new economic approach', OECD, September 11, 2020.
34 Steve Waygood, 'Harnessing the international financial architecture to deliver a smooth and just transition', Aviva Investors, April 22, 2021.
35 'Upgrading the economic system', Earth4All, September 2022.
36 Michael Jacobs, et al., 'Beyond growth: Towards a new economic approach', OECD, September 11, 2020.
37 'Know your limits: An interview with Nafeez Ahmed', Aviva Investors, August 29, 2022.
38 See The Ambition Loop.
39 Donella Meadows, 'Leverage points: Places to intervene in a system', The Donella Meadows Project, as of August 18, 2022.
40 Michael Jacobs, et al., 'Beyond growth: Towards a new economic approach', OECD, September 11, 2020.
41 Donella Meadows, et al., 'Limits to growth: The 30-year update', Chelsea Green, 2004.
42 Michael Jacobs, et al., 'Beyond growth: Towards a new economic approach', OECD, September 11, 2020.
43 Donella Meadows, et al., 'Limits to growth: The 30-year update', Chelsea Green, 2004.
44 'Planetary boundaries', Stockholm Resilience Centre, Stockholm University, as of September 2022.
45 Donella Meadows, 'Leverage points: Places to intervene in a system', The Donella Meadows Project, as of August 18, 2022.
46 Sarah Murray, 'Investors grapple with complexities of biodiversity', Financial Times, July 18, 2022.
47 AIQ Editorial Team, 'Law and climate: Using the legal stick to accelerate change', Aviva Investors, October 15, 2021.

PATTERNS, PARTNERSHIPS AND A MARSHALL PLAN FOR THE PLANET

AN INTERVIEW WITH NIGEL TOPPING

The UN Climate Change High-Level Champion for the COP26 summit in the UK sets out how the private and public sectors can work together to tackle the climate crisis and other systemic threats. Words by Miles Costello.

First, take a cupful of mathematics and marinade it in a love of science, engineering and the world's unfolding patterns. Then, mix in a rich blend of years spent in business and industry, stir thoroughly before bringing to the boil, and let simmer for several decades.

Add a garnish of politics and a sprig of articulate language and then serve, hot, to a hungry gathering. It's not the easiest of dishes to make but, prepared properly, it amounts to a deliciously potent recipe for making change happen.

This recipe also gives you the essence of Nigel Topping, which is just as well because he contains all its key ingredients. Topping is the UN Climate Change High-Level Champion appointed by Boris Johnson in the run-up to the 2021 COP26 climate summit in Glasgow. His job has been to mobilise businesses, investors, cities, regions and other non-state actors behind bigger and faster efforts to tackle the climate crisis, showing governments the real economy is already speeding towards a resilient zero-emission economy by 2050.

A case of herding mice, cats and tigers, perhaps – or of cooking with both sugar and spice – but Topping has his own particular style and, with it, a carefully crafted menu for success.

He agreed to talk to *AIQ* just months before his tenure as climate champion came to an end, although he made clear that he will remain involved with it and other environment-related activities, under the auspices of the United Nations, in a governance role.

While High-Level Champion, Topping was also named as an independent director at the government-owned UK Infrastructure Bank that was set up by former chancellor Rishi Sunak and launched in June 2021. He particularly enthuses about this because of its goal of channelling public and private finance together in the drive to achieve a net-zero carbon economy.

"That's just another bit of policy information that says: 'Here's a domestic development bank that's here to unlock more private finance flows,'" he says.

Mathematics and problem solving

Topping's approach is rooted in his understanding of maths, which he studied to master's level at the University of Cambridge during the mid-to-late 1980s, followed by a second master's degree in holistic science from Schumacher College in Devon nearly two decades later. These underpin his belief in the power of systems, or the science of patterns and their underlying rules.

His life in between consisted of a prolonged period in industry, including as a senior consultant at Lucas Industries, a parts manufacturer for the automotive and aerospace sectors, and a member of the management board at TMD Friction, the world's largest maker of brake pads.

Topping is also the former chief executive of We Mean Business, a coalition of businesses committed to halving emissions by 2030, and a one-time executive director of the CDP (formerly known as the Climate Disclosure Project), a charity that helps businesses and cities report their environmental impact.

Taken together, this background in academia and industry means not only does Topping have an ingrained understanding of the conceptual arguments about how the world works in principle, but he also gets it when it comes to how commercial life plays out in practice.

"There's something beautiful about solving problems and finding patterns. Although I did maths at Cambridge, I was never interested in going into the international financial system. I wanted to work in something concrete. My father is a civil engineer. It's why I went into industry; it's real people making real things, not like finance, where no-one makes anything," he says.

"Global finance is good at making money, but only that. It's not good at actually delivering value to society. It's good to a certain extent – the algorithm that drives innovation, but it doesn't solve issues for a lot of things unless those goals are designed structurally. It doesn't solve redistribution; it actually exacerbates inequality."

Patterns and planetary boundaries

It seems clear from Topping's comments that it's not that he doesn't like the financial system per se, it's that he doesn't like the patterns that dictate the way it behaves.

Topping believes all things human and natural, from the workings of a rivet factory to the causes of a warming planet, can be seen as a set of ever-repeating patterns. These patterns can be disrupted to reset the systems they create, he argues – adding that applying this approach to the climate transition can be more productive (and more encouraging) than looking at the issue through the lens of political or economic science.

But can patterns really help save the planet? "I think we have a very dangerous, educated tendency to be reductive," Topping says, bristling slightly at the baldness of the question. "I don't think we

> *"There's something beautiful about solving problems and finding patterns"*

PATTERNS, PARTNERSHIPS AND A MARSHALL PLAN FOR THE PLANET

continued

> *A market is a mass of rules – the idea of a free market is a myth perpetuated by those who benefit from outsourcing externalities*

can solve something as complex as the catastrophic relationship between our current model of industrial capitalism and the scientific boundaries to existence with linear reductive thinking.

"It requires a much more holistic understanding of the interplay between values, Earth system science, social structures, institutions, economics. There's no silver bullet here. We've created a beautiful, complicated edifice that optimises for the wrong goals," he says.

"The question is what are we designing for, because the system is designed by humans. When we reductively just try to optimise individual bits, we end up with an emergent design goal no-one has actually chosen."

So, be wary of pushing in at one part of a bulging seam only for the problem to resurface elsewhere and make matters worse.

Three rules for transformation

Topping has laid out three "rules" he believes, if they are followed by all players in each of the world's systems, can help transform those underlying patterns and ensure a successful transition to a zero-carbon future.

First, he says, we must "harness ambition loops". This means locking in the positive effects of bold climate commitments, with policy measures such as tax breaks and subsidies to forward-thinking businesses, which in turn fosters invention.

Next, we must "set exponential goals", Topping says, arguing history shows that, while the early stages of a transforming development might be slow going, progressively lower costs and increased innovation ensure growth quickly becomes more rapid over time.

A real-world example is the application of Moore's Law to the semiconductor industry, where the number of transistors that can be crowded onto a microchip continues to double roughly every two years.

Topping has also cited batteries for electric vehicles, where costs continue to reduce substantially each year, while their efficiency in terms of storage rises. This in turn helps fuel the growth of electric vehicle sales, which can only be good news for energy efficiency.

The third rule is to "follow shared pathways", ensuring everyone involved takes the required action so as to reach net zero in time to limit global warming.

The three rules are so seductively simple and appetisingly ambitious, it's tempting to argue we need a paradigm shift in the world's thinking, away from the conventions of capitalism, economics and politics.

"We need evolution not revolution. Good luck tearing things up and then rebuilding without collapse," Topping says. "I don't think we need to smash and rebuild, but it is quite a big paradigm shift deciding what the purpose of an economy is. We've had this lazy thinking, based on a misreading of Adam Smith, that an economy will deliver wellbeing if you just leave it alone. That is so demonstrably wrong.

"When you say paradigm shift, often it's a paradigm shift away from the myth of what business and markets are about. We need a paradigm shift, for example, away from the idea there's even such a thing as a free market. It's palpable nonsense.

"A market exists because it's a set of rules that govern trading behaviour. I can't just walk into Totnes market and start selling something. Somebody is required to take money off me to set up my pitch and there's a certain way I have to behave. A market is a mass of rules – the idea of a free market is a myth perpetuated by those who benefit from outsourcing externalities."

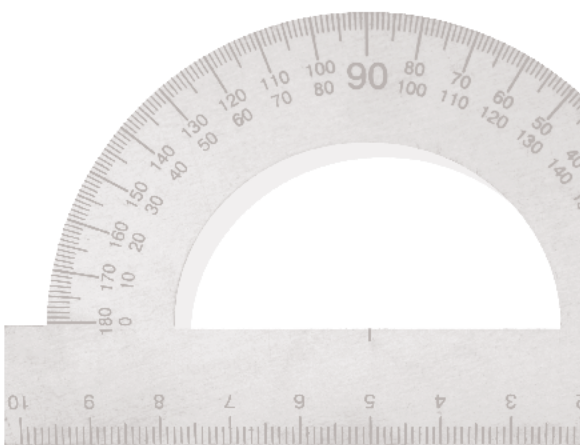
Dealing with externalities

Those rules, many of which don't serve the goal of reaching net zero and limiting climate change, are gradually being changed as part of the transition process, Topping says. And those "externalities", or consequences of our actions for which we've not taken responsibility, are slowly being brought on board.

"We are changing them. For example, one of the biggest externalities we've ignored since the Industrial Revolution is the pollution of the atmosphere, which causes the climate crisis. And we are starting to do that by pricing in that externality in all sorts of different ways – literally pricing it in, in some cases through, for example, [carbon] trading schemes.

"Indirectly, we're pricing it [climate change] in at infinity by banning combustion engines or coal-fired power burning; or implicitly through a requirement to publish transition plans, which the UK now has. The paradigm is changing, but we're in the middle of that shift now."

But there's a problem. We're not moving quickly enough. In the UK, for example, the government has laid out a bold set of climate targets, but is failing to deliver with policy implementation. It is not currently on track to enact its "green industrial revolution" in time for the 2050 deadline, according to the independent Climate Change Committee's (CCC) most recent report in June. It is clear the pace of change has to accelerate.



> *As a global pioneer in wind power, particularly offshore wind, the UK has a great opportunity to have energy security*

"That's kind of my point about exponential goals," Topping says. "As we've seen in this movie a thousand times before, and the way technological transition takes place, the good news here is the technology and economy and climate science all line up – i.e., the end goal is much more desirable. We end up surviving, and we end up with a bigger economy and cheaper energy costs.

"How do we do it? Well, in the UK we've got a lot of good mechanisms; I mean the CCC is an amazing bit of institutional innovation. To a large extent, it's taken the politics out of advice to governments.

"So instead of civil servants working for one minister advising the government, you've got an arms-length body advising parliament, and using quite blunt language sometimes about the failings of the government of the day. It's quite healthy in a democracy if we've committed to something legally and we've set up a body to critique the government's efforts. When you don't have that, it's much harder.

"What we're not doing yet is driving the feedback loop between the public and the private sector – or the ambition loop as I call it – which builds confidence on going faster and faster. In Denmark, they have it built into law now as they have to update their policies every year, and they do that in consultation with the private sector. That's building confidence."

Race to the top

There is evidence some governments are beginning to ratchet up their efforts to accelerate the transition process, which in Topping terms would help feed into his idea of harnessing the ambition loop.

"There's a whole bunch of people who've committed to net zero by 2050 and who are now saying 2040. Once you've spent three or four years seriously looking at what it means, then people get more ambitious.

