

## ERM, Resources & Environment

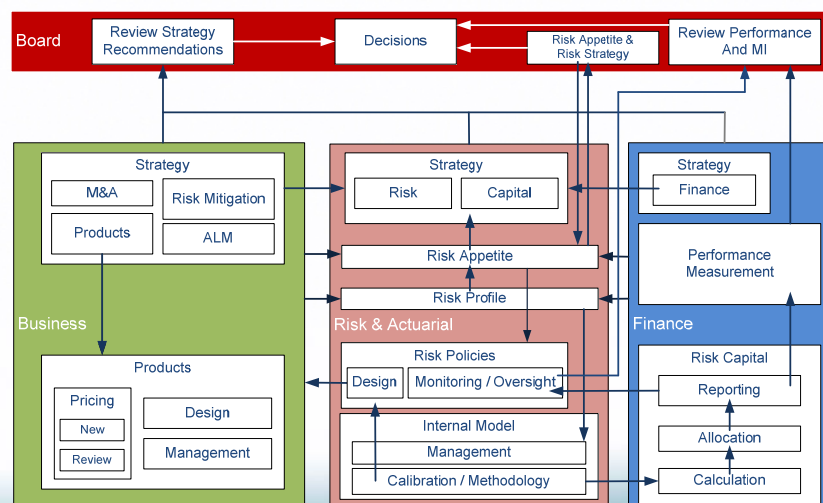
Some (hopefully) interesting ideas.

