DECISION-MAKING IN UNCERTAINTY

BY **PETER KINGSLEY**

The finance, pensions and insurance sectors have long relied on data and mathematical models to justify decisions, many backed by the authority of actuarial practice. Everything from projecting life expectancy to aligning long-term pension obligations and capital allocation decisions are measured, creating a shared set of norms. Risk is traded. Value exchanged.

The problem is that these models are cultural constructs rooted in historical experience. They rely on collective confidence. In 'edge of chaos' conditions dominated by high levels of interdependence, complexity and uncertainty, this confidence is under growing threat.

If actuarial and risk modelling is to remain relevant, anticipation is paramount. Above all, practices shared by actuaries, financial analysts and investors are necessary but no longer sufficient to meet the challenges facing leadership teams in government, financial institutions and corporations.

THE CLIMATE CRISIS AND COVID-19 show that if strategic advice is to be relevant to policy and board-level decision-makers, it must both anticipate potential shocks and make intelligence-based assessments of possible —distinct from probable— outcomes.

This challenges tradition and convention. After all, one of the assumptions in financial markets is that history-based modelling has predictive authority. This may work in the short-term, but when it matters most—in political, market or financial crisis—models fail. History is a poor guide to possible futures when shocks begin to cascade through tightly coupled systems. Models fail to capture real-world complexity, particularly in crisis when base-level assumptions break down.

DATA ARE OFTEN INCOMPLETE and inaccurate, giving little help to decision-makers in preventing system failures. This can be a matter of life and death. In extreme conditions, options narrow at exponential rates and

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leave little room for manoeuvre. COVID-19 has illustrated that data are too often lagging indicators.

THE VIRUS HAS SPREAD by the time signals are picked up, data validated, and models developed. If policymakers wait for definitive evidence and certainty, they are destined to deliver 'too little, too late'. Faced with radical uncertainty, they have to make imaginative, pre-emptive judgments.

NOR ARE EMERGING SOLUTIONS to these challenges necessarily the answer. The most recent artificial intelligence applications have great value and potential, but the machine learning paradigm is narrow, brittle and limited to specialised tasks that cannot adapt to changing system dynamics. Even the most advanced models are fragile in chaotic environments, as some quantitative funds have discovered. They are typically based on 'small world' perspectives that focus on what can be measured, rather than what is essential. They often fail to capture, to take one example, how weak signals gain momentum, or how social interaction shapes behaviour.

MACHINES DO NOT YET REASON, or model cause and effect. There is not even a consensus about what 'reason' means. A growing body of research suggests that human reason is not about how to deal with abstract logical

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problems but rather to meet the challenges of living in collaborate social groups.
In other words, decision-making leadership teams are embedded in social environments and shaped by cultural forces.
To compound the problems, decisions are influenced by how individuals and groups imagine the future. These are primary—if not dominant—cultural realities. Imagined futures shape political decisions, policy, corporate stewardship, sustainability and set innovation agendas. These realities cannot be modelled or forecast in conventional, logical, rational, statistical, or probabilistic terms.

DECISIONS ARE MADE NOT SIMPLY by careful cost-benefit analysis, but by leadership teams looking for stories that make sense of volatility, particularly in times of crisis and when the future is deeply uncertain. When the stories change and new ones gain momentum, financial and economic shocks emerge.

To illustrate, we might assume that financial analysts are interested only in data, even in low volatility conditions. The reality, as David Tuckett points out, is that financial markets depend 'nearly entirely on human imagination and emotion.' We act in the present on imagined futures. Or fail to. Asset values in low lying cities like Miami will collapse long before rising sea levels make them uninhabitable.

TAKE ANOTHER EXAMPLE, in December 2016, the first signs that major energy companies would come under sustained investor pressure emerged when they were asked to explain their long-term strategies in the context of climate change. Primary asset owners began to project transitions to autonomous electric vehicles, solar and wind power five, ten and more years ahead. The pressure was rooted in imagined futures and the narratives that described them. The future once again showed it can deliver shocks in the here and now.

Too much attention focuses on fine-tuning data, measurements and models, rather than on how real-world decision-makers use them. Models can act as anchors but are often ignored or used to give legitimacy to intuitive judgments. More often, they are challenged, poorly understood, or deliberately distorted.

THE UNDERLYING CHALLENGE for financial analysts, fund managers and actuaries is that, to recap, anticipation, not measurement, is paramount for leadership teams.
Decision-makers are searching for answers to the problem of how to deliver resilience in a world of well forecast 'wild card' shocks such as COVID-19 and the momentum of weak signals suggesting runaway climate change is underway. They are asking how they can imagine, navigate and make stewardship-based judgments about the long-term and hedge against worst-case scenarios.

If the actuarial profession is to meet these challenges and remain relevant at the highest levels, it has to think about how to combine imaginative foresight with traditional strengths. After all, professional services firms have to re-invent themselves, leading, not following, their clients. If they cannot picture the long-term, they will struggle to offer strategic advice.

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