"The CCC's advice to government includes a scenario where we get to net zero in 2042. The only reason they've given advice on 2050 is they've been asked to give advice on how to get to net zero in 2050. I think the most economically and competitively attractive scenario is one where we get there faster.

"In the US, California has said it will get to net zero in 2045, as has Germany. Some of the biggest economies in the world are committing to net zero in 2045. The UK is still aiming for 2050, so we're actually aiming to be uncompetitive, which is a bit dumb."

There is also an increased drive among business to move more swiftly, which should help to feed into the same virtuous circle of Topping's ambitions. He is a commissioner on the Energy Transition Commission, whose 2018 report *Mission Possible*, he argues, "flipped the paradigm".

"We had a series of CEOs from those sectors saying: 'Here's a way we can get to net zero, and, by the way, it won't cost as much as you think; it will have no impact on the end user economically; and it's do-able.' So, immediately, you start getting individual companies committing to get to net zero in 2050, and some of them 2040. Maersk said 2050, and two years later it's saying 2040; Mercedes says 2039, two years later it says 2030; Sony says 2050 and two years later it's saying 2040.

"So now we've got sectoral collaborations figuring out what the roadmap is and de-risking the transition. That is emboldening for policymakers, which changes the conditions for the laggards to realise they are going to have to change."

Moreover, consumers – or as Topping would rather describe them, citizens – have an important part to play.

"Citizens wear multiple hats, one of which is as a consumer, but the others are as a voter, a parent, an investor, or a productive member of society. I don't like the paradigm of labelling people as consumers. That's a coercive power statement that boxes people into one role in society, which is one important but small role, where they have power but it's not the only place where they have power.

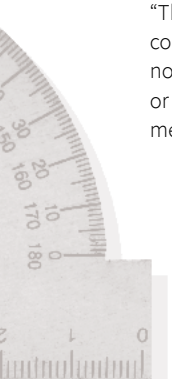
"Citizens have a huge role. You see that with citizen activists. They've changed the politics of this country because politicians have seen the level of [feeling]. They may have gone too far in some cases, but they've definitely made politicians aware there's a mass wrong. And the fact people are buying electric vehicles way faster than anyone thought possible a few years ago is a signal to policymakers and market participants to have more confidence in investing in that transition."

Partnerships and innovation

But there are other, concrete measures that can be taken now, including greater collaboration between the public and private sectors. Topping believes the UK should jettison its fear of "private sector policy capture", or big business gaining too much influence over government policy.

"You need to open it up [the collaborative conversation], but frame it as a consultation about, not how we get to net zero and what the risks are, but how we get there faster," he says.

"We need to embrace the massive need for more electricity. As a global pioneer in wind power, particularly offshore wind, the UK has a great opportunity to have energy security at a predictable low cost. We need to recognise all the energy price pressure now is because of the volatility of gas; we should recognise we've got really cheap wind power. We should be looking to make ourselves competitive in terms of energy and that means taking advantage of the massive opportunity we have."



PATTERNS, PARTNERSHIPS AND A MARSHALL PLAN FOR THE PLANET

continued

> *The world economy will be much bigger when we solve for a resilient net-zero climate everywhere*

As an example, Topping says the UK should be channelling investment into projects such as Xlinks in Morocco. This is an electricity generation facility, linked to Britain, that will be powered entirely by wind and solar power, aided by battery storage.

"It's a project that would bring masses of effectively baseload renewable power from Morocco into the UK at a price half the cost of nuclear in a quarter of the time and would lead to two manufacturing facilities being built in the UK. That means jobs, energy security, a low cost of energy, innovation, global leadership. We faff around with things like that because ministers are uncomfortable with innovation or industry."

Naturally, he would have no truck with a new coal mine in Cumbria, a government decision about which has been delayed several times. But the biggest move would be a globally co-ordinated umbrella plan, far more detailed than the Paris Agreement, designed to both free up private capital flows and end the financial and climactic vulnerability of emerging economies.

A Marshall Plan for the planet

"What we need – which is why the GFANZ work in mobilising finance in emerging markets is so important – is global Marshall Plan-type thinking," says Topping. (GFANZ stands for Global Financial Alliance for Net Zero and is a coalition of financial institutions that aims to speed up the decarbonisation of the economy.)

"The Marshall Plan came out of the Second World War when there were a lot of potentially productive economies on their knees and when there was a real risk of global conflict. And the Marshall Plan, and the USA, had the wisdom to say: 'Actually, we need to invest in growing those economies because the best way to grow our own economy is for the whole pie to grow.'

"Again, we know the world economy will be much bigger when we solve for a resilient net-zero climate everywhere, not just Europe. But there will also be much less conflict in the world if we invest in that because we will be partners in development and growth around the world rather than enemies. And you have to say that global geopolitics doesn't look very collaborative at the moment, which is why the mechanism of the Paris Agreement is still a miracle of multilateralism and our biggest hope for driving that kind of change."

Topping says the developed world's 2009 pledge to mobilise $100 billion a year in public and private climate finance for developing countries by 2020 – a target made at COP15 in Copenhagen that was consistently missed – is nowhere near enough.

"To use a mathematical term, Paris is necessary but not sufficient, particularly on finance," he says. "It's a trust signal, which is crucial and why we need it, but actually we need $2-3 trillion per year more, and 70-80 per cent of that needs to come from the private sector. But we do need more public financing."

The response of the West to the global financial crisis and COVID-19, of printing money to throw at the problem, has been "a brutal act" of driving inequality and further indebtedness into the system, he argues. The idea of a "global war bond", as discussed by the financier George Soros, or the issuance of special drawing rights, a reserve asset created by the IMF and used in size late last year, are far more attractive propositions and could wipe out emerging market debt in double-quick time, he says.

"We are starting to internalise the physical ecosystem boundaries of climate and biodiversity and oceans; we're still doing a variable job of internalising the externalities that come with inequality," Topping says.

The indebtedness of emerging and developing economies is central to the climate problem and solving it would make a meaningful contribution to a secure and fair transition, Topping says.

He complains about the absence internationally of the Chapter 11 bankruptcy rules that exist in the US, which mean a company can acknowledge a debt problem but continue to trade while it's ironing it out.

"The World Bank is supposed to deal with that [the problem of heavily indebted countries]. There are mechanisms, but they don't work – so the three countries that have gone into those processes have never come out."

He notes, for example, that a small US hurricane might inflict a minimal hit to US GDP but wipe out at a stroke the annual output of Barbados and the Bahamas, forcing them even further into debt.

"We're not yet designing the levels of capital flow in terms of public finance and leverage of private finance. The release from the debt trap can be done in multiple ways: debt restructuring, KPI-linked bonds [key performance indicators, linked to sustainability], catastrophe clauses, or the extension of insurance cover.

"It's a vicious circle: lack of insurance cover, increasing indebtedness, higher cost of capital, lack of capital to fix the problems caused by others. So, we're driving indebtedness down the spiral. We have to solve for those three issues, of poor capital availability, which means more public capital but better leverage, less indebtedness and more insurance cover.

"It's difficult, but we've done things like this before; we have the scientific evidence; we all agree we have to get to net zero now. We also have the economic evidence that doing this together is way better. It's a massive non-zero-sum game."

> *A lot of people are figuring out how we mitigate the damage and how we accelerate the transition*

Putting an end to finger pointing

Incidentally, Topping is a big fan of GFANZ, which he co-founded with Mark Carney in 2021, but critical of the late arrival to climate action of many of the financial institutions behind it.

"If we're honest, what we saw for a long time from the financial sector was clubs pointing fingers at policymakers and at the companies they held in their portfolios, telling them what to do.

"That's not leadership; that's what you do when you're on the terraces at a football match – shout at the referee, shout at the centre forwards. Leadership is getting on the pitch and being prepared to make a fool of yourself, which means making a statement about what you're prepared to do and then being accountable for doing it."

In fairness, he puts the financial sector's tardiness down to its role servicing the entire economy.

"And that's part of the challenge. How do you manage the transition without jeopardising your share of the profit pool based on the current paradigm? It's a difficult one. But that's flipped now, because we have a critical mass of financial actors financing the transition and now we're working through the mechanics of that."

But, in spite of the apparently slow pace of progress, the infighting and the lack of political will in some quarters, Topping has cause for hope about the future. Not optimism, it should be said, which he describes as the "Panglossian belief the world will be fine, which means you don't have to do any work". This is a reference to the character of Dr Pangloss in Voltaire's novel *Candide*, who argues that "all is for the best, in the best of all possible worlds".

"I think there's cause for hope, because a lot of people are doing the hard work now of figuring out how we make this transition, how we mitigate the damage and how we accelerate the transition. The evidence scientifically, economically and socially of that momentum is self-evident," Topping says.

"We are seeing more elements of the design needed being discussed publicly and being taken seriously. I was just in the Bahamas at a meeting of 22 government leaders and we were talking about it. We've now got Vera Songwe [economist and the UN's under-secretary general] and Nick [Lord] Stern leading an international commission writing a paper to be presented to the two champions and the presidencies on, not how we go from $100-120 billion, which is the wrong answer, but how to solve for the $2-3 trillion more that needs to flow in emerging and developing markets excluding China to get to a resilient net-zero future," he says.

"That's a fundamental shift in design thinking from: 'Let's put in a symbol of goodwill' to 'let's solve the problem'."

Some final words of advice

The backdrop to our conversation has been the unseemly battle for the leadership of the Conservative Party and, in turn, for the next prime minister to replace the outgoing Johnson. Topping has previously criticised the absence of any clear plan for the climate transition among the leadership contenders, who early on in the race even appeared ready to abandon the UK's legally binding climate commitments under the Paris Agreement.

Asked whether he has any advice for the new PM Liz Truss, Topping is characteristically erudite.

"I think it would be about using the genius of British engineering and the power of the world-leading British financial system to drive the second industrial revolution, like we drove the first. We should aim to make Britain the most competitive economy in the world as a result, and create long-term, attractive new jobs in, you know, battery factories in Northumberland and Cumbria and in offshore wind services in Aberdeen and everything in between.