Elliot Varnell FIA CERA FRSA  
28 November 2012



## Typical ERM System

### Information flows

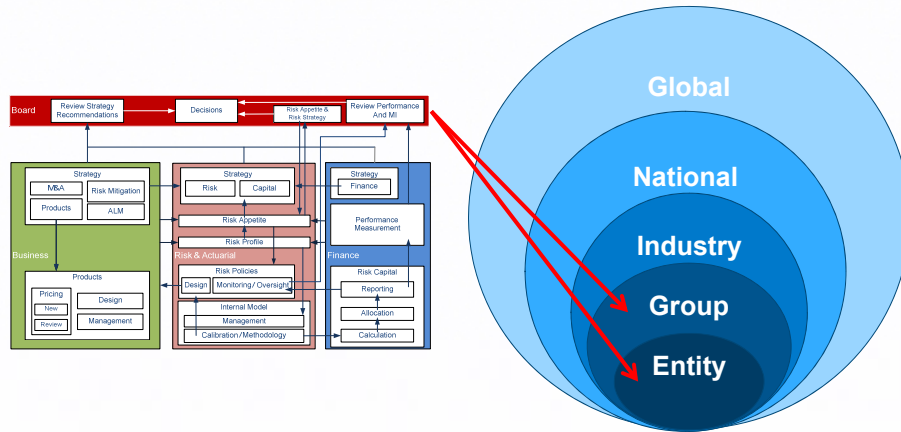


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## Typical ERM System

Careful where you apply it

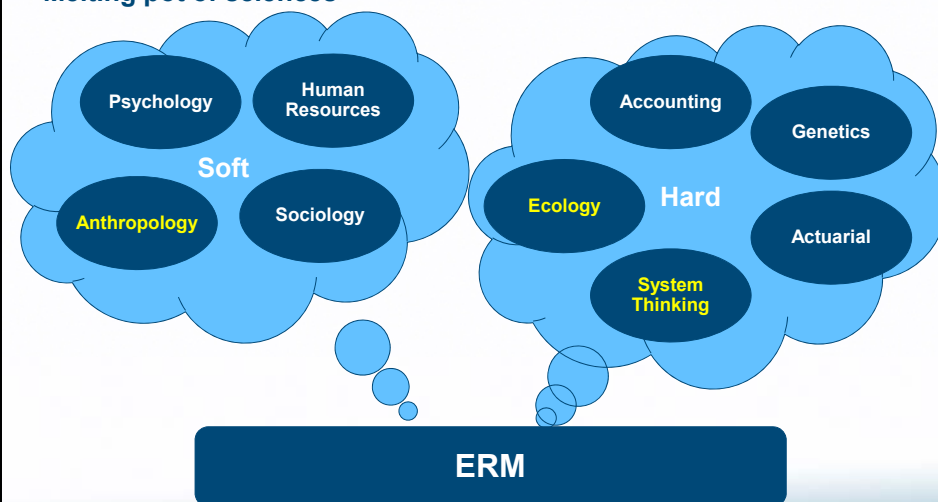


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## ERM Tools

Melting pot of sciences

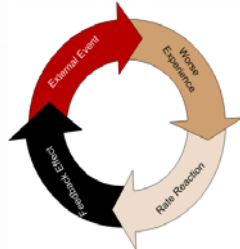


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## ERM Tools → Systems Approach

Traditional statistical modelling misses causality



### US Healthcare Death Spiral 1970s

Stagflation lead to a feedback mechanism of anti-selective lapses, increasing premiums, increasing claims ratios and accelerating losses.

### Global Banking Crisis of 2008

Sub-prime losses lead to unexpected mark downs of structured credit. Banks are highly interconnected so losses are amplified and losses rise beyond levels considered possible.

### London Market Insurance Spiral 1980s

London market player reinsured risks with each other leading to hidden concentration exposures and losses above those considered possible.

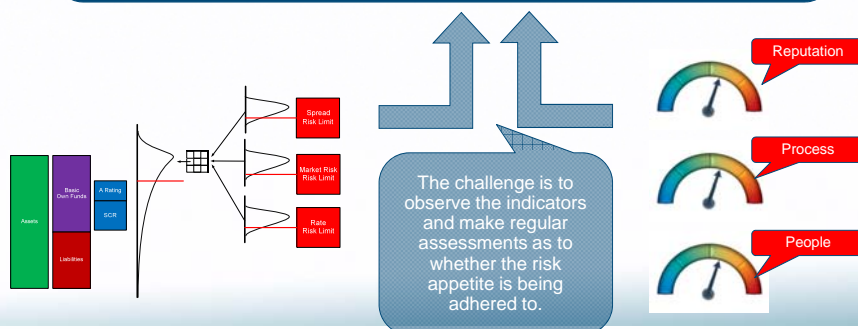
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## ERM Tools → Systems Approach

Using Bayesian Networks to check if Risk Appetite is met

- The Board expects to maintain sufficient capital during normal conditions to retain a AA rating
- Following a 1:25 year event the Board expects to have sufficient capital to retain at least a BBB rating
- During normal conditions the planned profit will be delivered
- Following a 1:10 year event, at least 75% of the planned profit will be delivered
- No appetite for regulatory censure or other significant reputational impact

