



GIRO Conference and Exhibition 2012

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)

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1

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*

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2

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

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3

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



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4

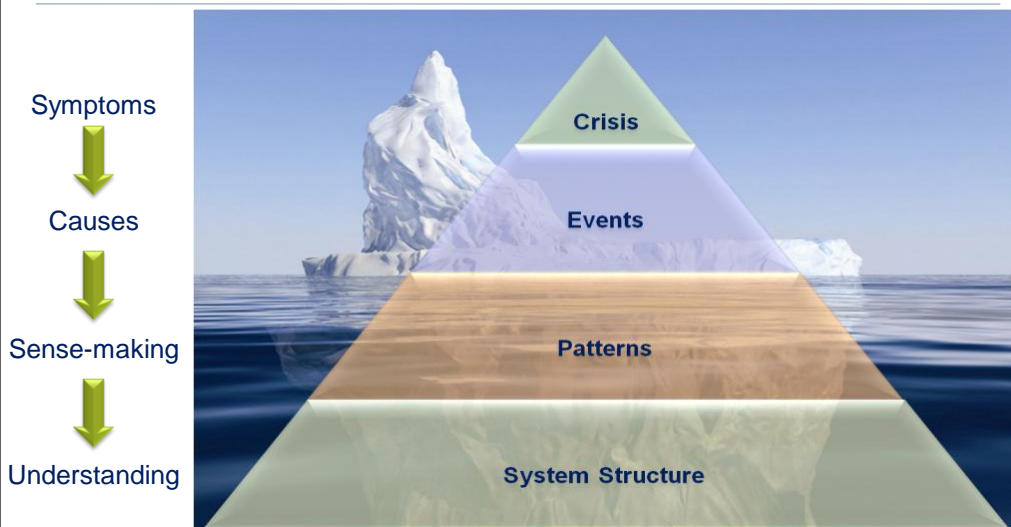
Why is it hard to spot emerging risk?

- 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...

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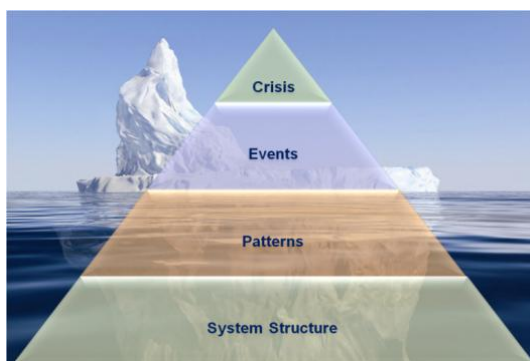
The Right Perspective



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6

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

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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



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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

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9

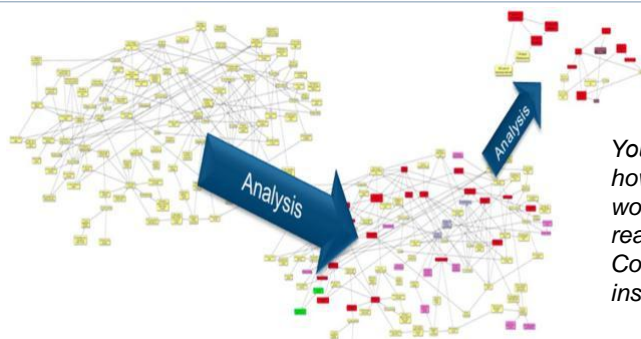
Knowing What Matters

- 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

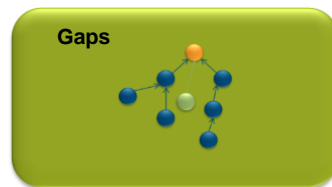
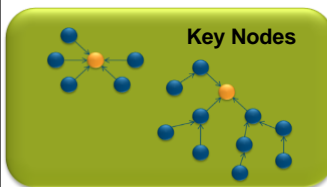
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10

Understanding The System



*You “know” more about
how your company
works than you might
realise!
Combine expert
insights.*



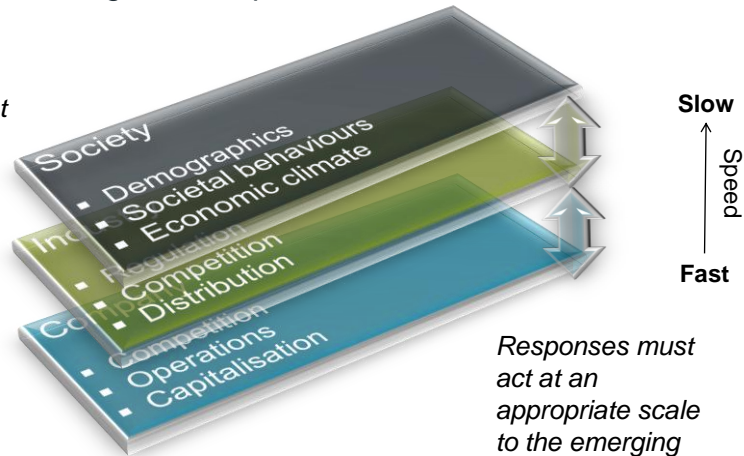
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11