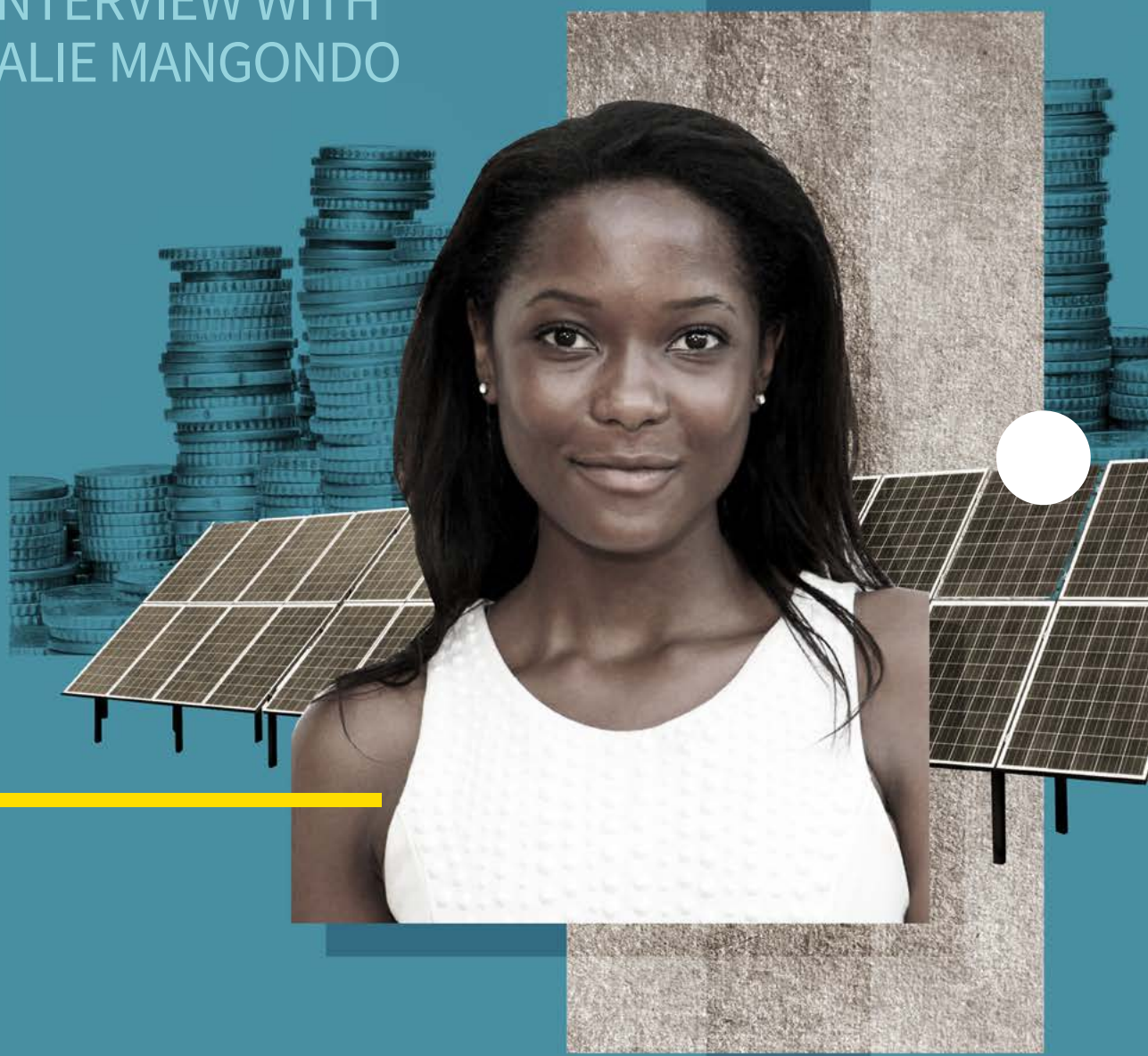
"It's straightforward: jobs, economic growth, competitiveness and innovation. We're brilliant at it. Seven of the ten Formula 1 teams are based in the UK because we're the best engineers in the world; the City is one of the most important financial centres in the world. Take those two; amazing workforce, great engineering; great financial innovation. It's a recipe made in heaven. If only people could get over the nimbyism and the fantasy of investing in the last century's jobs."

Spot the ambition loop, and the gameplan for redirecting some patterns, in that. The Topping recipe can sometimes take some stirring, but who can argue the dish it could produce wouldn't be worth it?

Miles Costello is a multi-award-winning writer and journalist

STRATEGIES TO CHANGE THE FINANCIAL SYSTEM

AN INTERVIEW WITH NATALIE MANGONDO



Can society reform the system that has enabled growth but simultaneously brought the long-term health of the planet into question? UN Climate Change High Level Champions Finance Youth Fellow Natalie Mangondo contemplates choices and change with *AIQ*.

The scale of change needed to deliver on net-zero targets is colossal. Today, concerted efforts are underway to ensure a range of voices are heard from those calling for action.

One thing is clear within the climate debate: the voice of young people – the most affected group – needs to be incorporated into decisions over how to redesign our economic and social systems. The UN has created a Youth Fellowship scheme for young professionals from around the world, to draw in best ideas and drive momentum.

Natalie Mangondo is a Finance Youth Fellow studying under the Southern Africa Climate Finance Partnership; she has been researching how climate resilience can be integrated into Zimbabwe's investments to mitigate greenhouse gases better. We spoke to her about the actions she believes are needed to ensure an economic pivot and ensure a transition that delivers for all.

Is the financial system broken? If so, what should we be doing about it?

For a long time, we have been in pursuit of exponential growth. This has been working for a tiny minority of the world's population, but without taking equity, justness or fairness into account. At the same time, that drive is undermining the system itself and could ultimately lead to its collapse. It is the most vulnerable among us, young people and those from the most climate-vulnerable countries, who will bear the brunt of these impacts.

But there is also an incredible opportunity to harness the interrelatedness and interdependence of our economic and financial systems to build something better; for example, in changing demand and developing momentum for civic engagement for younger people within finance and the markets. That's what I believe will give political actors and policymakers the impetus to drive change further.

It has always been about the three Es for me: the intersection of economy, environment and equity. Addressing these problems means taking a whole society approach – looking at what we choose to produce, how we consume, how financial institutions determine what to invest in. Changing these elements together will allow us to bring systemic change about, rather than us pressing on in established ways and continuing to work in silos.

Why is this so important? Why do you personally feel driven to get involved in climate finance and advocacy work?

It partly comes from a place of self-interest. I've seen the impacts of climate change quite visibly in Zimbabwe. We had Cyclone Idai at the end of 2019 before COVID-19 hit. It was one of the worst tropical cyclones on record for the Southern Hemisphere, and we are still recovering from it.

STRATEGIES TO CHANGE THE FINANCIAL SYSTEM

continued

> *Simply moving towards sustainable development is not ambitious enough as an objective*

It impacted young people: some lost their lives; others lost their livelihoods. In these emergencies, women often bear a heavy burden. Following the cyclone, some women were displaced and ultimately some were trafficked. Of course, there are many more vulnerable than I am to events like this, who have fewer resources to respond.

I'm also driven by recognition that the path we are on is unsustainable. It doesn't make sense to keep doing the same things that are leading us towards destruction.

Is it the role of people within the financial system to try and change it?

They have a role to play, because historically they have been part of the problem. In my view, they should care as citizens with a sense of altruism, but they should also care from a sense of self-preservation. A credible shift in how we invest and do business is required, because we are all so interconnected.

We can continue with business as usual and on the path to what a friend of mine calls "planetary suicide". Alternatively, we can harness and reinforce the best practices within financial services. Simply moving towards sustainable development is not ambitious enough as an objective; we also need to move towards regenerative development.

Financial actors have an important role to play. They have a choice to either change or die. We know this: in the past, those that have been inflexible to change have found themselves failing, while those who have been open and adaptive have found new opportunities and been able to thrive.

What about the balance of responsibilities between financial actors and governments and other non-state actors?

The UN's phrase – about common but differentiated responsibilities – is relevant. Those who have done more to exacerbate this crisis should be held to account. But we all have a role to play; I'm not a fan of individualising the problem.

As consumers, we all have signals we can give to governments. We can decrease emissions, change from one consumption model towards less carbon-intensive ones and give our institutions clearer signals about what might be desirable.

Financial institutions need to have credible plans to monitor and report on the emissions generated by their investments. Those who don't want to do that must be held to account. We need to see further action, through investing money to deploy negative emissions technologies and by deploying nature-based solutions.

But I don't think this should be done as part of a specific subset of activities falling under 'climate finance' or 'sustainable finance'. I'm thinking of Article 2.1C of the Paris Agreement, which flags aligning all financial flows with low emissions, climate-resilient development. The actions taken by a few players working within specific asset classes or segments are not sufficient to maintain a liveable planet for all. That means the rules of the game as well as the mindset of the actors within the game need to shift, and hopefully drive wider changes in behaviour as well.

What are the most powerful levers of change available to financial services actors?

Firstly, plans to report and reduce emissions and take accountability for emissions reductions; that's one huge lever.

Second, policymakers need to create an enabling policy environment to ensure mindful actions become profitable, and behaviours that have negative environmental and social implications are penalised.

Which actions should be prioritised to promote positive behaviours and disincentivise others?

If carbon pricing is carried out in a credible and transparent way, it is certainly an option. But there is a whole other conversation to be had around subsidies given to the oil and gas industry, rather than to promote nature-positive behaviours.

It is important to shift those subsidies towards nature-positive industries to allow them to scale up their work and ensure people who are inflicting negative externalities on our society pay the full cost.

How should financial institutions advocate for a more positive and enabling environment?

The toolkit for systems change involves creating a reinforcing cycle. When governments create an enabling environment, financial actors are more likely to engage in positive behaviours; that in turn can reinforce the appetite of policymakers to create enabling environments.

We all need to come together to make the changes. We don't have the time to say: "You should be doing this before we think about doing that."

> *Governments set signals, business responds, and that in turn creates space for governments to go further*

If we think about complex systems and feedback loops, can you clarify where you think the most useful interventions might come?

If we take the financial system, we need to be looking closely at what is seen as profitable – which assets are insured, which assets are invested in. These are the factors that create impetus for consumers to change their behaviour, and drive the ambition for politicians who are beholden to voters to create the supportive frameworks financial institutions need. That is what will drive change.

Governments set signals, business responds, and that in turn creates space for governments to go further: that's how I believe we can drive the ambition loop.

How has your studying influenced your advocacy and campaigning work?

Many people in academia have been doing good work, but the first challenge is how we connect people within the different spheres. It is an environment where you may get tunnelled into a specific area, and not connect with a lot of people outside it.

If we could bring more people together with different perspectives, there is an opportunity to take meaningful action now with what we have and what we know.

What is delaying change?

I think we have enough answers to make more change than we are currently. But the question really is: we have a complex system, so how do we connect all these things?

