

New paradigms explore 'systems-oriented' ways of managing risk



In an increasingly uncertain world, the concept of 'risk' has come to the forefront of policy. We use it to describe the likelihood of a range of negative events occurring, from car accidents, to illnesses, to flooding. Derived from *risicare* – the vulgar Latin verb for 'sailing a ship off a cliff' – the modern usage of risk originates from 14th century Northern Italy, when the advent of maritime trading ventures could bring either riches beyond measure or financial ruin. Indeed, marine insurance played a pivotal role in the development of risk calculations in early modern Europe. Shakespeare's *The Merchant of Venice*, written in the 1590s, revolves around offsetting the risk of losing cargo to the sea by using a merchant's own 'pound of flesh' as loan collateral.

Today, the way that multiple industries measure and manage risk is inexorably tied up with the financial system. Those with a vested interest in second-guessing the future – from investors to insurers – have developed complex methods for estimating the likelihood of negative events, with associated concepts like 'risk appetite' and 'risk management'. As attention turns to looming 'wicked problems', such as the climate crisis, biodiversity loss, and natural disasters, it is a finance-led understanding of risk that has been absorbed and applied by policy-makers, civil society, and the international community. We now easily speak of *climate risk*, *disaster risk* and *pandemic risk*, and attempt to measure, mitigate and adapt to these threats using complex finance-derived quantitative models to justify decision-making.

Financial risk measurement ultimately stems from the 'efficient markets hypothesis', which assumes that increasing the availability of information will allow markets to 'price in' all risks and optimally allocate capital. The very act of estimating and modelling risks is considered a method of managing them. This 'market-fixing' logic is epitomised by prominent initiatives such as the [Taskforce for Climate-related Financial Disclosures](#), which advocates voluntary data disclosure by firms as the primary mechanism to ensure the management of risks related to the climate crisis.

Finance-led approaches to managing risk are now deeply embedded in our existing world order, but there are important reasons to question their ability to address the most urgent challenges of our time. Financial models rely on historical data or known probability distributions in order to estimate future risks. Popular financial approaches such as Value at Risk (VaR) typically estimate outcomes at a 95-99% confidence intervals and usually over short time horizons. Yet the physical threats facing our planet have no historical precedent and typically represent 'tail risks' occupying that extra 1-4% not captured by VaR. Equally, probabilistic approaches cannot seamlessly be applied to disaster risk, because the magnitude of a negative outcome is a function of vulnerability as well as likelihood.

Most importantly, both environmental breakdown and natural disasters pose multifaceted challenges in terms of systemic complexity, interconnectedness, and dependency. Ecological systems are governed by non-linear processes, [tipping points](#), and [feedback loops](#), and they also interact with complex social systems, where geopolitical, cultural, and technological developments are all but impossible to predict. The global pandemic has demonstrated the devastating impact that can be wrought by such ['cascading risks'](#), unfolding against a backdrop in which a permanently altered climate system, ongoing internal conflicts, and global financial pressures compete with one another for the front page.

As an example, tropical cyclone Amphan struck Bangladesh and India in May 2020 when COVID-19 was escalating across South Asia. The total damage was estimated at more than \$13 billion USD making it the [costliest disaster event on record in the North Indian Ocean](#). Cyclone Amphan epitomises a risk scenario of extreme complexity – impossible to measure, or, indeed, 'price in', from probabilistic measures alone.

Policymakers relying solely on financial risk approaches will remain blinkered to the multi-dimensional nature of the threats facing our world. But new paradigms are now exploring innovative, ['systems-oriented'](#) ways of conceptualising risk. Disaster risk management frameworks offer an interesting case study here. Traditionally driven by cost-benefit analyses and Return On Investment estimates, disaster risk initiatives have grappled with the difficult trade-offs involving uncertainty and development needs. The chance element of a disaster can be off-putting for investment in preparedness. Events can turn on a dime, and risks can evolve or even transform based on situational or contextual factors. Poverty, as ever, hinders disaster investment, even where it is urgently warranted.

Instead of insisting upon quantitative risk modelling as a prerequisite to taking preventative action, disaster risk frameworks increasingly promote the inclusion of qualitative, context-specific, and resilience-focused factors into risk management plans. This approach applies a 'systems mindset' to the interconnected, often policy-led, trade-offs that form part of disaster preparedness — particularly in developing countries, where one development need is typically prioritised over another.

In India, for example, increased investment in weather forecasting, warning systems, and evacuation processes has seen a dramatic reduction in fatalities from extreme tropical cyclones in the Bay of Bengal. Super Cyclonic Storm BOB06 resulted in 10,000 fatalities in 1999; but by 2013 Cyclone Phailin – a storm of equivalent intensity – caused less than 50 deaths. Japan has also invested heavily in disaster preparedness, following the deadly magnitude 9.0 earthquake that struck the Tohoku region in 2011. Widely acknowledged to have one of [the most advanced disaster risk management](#) systems in the world, Japan uses qualitative as well as quantitative risk assessments to invest in critical infrastructure and technological measures. These resilience-building efforts have been made sustainable with multi-stakeholder engagement and strong legislative frameworks – leaving a legacy of good risk management practice.

Preparedness and resilience have long been the watchwords of disaster risk management, and can be a guiding star for other systemic threats such as the climate crisis and environmental degradation. A [recent paper](#) from the Institute for Innovation and Public Purpose (IIPP) argues that a preparation-oriented 'precautionary approach' can also be used to manage environmental financial risks. Instead of waiting for, and relying on, better information in the market, the general magnitude and direction of harmful trends should be taken as sufficient incentive for policymakers to act. In the financial sector, regulators should be empowered to steer finance away from unsustainable activities and encourage investment in mitigation and adaptation measures. This 'precautionary' approach recognises public-sector institutions to be part of a [wider 'market-shaping' landscape](#), guiding economic markets to actively solve 'wicked problems', rather than simply to measure out their riskiness.

The current lexicon and discourse of risk has been shaped by the financial sector. Yet its tools and resources, though insightful, will be insufficient to manage the complex environmental and social challenges we face ahead. Attempting to model complex risks will not by itself ensure readiness to mitigate and adapt to future impacts. This is especially true for cascading risks that span multiple ecological and developmental domains. System-based thinking can instruct policymakers on how to handle such challenges. In countries such as Japan and India where natural hazard-based risk management has been a success, qualitative and quantitative approaches have come together to build resilience and readiness to future threats. To ensure success, we must move beyond the market-dominated mindset. Coordination between the public sector, financial industry, and other relevant actors will be essential to remain both agile and innovative to emergent risks.



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