Knowing Where To Look

- Risks can emerge at multiple scales

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

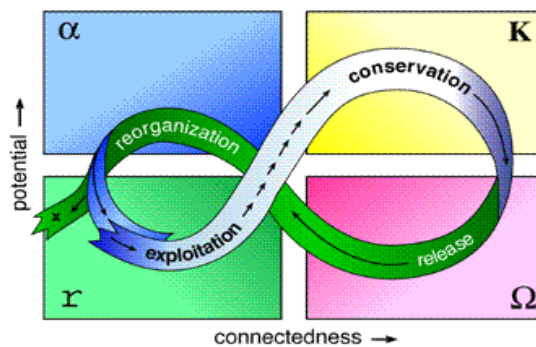


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12

Tipping Points

- Adaptive cycle



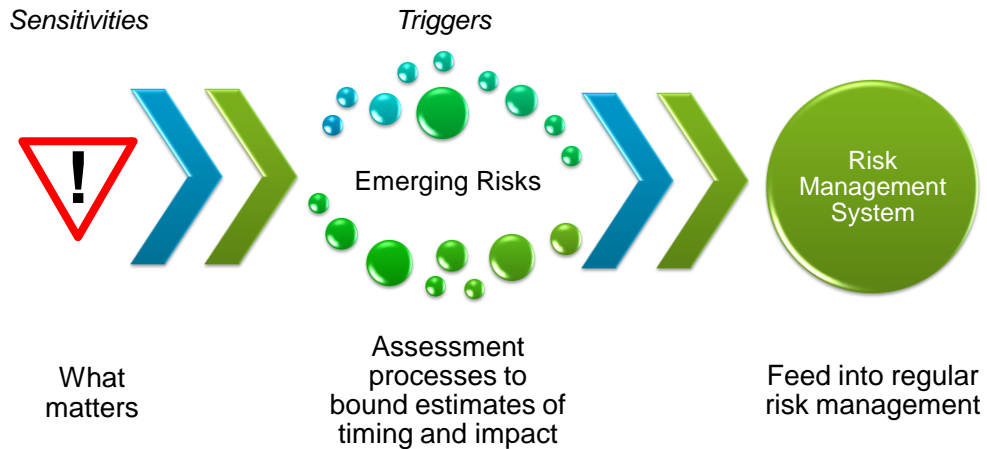
Proximity to a tipping point is relative to sensitivity to particular condition as well as presence of the conditions

Source: From Gunderson and Holling (2002)

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13

Assessing Emerging Risk



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14

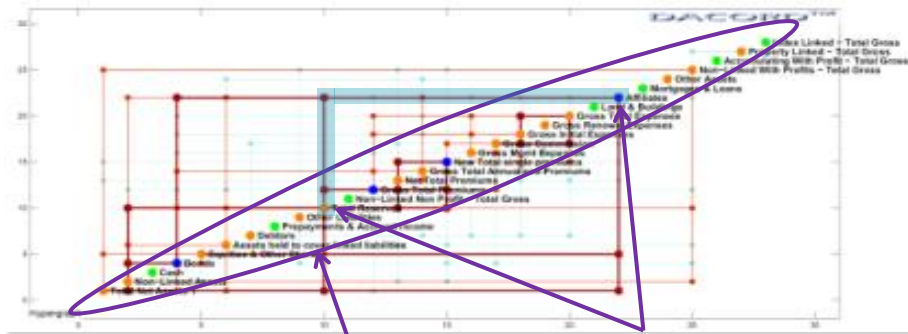
Using the right lenses

- Identify indicators signalling onset
- May not be “obvious”
- Non-linear relationships
- Adaptation
- Need tools to spot patterns
- No guessing in advance