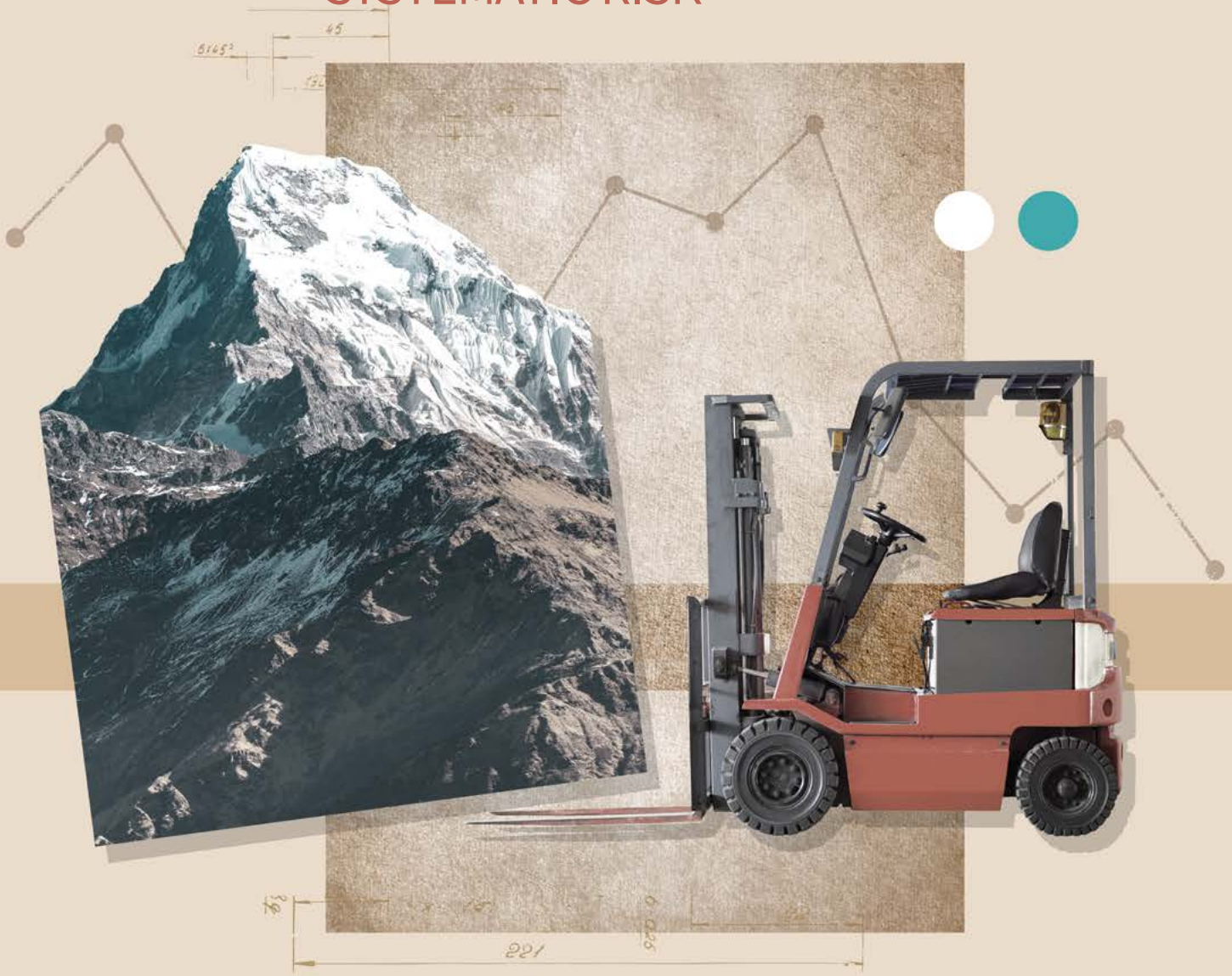
From a finance perspective, we have capital sitting on the sidelines, yet we have a strong case for investing in sustainable and regenerative economies and for developing the Global South. What is stopping us from seizing that opportunity? How do we connect the Global South to the capital that is potentially available, with the intention of creating a nature-positive, inclusive economy, where economy, environment and equity intersect?

For years I have been asking what financial actors are doing to ensure young people and marginalised groups are included in that conversation. How will they be brought to the table? Will they be equal players and collaborators in the process, or will they be excluded as we continue to follow the old models that are largely extractive? A large part of the solution lies in answering these questions properly

> *We have enough answers to make more change than we are currently*

MOVING MOUNTAINS AND MARKETS

A NEW WAY TO APPROACH SYSTEMATIC RISK



A series of market failures have brutally exposed the shortcomings of Modern Portfolio Theory. However, market participants play an active role in markets; they are not mere bystanders. Understanding this could provide a better way to think about and deal with systematic risk.

There are few statements that represent the separation of today's paradigm of investing from that of the past than the (now) ubiquitous words: "you have to think about risk as well as return."[1]

This deceptively simple, yet revolutionary, notion put forward by Harry Markowitz sparked an explosion in theoretical and practical innovation in the field of risk management, laid the foundations for Modern Portfolio Theory (MPT), and led to several Nobel Prizes in the process.

Yet when we consider modern finance in the context of the vast systemic challenges we face today, it is clear that theory has made a fatal error of omission.

The problem is this. At the heart of finance is an unquestioned acceptance the market "is what it is"; it cannot be influenced. This assumption cuts across many fulcrums of finance: in theory and practice, it covers all asset classes, and even unites the diametrically opposed active and passive zealots. Regardless of your investment philosophy and belief, the market itself – and by extension the systematic risks it comprises – cannot be moved. So the theory goes.

But, as one of the main MPT protagonists William (Bill) Sharpe points out, we all rely on a *well-functioning* market. Reflecting on the impact his work has had on the investment industry, Sharpe remarked there will "be higher expected return for higher risk, but […] not just any risk […] the risk for which there will be a reward if markets are *functioning well*." Sharpe reminds us this is "risk that […] cannot be diversified away".

Indeed, MPT and other prevailing economic schools of thought provide investors with the analytical framework to manage idiosyncratic (unsystematic) risks but are conspicuously silent in providing investors with a framework to manage the manifestation, or mitigate the drivers, of systematic risk.

In doing so, the theory implies market participants cannot impact the risk profile of the market. As the orthodoxy would have it, doing so would equate to moving a mountain as a 'well-functioning' market is the centrepiece of every asset-pricing model. Even those that have identified other factors that influence expected returns, most famously Eugene Fama and Kenneth French, recognised the fundamental importance of the overall market. As Fama acknowledged when interviewed by Andrew Lo: "Every asset pricing model basically says the market portfolio is the core, and you start with that."[2]

However, the unquestioned belief that the integrity[3] of the market itself is treated as exogenous to market participants, whether active or passive, has blindsided investment and finance to any real, substantive notion of sustainability. Insidious feedback loops go unnoticed. Implied global temperature changes get ignored. And negative externalities from today's investment decisions build up on a ledger in some far-off cosmic dustbin; all are left to fester and multiply, with the final tab left for someone to pick up tomorrow.

Overhauling any status quo is fiendishly hard. After all, the hallmark of any profound idea is struggling to envisage what life was like before it. As John Maynard Keynes once wrote: "The difficulty lies not so much in developing new ideas as in escaping from old ones."[4]

More specifically, Peter Bernstein, the legendary scholar of risk, stated:

"Before Harry Markowitz's 1952 essay on portfolio selection, there was no genuine theory of portfolio construction – there were just rules of thumb and folklore. It was Markowitz who first made risk the centrepiece of portfolio management by focusing on what investing is all about: *investing is a bet on an unknown future*. Before Bill Sharpe's articulation of the Capital Asset Pricing Model in 1964, there was no genuine theory of asset pricing in which risk plays a pivotal role – there were just rules of thumb and folklore… before Eugene Fama set forth the principles of the Efficient Market Hypothesis in 1965, there was no *theory* to explain why the market is so hard to beat. There was not even a recognition that such a possibility might exist."[5]

However, there is no genuine theory to explain how market participants can act as stewards for the financial system itself by mitigating risks that pose a threat to its stability. It doesn't have to be this way; we *can* break free from the past. What if some of the core assumptions in finance were re-designed? Oliver Morriss, macro stewardship analyst at Aviva Investors, and his colleagues believe "MPT, for all its flaws, can be reimagined".

To really unpick matters, though, we must first understand how we got here.

MOVING MOUNTAINS AND MARKETS
continued

PART 1: THE ONLY 'FREE LUNCH' IN INVESTING

According to Jonathon Burton, Markowitz came along and then there was light.[6] To put it another way, Markowitz gave investors their only 'free lunch' – diversification.

At the heart of his article *Portfolio Selection*, for which he received the Nobel Prize in Economic Sciences, is a simple rule: no risk, no reward.

In taking risk, Markowitz tells us, don't put all your eggs in one basket – diversify! But he also brought new meaning to diversification, arguing it must be the "right" kind. That is, "it is necessary to avoid investing in securities with high covariances among themselves".

The relative performance between portfolio assets, rather than the quantity of assets owned, became the focus. By creating a portfolio of imperfectly correlated assets, investors could in theory minimise the amount of risk they take. This is because the aggregate risk of the "least mean variance" portfolio will inevitably be less than that of its individual securities. After all, "the whole is greater than the sum of its parts". As a result of this breakthrough, the risk of the asset was now only as important as its impact on the overall portfolio.

Reducing variance became the goal. Markowitz declared such a diversified approach to investing "is both observed and sensible; a rule of behaviour which does not imply the superiority of diversification must be rejected both as a hypothesis and as a maxim".

Yet, while diversification may be the best mechanism for reducing risk (framed in terms of 'variance'), it has a propensity to dampen the opportunity to generate higher returns that might be obtained from more concentrated holdings. Pre-empting this shortcoming, Markowitz argued "the investor should diversify and that he should maximise expected return. The rule states that the investor does (or should) diversify his funds among all those securities which give maximum expected return… and commends this portfolio to the investor".[7]

The commended portfolio, for Markowitz, is the one that maximises output for a given (but preferably minimum) input; in other words: *efficiency*. The 'efficient' portfolio, therefore, was to be one that generated the highest expected return (output) for the risk required to achieve it. Having identified efficient portfolios, these should be ranked in order of expected return or riskiness. The resulting collection of efficient portfolios formed what Markowitz termed the "Efficient Frontier," whereby increasing the level of expected returns incurs an increase in risk.

> *"Reducing variance became the goal"*

SYSTEMATIC VERSUS SYSTEMIC RISK

Despite being commonly used to refer to the same thing, it is important to understand the differences between systemic and systematic risk. They are different frames of reference, which originate from different disciplines (regulatory/governance practitioners and financial theorists) that were not designed or intended to fit together.

Systemic risk refers to the risk of a breakdown of an entire system rather than simply the failure of individual parts. In a financial context, it denotes the risk of a cascading failure in the financial sector, caused by linkages within the financial system, resulting in a severe economic downturn.

Systematic risk is that which is deemed to be inherent in the overall system and affects the entire market or economy. It is non-diversifiable, and therefore the manifestation of systematic risk cannot be avoided. The drivers of systematic risk, however, can be dealt with.

The two concepts clearly intertwine and overlap – which is why confusion arises. In this article we do our best to use the terms in their proper context and to not use them interchangeably!

> *Systematic (or market) risk accounts for as much as 91.5 per cent of the variability in investment returns*

PART 2: THE (MOST IMPORTANT) INFLUENCE IS THE MARKET

The seeds were sown, and the roots of modern finance began to take shape. In the years that followed, almost all theoretical development sprouted from these initial insights.

Bill Sharpe, father of the Capital Asset Pricing Model (CAPM), built on this by starting from the basis all investors want to hold the most 'efficient' portfolio – *efficiency* in the Markowitzian sense of the word. In making a number of enabling assumptions, such as risk-free borrowing and lending, Sharpe concluded the optimal portfolio along Markowitz's Efficient Frontier must be the market portfolio, a proxy for which would be the S&P 500 Index, which represents a broad basket of US stocks.[8]

From this, Sharpe could then calculate the price of each individual asset in capital markets. According to his CAPM, the only risk investors would be rewarded for bearing was that which could not be diversified away.

Sharpe called this "systematic risk", which has come to be represented by beta (β). Beta is a measure of an asset's co-variance (or correlation) with the market. It compares the volatility in returns on a particular security with the volatility of the overall market. Sharpe distinguishes "systematic risk" from "unsystematic risk" – the portion of an asset's risk that is uncorrelated with the market.

Naturally, Sharpe recognised no model can precisely predict returns, and CAPM's beta prediction will often differ from reality. As such, he classified the actual realised return on an individual asset as alpha – which can be both positive and negative – with positive alpha indicating one has "beaten the market".

The significance of this decomposition of risk into "systematic risk," which we are unavoidably exposed to, and "unsystematic risk," which we can control through diversification, has done much to frame and measure risk in relative terms, as well as inducing a focus on the latter at the expense of the former.

As Sharpe concluded: "Diversification enables the investor to escape all but the [systematic] risk resulting from swings in economic activity – the type of risk remains even in efficient combinations. And, since all other types [such as unsystematic risk] can be avoided by diversification, only the responsiveness of an asset's rate of return to the level of economic activity is relevant in assessing risk."[9]

The problem? Once unsystematic, or idiosyncratic, risk has been diversified away, systematic (or market) risk accounts for as much as 91.5 per cent of the variability in investment returns.[10]

PART 3: THEORY HAS CREATED A WORLD IN ITS OWN IMAGE

Ignoring that huge caveat for a moment (just as the key theorists and practitioners did), the CAPM paradigm of investing dovetails neatly with an understanding of markets that emphasise their efficiency and composition by rational actors. The "Efficient Market Hypothesis" (EMH), postulated by Eugene Fama, argues market prices always reflect all relevant information.

