How to spot an emerging risk
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Agenda

Emerging Risk
• What is emerging risk?
• What is the problem in spotting it?
• How do you spot it?
• (and manage it)
What is emerging risk?

• Some definitions
  – “an issue that is perceived to be potentially significant but which may not be fully understood or allowed for in insurance terms and conditions, pricing, reserving or capital setting” Lloyds
  – “new or already known risks which are difficult to assess and which may have a major impact on an organisation” Swiss Re
  – “developing or already known risks which are subject to uncertainty and ambiguity and are therefore difficult to quantify using traditional risk assessment techniques” IAA

What is emerging risk?

• Common themes
  – Something you don’t fully understand
  – Uncertain impact and/or timing
  – Impact may be significant

• Key Points
  – May not be sure that impact is significant at the point of study
  – An emerging risk does not need to be unknown
  – The risk may not be emerging (uncertain) for everyone
What is the problem in spotting it?

• You don’t know where to look
  – A universe of possibilities…
  – Study every science journal…
  – Scrutinise every news story…
  – Employ futurists…
• Too much data and not enough information
• Hard to engage people if scenarios unrealistic or fanciful

Why is it hard to spot emerging risk?

• You can’t make sense of what you see
  – Which trends will lead to risk for us…
  – What scale is the risk operating at…
  – Observed trends may be important but not yet combining sufficiently for sight of the risk to emerge…
  – Cognitive biases…
  – Insufficient resource…
  – Relevance to us…
The Right Perspective

Emergence

Emerging risks by spotting “events”
Too late in development to react
Imagined events too hard to relate to

Emerging risks spotted early from understanding of system

Emerging risk is hard to spot if you look in the wrong place
Complex Adaptive Systems

- Relevant properties...
  - Outputs result from multiple non-linear interactions
  - Self-organising
  - Emergence
  - Critical complexity/tipping point
  - Cause and symptom separated in time/space

- These offer clues about how to spot emerging risk

How To Spot Emerging Risk

- Know what matters
- Look in the right place
- Look with the right lenses
- Know how to assess it

Then...
- Know how to manage it
Knowing What Matters

- Look at strategic scale first
  - What does strategy rely upon?
  - How do these things interact?
  - Exogenous as well as endogenous factors
- Trends must impact this scale to matter to you a lot
- Create scenarios at scale of operations to test how they might play out and plan your actions pre/during/post onset

Understanding The System

You “know” more about how your company works than you might realise! Combine expert insights.
Knowing Where To Look

- Risks can emerge at multiple scales

Reaching a tipping point at one scale will cascade to others.

Responses must act at an appropriate scale to the emerging issue.

Tipping Points

- Adaptive cycle

Proximity to a tipping point is relative to sensitivity to particular condition as well as presence of the conditions.

Source: From Gunderson and Holling (2002)
Assessing Emerging Risk

Sensitivities

What matters

Triggers

Assessment processes to bound estimates of timing and impact

Emerging Risks

Feed into regular risk management

Risk Management System

Using the right lenses

- Identify indicators signalling onset
- May not be “obvious”
- Non-linear relationships
- Adaptation

- Need tools to spot patterns
- No guessing in advance
Non-linear dependence

Variables sharing significant information

Variables of system performance

Looking beneath the surface

Same outcome but different drivers

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Predictive Analytics

- Machine learning can determine predictive models for non-linear factors, providing real-time segmentation and performance data
- Significantly more powerful than GLM

Evolution of Risk

- Typical risk register asks for single classifier

Source: Milliman/EagleEye Analytics

Source: Actuarial Profession
Leverages Existing Information

- The technique builds on (enhanced) risk register info
- Simply extend range of characteristic classifiers

Source: Actuarial Profession Research

Evolutionary Risk Profile

We can see that these themes are common across the group but other themes such as strategy, legal and expenses are potentially big issues too

We can identify risks which share similarities, common evolutionary paths and identify clues about future development

Source: Actuarial Profession Research
Assessing Scenarios

Aggregate outcome depends upon complex array of possible world states

Final outcome comprises a variety of individual outcomes all of which depend upon a complex array of possible world states

The world states can be described contingent upon the interactions and states of a variety of key factors

How to Manage it

• Work to the right “scale”
• Resilience
  – Short-term cost of forgone “profit” vs. Cost of being in an alternative regime *(from Walker and Salt, 2006)*
• Know the “Tipping points”
• Evaluate trigger effects conditional upon current state
• Use (non-linear) systems thinking and methods
Summing Up

- It *IS* possible to spot emerging risks (unless they are chaotic)
- It *IS* possible to do so formally and rigorously
- The past is helpful but not exclusively predictive
- Expert judgement is useful but not unbiased
- Combining tools and methods is highly productive
- Resilience better than optimisation
- Consider how to manage unavoidable “Tipping Points”

- Emergence can lead to innovation and opportunity