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15

Non-linear dependence



Variables sharing significant information

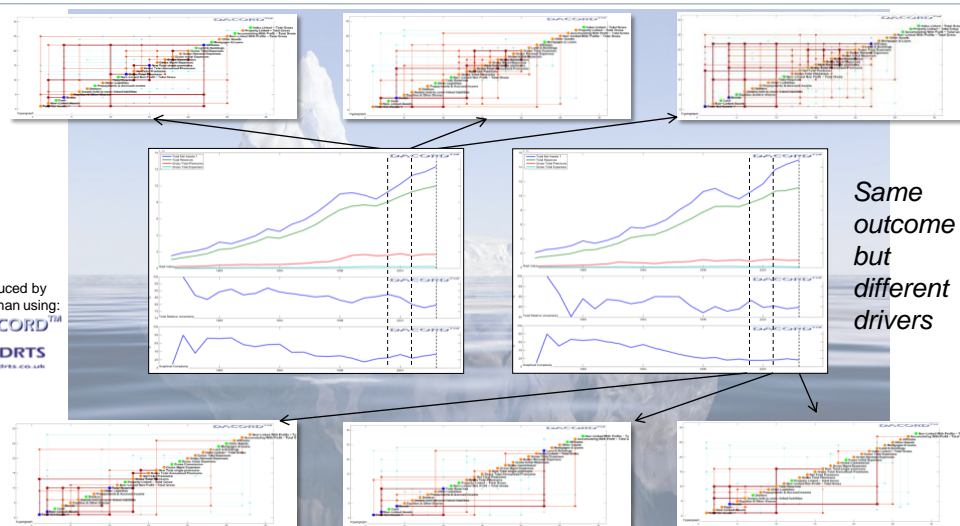
Variables of system performance

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16

Looking beneath the surface



Same
outcome
but
different
drivers

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17

Predictive Analytics

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



Source: Milliman/EagleEye Analytics

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18

Evolution of Risk

- Typical

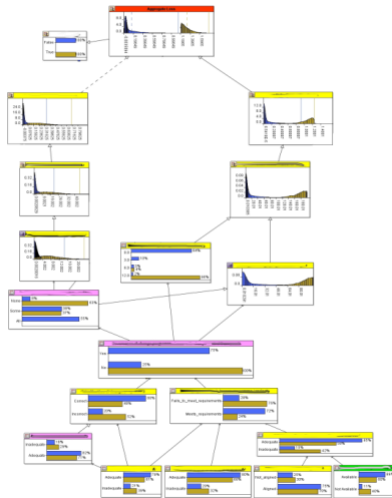
Risk Characteristic	Code		
1.1 Portfolio risk selection	1	5.05 Employment Practices / Employee Relations	30
1.2 Portfolio Management	2	5.06 Employment Practices / Safe Environment	31
1.3 Claims management	3	5.07 Employment Practices / Diversity & Discrim.	32
1.4 Technical Reserving	4	5.08 Improper Business or Market Practices	33
1.5 Reinsurance arrangements	5	5.09 Published Financial Statements	34
1.6 Longevity risk (Pension)	6	5.10 Advisory activities	35
1.7 Pricing	7	5.11 Damage to Physical Assets	36
2.1 Reinsurance Credit Risk	8	5.12 Bus disruption & sys failures / Systems	37
2.2 Insurance products credit risk-A23	9	5.13 Transaction Capture & Maintenance	38
2.3 Insurance operations credit risk	10	5.14 Monitoring & Reporting	39
2.4 Invested assets credit risk	11	5.15 Customer Intake and Documentation	40
3.1 Asset and liability matching	12	5.16 Customer & Client Account Management	41
3.2 Investment default	13	5.17 Trade counterparties	42
3.3 Currency risk	14	5.18 Vendors & Suppliers	43
3.4 Basis risk	15	5.19 Compliance with existing regulation	44
3.5 Property price depreciation	16	5.20 Increase in regulatory costs	45
3.6 Equity risk	17	5.21 Failure to implement Solvency II	46
3.7 Interest rate risk	18	5.22 Cross sector funding FSCF	47
3.8 Commodity risk	19	5.23 Product Flaws	48
3.9 Spread risk	20	5.24 Expenses overruns	49
4.1 Assets liquidity	21	6.1 Regulators	50
4.2 Funding liquidity	22	6.2 Corporate responsibility	51
4.3 Liability liquidity	23	6.3 Investors / JV Partners	52
4.4 FX liquidity	24	6.4 Media	53
4.5 Intra-day liquidity	25	7.1 Legal, Public Affairs & Regulatory	54
5.01 Internal fraud / Unauthorised Transactions	26	7.2 Macro-Economic	55
5.02 Internal fraud / Theft and Fraud	27	7.3 Changing Claims Patterns	56
5.03 External Fraud / Theft and Fraud	28	8.1 Internal	57
5.04 External Fraud / System Security	29	8.2 External	58
		8.3 General	59

Source: Actuarial

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19

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

Source: Milliman, using AgenaRisk™

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22

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

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23

Summing Up

- It /S possible to spot emerging risks (unless they are chaotic)
- It /S 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