By this logic, supported by the empirical analysis of Michael Jenson[11] and Jack Treynor,[12] while beating the market is possible, attempts to consistently outperform the collective wisdom of all other market participants may be futile. On average, in an efficient market, information flows into prices so quickly the overall market knowns more than the individual investor can. As such, any deviations from the equilibrium value cannot last long.

Cautioning against looking for the alpha needle in the haystack when you can just buy the haystack,[13] the self-fulfilling prophecy of EMH provided the intellectual foundations that spawned the behemoth (passive) index fund market, which consequently reshaped the dynamics of markets. In efficient markets, short-term irrationality will always be rectified by the collective wisdom of the investment community over the long run.

Enter derivatives. Again, with their roots in the MPT paradigm of investing, derivatives acted like icing on an already well-baked cake. Crystalised in the Black-Scholes-Merton formula, derivatives presented a way to build risk pricing into futures markets, further embedding and institutionalising the naive notion all risks can be transferred and avoided.

The influence on financial and economic thinking cannot be overstated and was neatly summed up by former US Federal Reserve chair Alan Greenspan in 1997: "The use of a growing array of derivatives and the related application of more sophisticated methods of measuring and managing risk are key factors underpinning the enhanced resilience of our largest financial institutions... as a result, not only have financial institutions become less vulnerable to shocks from underlying risk factors, but also the financial system as a whole has become more stable." We all know how wrong that proved.

MOVING MOUNTAINS AND MARKETS

continued

To summarise, Markowitz put risk at the heart of all investment decisions and showed the whole is more than the sum of its parts. Sharpe's CAPM demonstrated the expected return of an asset depends largely, though not exclusively,[14] on its relationship with the market itself. Eugene Fama articulated the EMH and, along with Jenson and Treynor, established markets, despite the contestations of fund managers, are hard to beat.

MPT, and the explosion in financial innovation that followed, entirely changed the game of finance. And for us to move to a higher plane, this extensive context is crucial.

As Pulitzer Prize-winner Louis Menand said about Freud's infamous treatise, *Civilisation and Its Discontents*: "[T]he grounds have been entirely eroded for whatever authority it once enjoyed as an ultimate account of the way things are, but we can no longer understand the way things are without taking it into account."

PART 4: GORGING ON THE 'FREE LUNCH'

One of the major failings of MPT is a narrow conception of risk and the assumption all risks can be measured mathematically. In his 1921 work *Risk, Uncertainty, and Profit*, University of Chicago economist Frank Knight distinguished between risk and uncertainty. Whereas the former was quantifiable, the latter implied a fundamental degree of ignorance, a limit to knowledge, and an essential unpredictability of future events.

Risks, as Nobel Laureate Kenneth Arrow once put it, come "trailing clouds of vagueness".[15] Variance is particularly conspicuous in its ability to obscure the danger that lurks. The disproportionate focus on volatility as a proxy for risk, and the subsequent overreliance upon diversification, has the effect of placing systemic *risks* into the realm of *uncertainty*.

Jon Lukomnik, co-author of the 2021 book *Moving Beyond Modern Portfolio Theory: Investing That Matters*, holds a similar view. He wrote: "Prevailing investment orthodoxy just can't simply deal with systemic risks, which has led investors to focus on the manifestation of risk as volatility but do nothing to tackle the underlying risk."

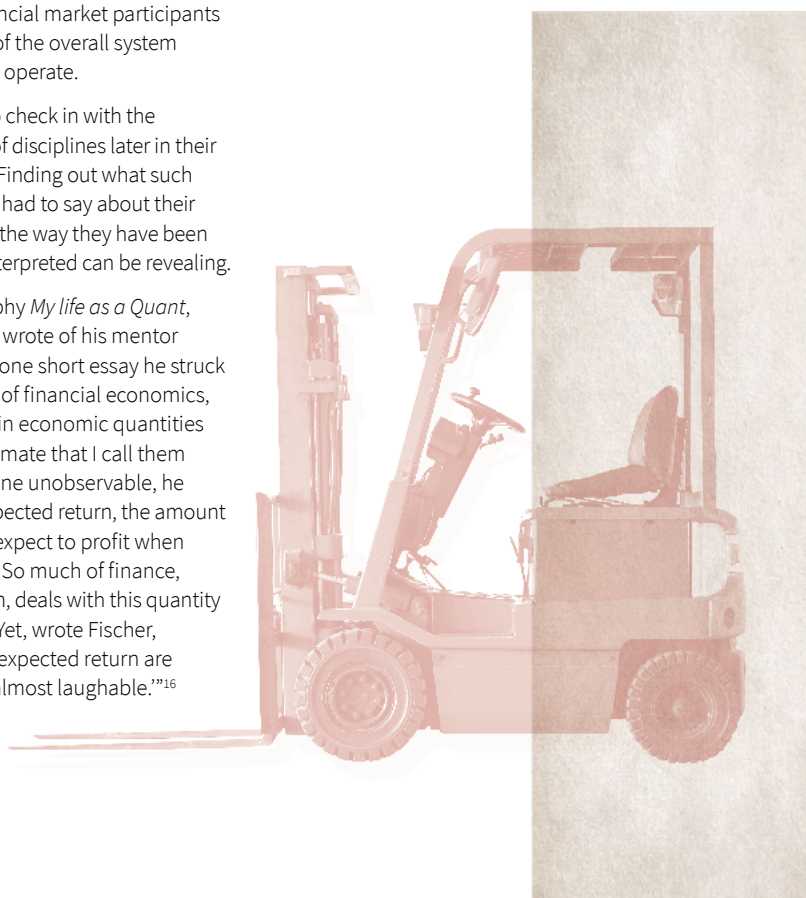
Morriss agrees. "While a diversified portfolio and managing exposure to risks through hedging instruments such as derivatives are important tools, an inherent reliance upon volatility can breed ignorance to the risks building up at the systemic level," he argues.

All these approaches to risk management can have the appearance of prudence at the local level. But the aggregate market, where everyone adopts these approaches, is a different matter altogether. After all, the sum of individual actions is the genesis of a financial crisis. What these sophisticated financial innovations, with their roots in MPT, have facilitated is a widening of the gulf between financial market participants and the integrity of the overall system within which they operate.

It is often useful to check in with the founding fathers of disciplines later in their lives and careers. Finding out what such intellectual giants had to say about their own theories and the way they have been developed and interpreted can be revealing.

In his autobiography *My life as a Quant*, Emanuel Derman wrote of his mentor Fischer Black: "In one short essay he struck at the foundation of financial economics, writing that 'certain economic quantities are so hard to estimate that I call them unobservables.' One unobservable, he pointed out, is expected return, the amount by which people expect to profit when buying a security. So much of finance, from Markowitz on, deals with this quantity unquestioningly. Yet, wrote Fischer, 'Our estimates of expected return are so poor they are almost laughable.'"[16]

> *An inherent reliance upon volatility can breed ignorance to what risks are building up at the systemic level*
>
> **Oliver Morriss**
> Macro Stewardship Analyst



> *The notion of a well-functioning market is starkly undermined by the threats we face today*

PART 5: THEORIES ARE NEAT, REALITY IS MESSY

An entire school of thought has arisen around applying the assertions in financial theory to the messy real world. Behavioural finance recognises we are human beings; our choices are not made in a vacuum but moulded by various heuristics and biases incompatible with that which theory assumes.

We are prone to fear, impatience, overconfidence, analytical errors, herding and irrational exuberance that divorces asset prices from their fundamentals,[17] to name but a few. In other words, we are hard-wired to disappoint the *homo economicus*-envisaging models we have devised.

Andrew Lo acknowledges this reality, reconciling the financial theories rooted in EMH with the challenges presented by behavioural finance as part of his "Adaptive Market Hypothesis".[18] He argues that in the face of limited computational ability, investors engage in "satisficing", making choices that are satisfactory even though they are sub-optimal, thereby culminating in applying heuristics of old to new emergent contexts in which they are ill-suited.

As G.K. Chesterton put it in *Orthodoxy*: "The real trouble with this world of ours is not that it is an unreasonable world, nor even that it is a reasonable one. The commonest kind of trouble is that it is nearly reasonable, but not quite. Life is not an illogicality; yet it is a trap for logicians. It looks just a little more mathematical and regular than it is; its exactitude is obvious, but its inexactitude is hidden; its wildness lies in wait."

In the never-ending quest to seek more sophisticated means by which we can manage risks, we risk relegating the art of investing to the very rules of thumb and folklore these evolutions in theory proclaimed to take us away from. The implicit assumption of exogeneity, and the notion a well-functioning market is a constant from which investors can make allocations to exploit inefficiencies, is starkly undermined by the threats we face today.

PART 6: RISKS – AND RETURNS

Once you challenge the idea markets are immovable objects, the next question becomes: "How might we rethink approaches to risk and return, or opportunity?" Or rather: "What does all this mean in practice?"

The first point to make is ESG integration, the explicit and systematic inclusion of ESG issues in investment analysis and investment decisions,[19] still fits into EMH as it simply represents consideration of information relevant to asset prices. Used properly, it can help investors achieve a more rounded view of diversification and risk.

As Tom Chinery, senior credit portfolio manager at Aviva Investors, argues: "Ensuring the companies we invest in are developing the appropriate corporate strategies to navigate the changing world is essential and only possible through sound, forward-looking analysis – something no simple screening process can replicate."

Ahmed Behdenna, multi-asset strategist at Aviva Investors, believes: "Systemic change is an important consideration for investors, especially when it is happening on such a scale." He perceives it as both a risk and opportunity. "Managing those risks is a key part of our portfolio management activity, and of our economic scenario-building work. One example is the integration of climate change variables into capital market assumptions and macroeconomic forecasts," he adds.

Most viscerally from a downside perspective, the moral case for greater sustainability, fixing market failures and removing negative externalities is colliding with the financial one. The timelines of climate change and other major risks are collapsing in on us. No longer are they a problem of some distant tomorrow. They are affecting lives and portfolios, now.

Steve Waygood, chief responsible investment officer at Aviva Investors, agrees. "Risks like climate change could cause a domino effect. If parts of the insurance market collapse or become uninsurable, this will spread throughout the system, threatening not only insurers but also banks. At that point, the market itself will look very precarious and could easily seize up."

The late economist Hyman Minsky understood these linkages and argued stability breeds instability – with misleadingly precise risk metrics leading to a false sense of security and, ultimately, to what has come to be known as a "Minsky Moment".

"The financial crisis was triggered by the failure of one (relatively) small market in one country. Imagine the impact if multiple markets, across multiple geographies, fail simultaneously," argues Waygood.

This is why engagement with the underlying drivers and sources of risk, in a way investment orthodoxy does not envisage, is critical. Engagement with holdings, what

MOVING MOUNTAINS AND MARKETS
continued

> *Systemic change is an important consideration for investors, especially when it is happening on such a scale*
>
> **Ahmed Behdenna**
> Senior Portfolio Manager, Multi-Strategy

we call micro-stewardship, is one important aspect of doing so; promoting sustainable practices and mitigating companies' contribution to risks that may undermine the system within which they operate.

Macro stewardship – engagement with the system itself, via collaboration and consultation with peers, regulators, sovereigns and policymakers – is another mechanism for engaging with the underlying causes of risk. As Jess Foulds, global responsible investment senior manager at Aviva Investors, puts it: "What might active engagement look like if we thought about it through a systems lens, rather than merely at the local, individual issuer or corporate entity level?"

Aligning micro and macro stewardship efforts is crucial. "We can affect risk by changing the way capital is allocated, but we can also reduce overall market-level risk by engaging with governments," says Foulds. Sovereign bondholders are yet to fully tap into their influence.

Morriss believes there is a growing desire among investors to up the ante. He believes professional investors should take a more hands-on approach to investing by tackling what they perceive to be market failures, from climate change to biodiversity loss, and from human rights violations to labour abuses.

"By mitigating the concomitant risks, the aim is to enhance the long-term value of investments. In doing so, they are implicitly challenging investment orthodoxy, as represented by MPT," he says. "Alpha means nothing if beta implodes – and we are facing existential crises that threaten the very integrity of markets."

It is not just a risk mitigation story, though.

As capital is increasingly directed towards transition themes, opportunities to generate returns are created as well.

"It will be increasingly important for those who are managing money to understand how policy will change," notes Tom Tayler, senior manager in the Aviva Investors Sustainable Finance Centre of Excellence. "Those shifts will transform industries, creating losers but also huge winners. Anticipating them means asset managers can be on the right side of those trends for clients.

"As a heavily regulated industry, we understand regulation, so we can and do advocate for legal and regulatory changes that help bring more sustainable practices into place," he says.

Investors should be careful in trying to time the market though. "Trying to precisely time the market is not a great idea in general, and even less so in the case of systematic risk," warns Behdenna.

"Collaboration with our colleagues in the macro stewardship team is key, so that portfolio managers have those issues on the radar and can incorporate them into broader portfolio construction thinking. It is also about thinking creatively, and reflecting not only on the short-term issues, but also the long-term consequences, and also the first and second derivatives," he adds.

Carbon futures are a recent investment example from the multi-asset & macro team at Aviva Investors as they provided exposure to carbon emission prices. Another climate-related example is increased exposure to companies improving their buildings' efficiency, from heating and cooling to lighting.

PART 7: MOVING TOWARDS A SUSTAINABLE MARKET HYPOTHESIS

Economics and finance are unique scientific subjects in that they deal with human behaviour – a notoriously hard variable to pin down. They essentially try to analyse, map and predict what we will do in the aggregate. But both disciplines are caught in a dangerous no man's land between the hard and soft sciences. The precision of mathematics pitted against the messy reality of social structures.

The result is a perpetual game of cat and mouse, where the whims of market participants influence end outcomes. It is a circular dance – or rather a reflexive one, to use the technical jargon.

However, individuals and institutions can and do influence the market – for better or worse, whether by trying to beat it or simply following it. And while we have plenty of examples of participants doing so for the worse, why can't markets be nudged, designed and influenced for positive change? As Chinery notes: "Markets may not be efficient, but they can be used to drive change."

Morriss agrees. "The design of markets can be changed. They are human constructs. And, intuitively, market participants like professional investors are well placed to help advise on how to fix the cracks and weaknesses in the system."

In his mind, we need to re-imagine what it means to have an efficient market; that is, not just a market that is hard to beat, but also one that doesn't jeopardise its functioning tomorrow because of how it operates today.

"Intricate understandings of regulation, standards, policy tools, market dynamics and pricing mechanisms, fiscal levers, and so on. These are our bread and butter," he says.

Policymakers and regulators, as the shapers of the investable universe, are critically important for ensuring the integrity of the market. But they cannot act alone and must be informed by financial market participants as part of a robust feedback loop.

> *Investor activity can and does have an impact upon the extent to which markets function*
>
> **Oliver Morriss**
> Macro Stewardship Analyst

Lukomnik also dispels the notion it is solely for governments to tackle systemic issues. "Choosing government or capital markets is a false dichotomy. No one has ever said addressing systems risk, environmental systems risk in this case, is a substitute for government action. Investors understand that: I don't believe the Paris Agreement ever would have gotten done had the institutional asset management industry not united and lobbied for it," he says.

To that end, investors should look to collaborate with other institutions to complement their own bilateral engagement with governments and regulators.

Attempts by investors to mitigate risks in this way is something not envisaged by investment orthodoxy. And Morriss argues attempts to mitigate risks of a non-diversifiable nature suggest we are moving towards a Sustainable Market Hypothesis (SMH). Investors are starting to acknowledge that rather than being exogenous to financial markets, they are indigenous to it. Therefore, many of the risks to the financial system are endogenous; they originate from within.

"Investor activity can and does have an impact upon the extent to which markets function. If we can accept a well-functioning market is the lifeblood that generating a risk-adjusted return relies upon, it is high time we move to develop and embrace the SMH as a genuine theory for ensuring the market's integrity."

If we agree with Markowitz that the whole is indeed more than the sum of its parts, we ought to apply such thinking to the overall market.

Although such an idea might seem far-fetched, just imagine what could be achieved if we set some of the brightest minds running towards the challenge of creating a more sustainable market structure. We have already seen what happened in reverse when the employment void for physicists and rocket scientists left by the US government's scaling back of its space programme was filled by Wall Street in the 1970s and 80s.

Clearly many PhDs and years of research will be required to explore whether this embryonic idea is viable. However, if the EMH says it is essentially impossible to beat the market, an SMH suggests it is possible to positively contribute to the integrity of the market.

It is an ambitious thought, but to paraphrase Nelson Mandela: "Things always seems impossible until they are done." Maybe that metaphorical mountain of a market can be moved to a higher plane after all ●

1 Harry Markowitz, 'Portfolio selection', The Journal of Finance, Vol. 7, No. 1, pp. 77-91, March 1952.
2 Andrew W. Lo and Stephen R. Foerster, 'In pursuit of the perfect portfolio: The stories, voices, and key insights of the pioneers who shaped the way we invest', August 17, 2021.
3 In the UK, the FCA, which takes its authority from the Financial Services and Markets Act 2000, has, under its "enhancing market integrity" objective the goal of "protecting and enhancing the integrity of the financial system", with "integrity" defined to include its soundness, stability and resilience, it is not being used for a purpose connected with financial crime, it is not being affected by market abuse (including insider dealing, unlawful disclosure of inside information, and market manipulation), the orderly operation of the financial markets, and the transparency of the price formation process in those markets.
4 John Maynard Keynes, 'The general theory of employment, interest and money', February 1936.
5 Peter L. Bernstein, 'Capital ideas evolving', 2007.
6 Jonathon Burton, 'Revisiting the capital asset pricing model', Stanford University.
7 Harry Markowitz, 'Portfolio selection', The Journal of Finance, Vol. 7, No. 1, pp. 77-91, March 1952.
8 William. F. Sharpe, 'A simplified model for portfolio analysis', Management Science, Vol. 9, No. 2, pp. 277-293, 1963.
9 William. F. Sharpe, 'A simplified model for portfolio analysis', Management Science, Vol. 9, No. 2, pp. 277-293, 1963.
10 Gary P. Brinson, et al., 'Determinants of portfolio performance', Financial Analysts Journal, Vol. 42, No. 4, pp. 39-44, 1986.
11 Michael C. Jensen, 'The performance of mutual funds in the period 1945-1964', The Journal of Finance, Vol. 23, No. 2, pp. 389-416, 1967.
12 Jack L. Treynor, 'How to rate management of investment funds', Harvard Business Review, Vol. 43, No. 1, pp. 63-75, 1965.
13 John C. Bogle, 'The little book of common sense investing: The only way to guarantee your fair share of stock market returns', March 2007.
14 Most famously, Fama and French identified additional factors which explain returns in: Eugene F. Fama and Kenneth R. French, 'The cross-section of expected stock returns', The Journal of Finance, Vol. 37, No. 2, pp. 427-465, 1992.
15 'I know a hawk from a handsaw', in: Michael Szenberg, 'Eminent economists: Their life philosophies', Cambridge University Press, 1993.
16 Emanuel Derman, 'My life as quant: Reflections on physics and finance', Wiley, 2004.
17 Robert J. Shiller, 'Irrational exuberance', Princeton University Press, 2000.
18 Andrew W. Lo, 'The adaptive markets hypothesis', The Journal of Portfolio Management 30th Anniversary Issue, Vol. 30, No. 5, pp. 15-29, 2004.
19 'Fixed income: What is ESG integration?', UN Principles for Responsible Investment, April 25, 2018.

KNOW YOUR LIMITS

AN INTERVIEW WITH NAFEEZ AHMED

Warnings that natural systems are close to breaking point are not new – but how will we respond? Combining what we know with existing technologies could offer a remarkable opportunity to rethink our world, as Nafeez Ahmed explains.

> *Our dependence on fossil fuels has played a role in our geopolitical vulnerability*

Back in the 1970s, US academic Dennis Meadows was working at the Massachusetts Institute of Technology, undertaking systems modelling. His work ultimately prompted him to step forward with a bold thought:

"If present growth trends in world population, industrialisation, pollution, food production and resource depletion continue unchanged, the limits to growth on this planet will be reached sometime within the next 100 years," he wrote. "The most probable result will be a rather sudden and uncontrollable decline in both population and industrial capacity."[1]

Unsurprisingly, that view of societal collapse was not universally welcomed at the time. Fifty years on, the natural world faces a variety of major stresses, but we also have more tools at our disposal – in information technology, energy generation and precision biology – which can be put to work.

Dr Nafeez Ahmed, director of global research communications at thinktank RethinkX, is a respected voice on the risks and opportunities of system transformation. He spoke to *AIQ* to give his take on where we are and what needs to happen next to put the global economy on a more sustainable footing.

There is renewed interest in Dennis Meadows and the way he and his team developed ideas around The Limits to Growth. How did they influence you?

Dennis Meadows was pioneering. He and his late partner Donella had an influence on me and many others engaging in systems thinking. Their approach was groundbreaking; they thought about how we need to see global trends in an interconnected way and understand how surface-level phenomena are embedded in environmental and natural systems. That approach means considering the interplay between natural resources and other factors economists might traditionally look at.

The idea of being able to look outside the box and make connections was pivotal. Even if there were limitations to the World3 model, subsequent independent assessments have shown the modelling itself was largely accurate. There are areas where perhaps they overplayed or underplayed certain factors, but they flagged something very important: that natural limits or constraints can exist in nature, and we need to understand our relationship with these planetary boundaries. They also identified a resource bottleneck between 2020 and 2050, which I believe is broadly accurate.

What is often forgotten is that the modelling was not simplistic. They set out a set of scenarios that are interesting tools for decision making and how we anticipate challenges, risks and opportunities. Contemporary research attempting to assess the accuracy of World3 suggests we are close to a potential breakdown, decline and collapse scenario, but perhaps not approaching catastrophic worst-case scenarios – although they are still possible.

Conversely, this research confirms there is also the possibility of leveraging assets and technology and reorganising our societies to move towards a future full of possibilities. Within the scope of the modelling, there are multiple possible pathways. The future is not decided yet: we still have a window to make pivotal decisions about where we go.

You have spoken about feedback loops and how collapse in one system – food or water or geopolitics – could lead to collapse in another. Can you elaborate?

It is difficult to pin a single issue down. The danger is there are a lot of different things happening at the same time. That overwhelms our institutional capacity to respond, and we are starting to see this play out.

We have the climate challenge, and it is escalating. There are always natural disasters taking place, but there is something about the intensity and simultaneous nature of events recently that has struck people hard. We have had a global heatwave involving Europe, Asia and Africa. Perhaps that's the first time that we've experienced this in such a visceral way; it broke all records.

One day, the *Daily Mail* was telling everyone not to worry about record heat and go to the beach; the next, there was a complete turnaround, with front-page coverage of the fires in London. Even those who are trying to downplay the problem are being forced to take note.

This is intimately interlinked with other crises. Our dependence on fossil fuels has played a role in our geopolitical vulnerability. We have seen war break out in Europe, partly because Russia has recognised that as a major fossil-fuel exporter, it needs to do something to shore up its global power in an economy where its most prized commodity may no longer be valued as much. There is a lot of complexity to break down, but all this is having repercussions on food and energy prices, driving an inflation and cost-of-living crisis.

These trends were coming into play even before the war in Europe, but are now intensifying. This is what happens when you fail to think systemically or holistically: you bunker down in the traditional way of thinking. The same geopolitical structures, values, land grabbing, energy grabbing – you do whatever you can to keep the show on the road. But these actions accelerate and amplify the interconnected challenges, and so we find ourselves in a feedback loop.

Where is the biggest potential for a negative feedback loop?

The key detail is the connection between Earth-system disruption and human-system destabilisation. When you have things happening in the Earth system that accelerate shocks, we must respond. The fire engines must come out and put fires out, and that will create costs. Politicians need to think about that, but the reality is that certain industries are risk-taking, and we are doing destructive things.

KNOW YOUR LIMITS
continued

> *Technologies already exist and are scaling at an exponential rate that has taken many incumbents by surprise*

There is a danger we get lost in that symptom-oriented approach. If we focus too much on dealing with the symptoms, we forget the whole system, the big picture, and then we are more vulnerable to the next crisis.

We can see issues emerging with polarised politics and culture, and now people are talking of possible nuclear confrontation. By focusing on symptoms in this way, we become more vulnerable to the next Earth-system shock, because we are devoting too many resources in the existing system to the obvious signs of human-system destabilisation. When the next Earth-system shock takes place, it is more amplified, and more destructive for society and the economy – and we may again respond with more polarisation and division. The result is an amplifying feedback loop. This gives us a sense of how these feedbacks can get out of control.

However, this is a negative way of addressing things. We could get so lost in thinking about risks and crises, we fail to see how rapidly positive changes are coming and how quickly they could be scaled. We need to be asking whether we already have the tools to solve some of our problems. One narrative suggests we need expensive breakthrough technologies to solve our problems. When will we be able to suck carbon out of the air, for example, and do other difficult, expensive things?

What are the key areas with the potential for positive transformation?

If we look at the five foundational sectors in the economy – energy, transport, food, information and materials – existing technologies are going through a familiar pattern of exponential cost reductions and improvements in effectiveness which have historically driven exponential adoption. In these sectors, genuinely disruptive technologies have the potential to solve many of our biggest challenges.

Energy, transport and food are key, accounting for 90 per cent of carbon emissions. In energy, we are looking at solar, wind and batteries (SWB); in transport, electric vehicles (EVs), the potential for autonomous vehicles, and a new model called transport-as-a-service. We are looking at precision fermentation in the food system, and that is driving a revolution in plant-based proteins. This is linked with cellular agriculture, extending the revolution into animal proteins without having to kill animals.

These technologies already exist and are scaling at an exponential rate that has taken many incumbents by surprise. Conventional analysts have consistently failed to anticipate how rapidly the change might happen, and how the performance of these technologies is getting better all the time. If that continues according to the familiar patterns we've seen time and again with past technology disruptions, we have good reason to believe these technologies will become not only cost competitive, but cheaper – in most cases up to ten times – than the incumbents, purely due to economic forces. This will increasingly drive the impetus for wide adoption. It is very exciting, very positive and often missed when we are talking about the terrible things going on.

These new technologies are not going to be like-for-like substitutions, either. For example, a car wasn't a faster horse; it was wholly different. It completely changed the game. Many of these technologies are similar in the sense they will not be slightly better than what has gone before: they will completely change the way we do things.

The superpower potential of clean energy is one area worth watching. When you look at all the different combinations of solar, wind and batteries, we find the cheapest and most effective combination involves supersizing generating capacity by three to five times, which means you need far less storage capacity. It means overall system costs are far lower than implied by conventional assessments, because battery storage is one of the most expensive costs.

Once built out, you will be generating three to five times more energy than you do today, with the cost of production almost free, for most of the year. One robust scientific estimate suggests if rolled out globally, such a system could generate ten times today's energy demand. You won't need continued raw materials inputs as we do with fossil fuels. The installations have a lifetime of around 50 to 80 years, and the technology is getting better.

That suggests a huge potential dividend, which could open other possibilities. Just as zero-cost information led to the emergence of Facebook, Google, Netflix and previously unthinkable new platform-based products and enterprises, this could happen too with renewable superpower. Energy owners will be able to offer their energy for all the services and industries that will now be electrifying and switching to the new energy system.

What could we do with that surplus electricity generated almost free? We could electrify processes that are costly to run, from wastewater treatments to recycling. Many industries could be revolutionised.

Imagine what could happen when, say, utilities invest in SWB facilities that allow them to reduce the cost of wastewater treatment. At first, traditional energy investors are likely to jump in, but the situation could change rapidly and become a global market that major companies seek to participate in. The initial investors will have first-mover advantage. Google is already in the lead here, buying its own SWB facilities – but it has not fully recognised its superpower potential yet.

The key point is that this new system of energy production could generate more energy than we use today in the fossil-fuel system, at zero marginal cost. For most of the year, once the system is built, the cost of producing energy for those who own SWB systems should reduce to near zero, but the returns from selling that energy to a panoply of services who need it could be attractive.

Just as the disruption of zero marginal cost information via the internet, smartphone and social media has led to the emergence of new business models, value chains and wealth creation opportunities, the same will

happen under clean energy, which will drive the emergence of a new electricity trading system. Value creation opportunities will extend far beyond our understanding of the energy system today.

How do you reconcile the negative and positive scenarios?

It is difficult, because one vision seems dystopian and the other utopian. We are moving through the eye of the needle and the big danger is that negative externalities escalate and derail the transformation of our production systems over the next 20 or 30 years.

What happens depends on the choices we make. If we continue to put up barriers to new technologies, throw money at fossil fuels and engage in conflict, we could accelerate collapse processes. Our actions could delay the rollout of positive technologies, ensuring the change just isn't fast enough. Our modelling suggests if we do nothing explicit, the disruptions won't stop, but will take longer to roll out.

For example, if we delay the rollout of renewables to around 2040, we are well into the climate danger zone. Who knows what catastrophic outcomes could occur at that point? There are lots of uncertainties. I sometimes get accused of being a techno optimist, but there is no simple, automatic techno fix. We have brilliant tools that can help solve our problems, but we need to use them in the right way, fast, to get out of the danger zone. That requires big societal choices.

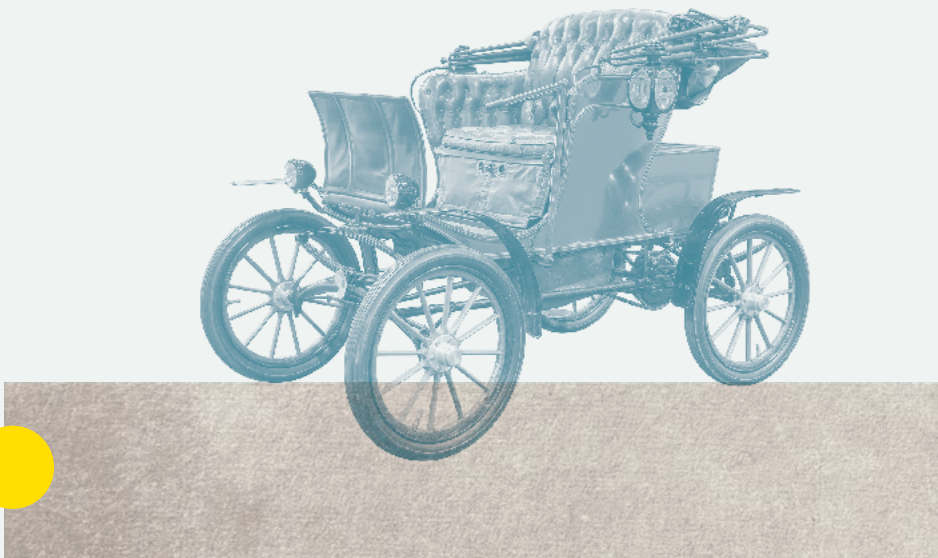
We can leverage markets to scale these things, but it does not mean we don't also leverage state power. We need governments to stop distorting markets and invest in difficult areas where the market is not likely to act, like residential heating. With the right action, there is a roadmap to accelerate change. But to do it, we must understand the possibilities.

What are the prospects of multilateral agreement to ensure change happens?

Many of the largest and most powerful actors in the world do not understand the environment we are in. If we use the framing of the adaptive cycle identified across nature by the late systems ecologist Crawford Holling, global civilisation has experienced a growth stage, a conservation stage and is moving into the release and reorganisation stages. It is a period of breakdown and uncertainty but also radical opportunities for new things.

Civilised societies have been here before, but the difference is that they did not know it. For instance, the printing press broke down medieval monopolies and paved the way for new thinking. It made a scientific revolution possible. But before that happened, a cultural and organisational shift was necessary. No-one planned this, but without it, the modern world as we know it would not exist.

> *If we delay the renewables rollout to around 2040, we are well into the climate danger zone*



KNOW YOUR LIMITS
continued

> *The specific dynamics of how technologies are impacting cost curves are not widely understood*

That is different now, because of the knowledge we have and the kind of conversations underway. We are capable of recognising the inflection point we are arriving at. We have the tools and science to understand what is happening in a way no civilisation before us could. But we are still not quite there: until we have people and organisations able to see this moment for what it is – a fundamental phase transformation – to inform our choices, it could go either way.

The challenge is that the dominant world view belongs to the old system, built around incumbent industries. For example, centralised control of fossil fuels has been tied to military security arrangements, and these could unravel rapidly over the next ten to 15 years. This is a real challenge for institutions if they do not understand what is happening.

Further complicating matters are industries with almost open doors to governments, because of the way things have evolved. This results in a kind of thought capture among leaders and decision makers that may not have positive implications over the long run.

How can we open conversations through a more holistic systems lens?

We have begun having these conversations among influential networks, including asset managers who make decisions about where funding is directed. We need to scale these conversations, because ultimately it is about the kind of world our children will inherit. It's not about: "Where shall we go on holiday next year to avoid the danger of wildfire?" There are visceral implications for us to think about that not only stretch well into the future but affect us here and now – and it has a very human element to it.

We need to be mindful in the meantime that the conversation has become quite reductionist. It involves asking: "Which evil guys created this mess?" What's been done has terrible consequences for the environment, and it is difficult to tackle.

There is another narrative we could follow. We simply need to ask: "Does what we are doing make sense? Is it rational to work and invest like this? Are these assets stranded, and will the investments around them therefore collapse within the next ten years?" Incumbent industries need to know that if powerful groups and governments are funding them, it is in everyone's interest to understand whether their assets are at risk of stranding.

When we understand the predictable pattern of technology disruptions throughout history, we realise certain industries are bound to become obsolete due to economic factors well within the next two decades. That process is unstoppable. But if this is allowed to happen without protecting people, it will be devastating for everyone. This doesn't mean trying to shore up doomed industries, which would be a colossal mistake. It would tie our societies into the failure of industries being outcompeted by superior ones which have potential to generate bigger markets and more jobs. It means ensuring the transformation is managed carefully, so people have opportunities to benefit from this emerging system and are protected from the inevitable decline of incumbent industries.

This could include coming up with a strategy that allows industries to pivot using the best talent: we can make careful decisions about how to move people into new industries and reconfigure existing ones. This means realising environmental imperatives and economic interest are not a zero-sum game. The best pathway is to consider these things together.

You mentioned a lack of societal self-knowledge. Where are the blind spots?

One of the biggest relates to a lack of understanding about the technology solutions impacting the key foundational sectors of our economy. Everyone knows there has been a disruption in information technology, that the Internet has transformed the way we live, work and communicate. But recognition of disruptions in energy, transport and food is not widespread.

The specific dynamics of how those technologies are impacting cost curves, and the relationships between those curves and adoption rates, are not widely understood. When they are understood better, we get a clearer sense of the potential speed and impact of change.

We also need to understand disruption as a lever for system change. Disruptions are never just one-for-one substitutions. They always create new systems with new rules, properties and dynamics. Only by recognising and reorganising our societies to adapt to these new system dynamics can we be in a position to harness, maximise and distribute the benefits. If we fail to make the right choices based on a lack of understanding of how disruptions drive systems change, our societies may not adapt quickly enough. If, for example, we cling onto the centralised utility monopoly regulatory framework for energy, we won't be able to harness the distinctively distributed benefits of a superpower renewable energy system.

The key is to ask: "What are the distinctive system properties, and what risks and opportunities come with that?"

With EVs, for instance, lots of people are asking about materials scarcity. One of the insights we had is that EVs will not only become cheaper, but autonomy will drop costs further. Ride hailing, using transport-as-a-service, will be cheaper than owning and managing your own car: the economics of that make sense.

It might happen through a private market system. It might be something governments choose to build as a public transport system. Either way, driven to mass adoption by the cost trajectory, transport-as-a-service will mean you need a fraction of the vehicles on the road today. Coupled with no longer needing seasonal battery storage due to

> *If we recognise the possibilities, it will completely alter the way we think about finance*

supersizing generating capacity, this will change the story on materials requirements completely. If we don't think about this, we could build out a lot of battery storage and not enough generating capacity and end up with a very expensive system.

With renewables, there is a misunderstanding of the intermittency issue. There is an assumption we need baseload power, and fossil fuels will have to supply it, perhaps alongside some carbon capture technology, along with nuclear. That is a different narrative to the one that emerges if you consider the empirical cost curve data showing how renewable technologies will become ten times cheaper than fossil fuel in the next ten-15 years. As my colleague Tony Seba says, a tenfold differential in cost consistently leads to the evisceration of incumbent technologies throughout history.

What about the financial system?

One major misunderstanding of the energy, transport and food transformations is the assumption they need to be state-driven. While the state has an important role to play, markets can do the bulk of the work. That is because the key technology disruptions are scaling for economic reasons. As their costs of production are plummeting exponentially, the opportunities for returns are growing exponentially.

This is an entrepreneurial opportunity that has great potential for value creation, but it is constrained by regulations designed around the old incumbent industries. It needs to be unlocked.

Subsidies for these technologies are not needed – only strategic support for specific difficult areas such as residential heating. The key challenge is to remove market barriers, such as subsidies for incumbents. This recalibrating of markets is simply about making them free, fair and competitive. That will incentivise private finance to come on board, which will be able to contribute most of the investment required. But to do that, we need better regulation. We need free and fair electricity markets, and we need the same in food and transport. An 'Energy Bill of Rights' underpinning the rights of individuals to own and trade electricity would unleash entrepreneurial drive.

Finance wants to move in but is constrained when markets are skewed towards incumbent interests that often distort perceptions of risk and opportunity. We need to ensure investors and others think through the issues coherently.

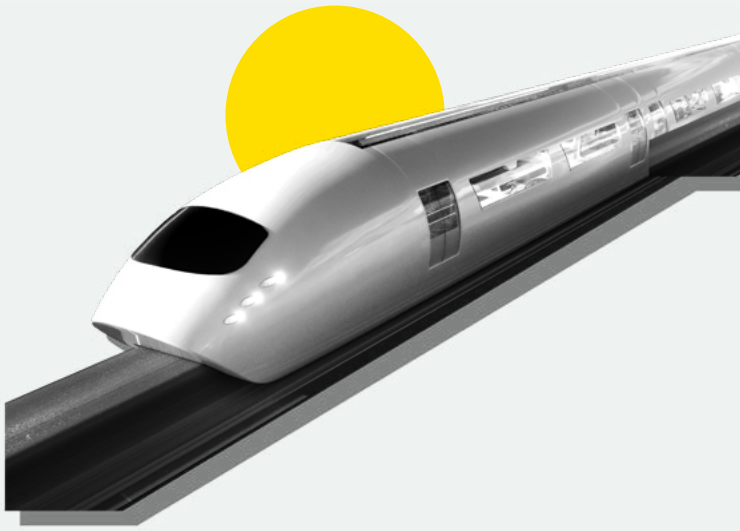
We are looking at a world that is more networked and decentralised, where many of the old, centralised structures will become obsolete quite quickly. It is going to be an exciting space to work in, as we need to think about power shifts. In electricity markets, for example, we expect people will become owners and traders of electricity, breaking existing monopolies, which will be an important value creation opportunity.

Where else do we need to reshape our thinking?

One story that people are not thinking about enough is that we have the tools to begin an era of abundance. We are shifting from an extraction age into a creation age, where energy, food, transport and information are all cheap and abundant.

If we cling to the old mindsets and ways of organising our societies, we might not be able to adapt to this emerging reality – with all sorts of grave consequences. But if we recognise the possibilities, it will completely alter the way we think about finance and how it can be mobilised to generate wealth within planetary boundaries as part of the new system that is emerging.

We already have technologies to leverage to make an amazing world and solve our deepest challenges. They also happen to be the technologies where the biggest opportunities for value creation can be found ●



1 Dennis Meadows, et al., 'Limits to growth: A report for the club of Rome's project on the predicament of mankind', 1972.

THE BURNING ISSUE

AVOIDING ESG FATIGUE

How can we face existential problems and stay positive? Abigail Herron contemplates simple steps to protect momentum and avoid burnout.

> *Each person has a unique mix of responsibilities*

This summer was hot. Very hot. While newspapers offered handy tips on making the most of the weather, those working on climate and biodiversity issues had little enthusiasm for it. How can you enjoy the beach when you know the climate trajectory will force millions into becoming climate refugees, or an ice cream when the heat is decimating prospects for pollinators?

These questions are at the heart of the conundrum faced by people working in sustainable finance. Everyone is exhausted by COVID-19 and the unfolding of another tragically wasteful conflict, but there are other specific challenges for ESG specialists too. Work is evolving rapidly: there are more complex problems to tackle, new regulations and a raft of metrics to assess. The responsibilities keep ratcheting.

Meanwhile, the profession is getting a lot of attention. Investors, trustees, NGOs, special interest groups and policymakers all want more: more on what investee companies are monitoring, more evidence on impact, and more on what it could mean for returns. There are many wanting to join the conversation, but alongside the opportunity to air views comes the chance of being hit by accusations of greenwashing. It's a lot to juggle.

That's why burnout is real. If knowledge about the state of the world bubbles up every time you walk in the park and see baked earth and a lack of nature, or head down the high street and see retailers with every ESG issue under the sun in their supply chains, it's difficult to enjoy quiet moments with family and friends. This is about more than stress in busy people; recognising the precarious state of the world can involve feelings of despondency or even despair.

Burnout comprises three components – exhaustion, cynicism, and inefficacy. In a state of exhaustion, you become unable to concentrate or see the big picture; essential skills in the ESG world. Even routine and previously enjoyable tasks seem arduous. Cynicism manifests itself as feeling detached and negative about your projects and workplace instead of collaborative and upbeat. It's also infectious. Inefficacy leads to paralysis, a dramatic decline in productivity and nagging worry that success is impossible.

But there are solutions. Firstly, recognising each person has a unique mix of responsibilities is an important step towards making life a little bit easier for everyone.

How we balance these elements is key. It might mean making space to talk and process complex feelings with others in the same field. It might mean taking advantage of flexible working, freeing up time for relaxation alongside work: time for enjoyment and time for purpose, when parents can parent, carers can care and those with an appetite to mentor can guide others along the way.

Immersing ourselves in nature can also bring a sense of perspective, as so many working in the field already appreciate. Enjoying the calm of a walk, especially with a canine companion, the coolness of a wild swim or the understated stoicism of a tree can be helpful, while we double-down on efforts to ensure no-one is excluded from these simple benefits. Embedding them into our daily routine, where possible, surely makes sense.

It is also worth taking a step back to think about the role change plays in the long game. At the beginning, it tends to be incremental. Small changes accumulate, they contribute to building momentum, then all of a sudden you reach a tipping point and everything starts to look different. We need to keep this in mind when problems seem insurmountable, work is gruelling and the pace of progress feels too slow.

With this in mind, it is worth checking in to celebrate the milestones we have already reached. There is change underway on several fronts, as these diverse touchpoints show.

> *It is not too late to intervene in health settings and agriculture to tackle antimicrobial resistance*

The legislative agenda around climate is shifting. In 2022, the US has announced a bill with $375 billion of investment pencilled in for climate fighting;[1] the EU has pledged to pivot away from fossil fuels faster with investment chanelled through REPowerEU,[2] and UK lawmakers are pressing the government for greater rigour and transparency with net-zero plans.[3] Delivery is not assured, but ambition is growing and the renewed focus on the end-goal must be welcomed.

Awareness of the need to reverse biodiversity loss is also stepping up. In the UK, the introduction of a legally binding target to reverse nature loss by 2030 is being discussed,[4] and more intensive coverage of the power of regenerative agriculture and nature recovery shows the messages are starting to land. It is a modest start, but the issues are essential to confront in tandem with the climate crisis. The next step is to ensure the broader principles are properly reflected in our agriculture and planning systems.

It is also encouraging to see more asset managers and owners concentrating on ensuring investee companies become better custodians of precious antibiotics that underpin all modern medicine. This is timely: although COVID-19 is viral, reports suggest the danger of antimicrobial resistance has increased. Many COVID patients have been given antibiotics to stave off secondary infections, but failing to manage these essential treatments will store up life-threatening problems for the future. It is not too late to intervene in health settings and agriculture – where the scale of the issues is even greater – as drug-resistant bacteria continue to evolve.

These varied examples bring home the importance of wanting something better. There are deep-rooted issues in many parts of the global economy: we can't ignore that. We cannot ignore the prospect that conflict delays decision-making either. But the mood feels urgent, and that is something powerful to harness.

Trying to ensure finance enhances, rather than diminishes, prospects can feel overwhelming, but it is worth sustaining ourselves enough to give us the energy and motivation to strive for a better future. As momentum builds, we can take solace in playing our part in making vital changes to the systems that shape economies and societies

1 'Analysis: Democrats' bill will make mark on climate, healthcare costs', Reuters, August 7, 2022.
2 'REPowerEU: affordable, secure and sustainable energy for Europe', European Commission, 2022.
3 'Court rules UK plan to hit net zero target for emissions too vague', Financial Times, July 18, 2022.
4 Department for Environment, Food & Rural Affairs, 'Delivering on the Environment Act: new targets announced and ambitious plans for nature recovery', GOV.UK, March 16, 2022.

AVIVA
INVESTORS