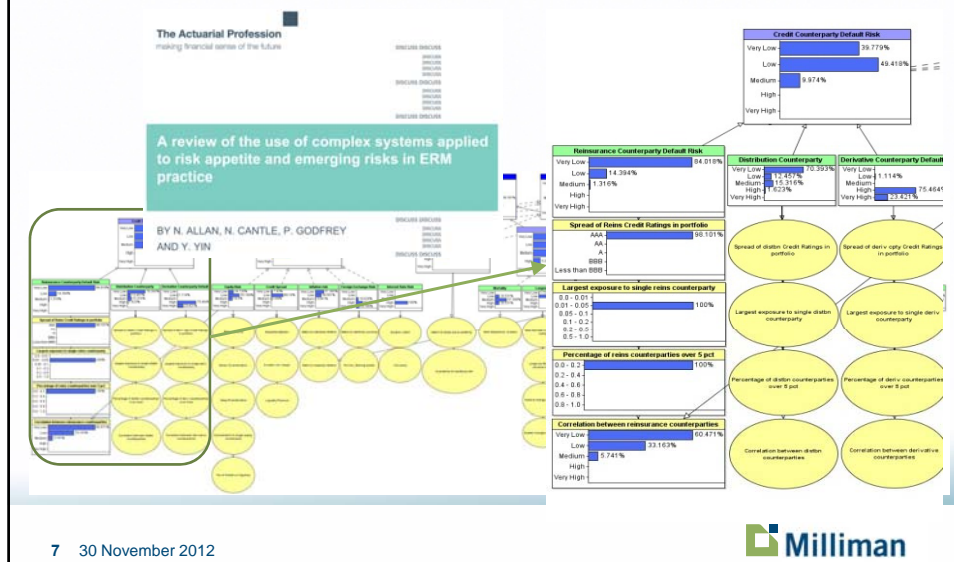


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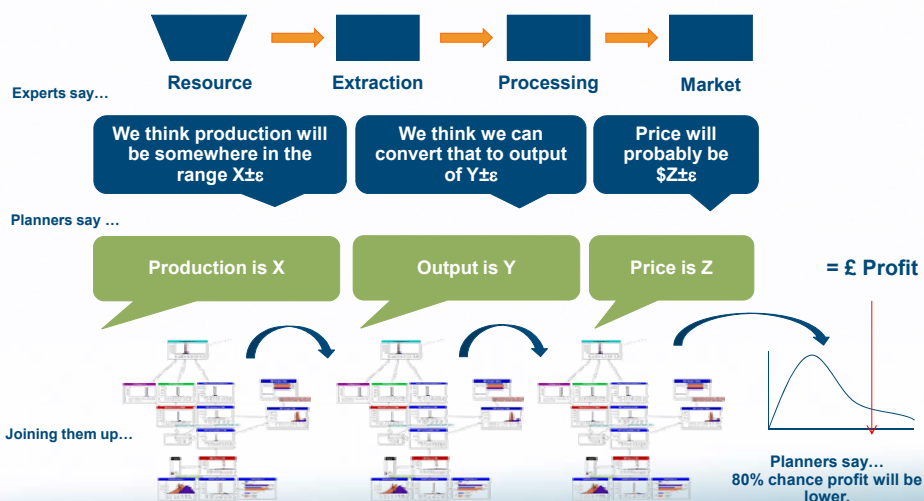
## ERM Tools → Systems Approach

Monitoring Risk Appetite with Bayesian Networks (Profession R&D)



## ERM Tools → Systems Approach

Using Bayesian Networks to help resource extraction planners



## ERM Tools → Anthropology

### Classical View

#### Methodological Individualism

Social science is best approached through the study of individuals.

#### Methodological Collectivism / Holism

Social science is best approached through the study of groups and organisations



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## ERM Tools → Anthropology

### Cultural Theory

Individualist Rationality

Hierarchical Rationality

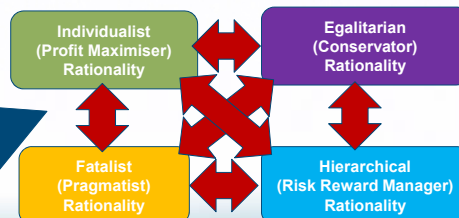
A good deal of social science looks to dualism between **markets** and **hierarchies**.

Leads to the idea that if the market and hierarchy can agree then a workable solution is found.

Mary Douglas was for many years the leading UK Social Anthropologist.

She disagreed and developed a Cultural Theory of Risk (now well established in Anthropology) that brings in two more rationalities. Former colleagues Michael Thompson takes this work forward.

Fatalists (passive – accepting of their fate)  
Egalitarians (proactive but anti-hierarchy and anti-market).



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## ERM Tools → Anthropology

### The Surprise Game - Agent Based Model

During the <b>BOOM</b>	During the <b>BUST</b>
Attitudes shift towards <b>Maximizer</b>	Attitudes shift towards <b>Conservator</b>
In <b>UNCERTAIN</b> times	In <b>MODERATE</b> times
Attitudes shift towards <b>Pragmatist</b>	Attitudes shift towards <b>Manager</b>

To make this more concrete Dave Ingram of the IAA worked with Michael Thompson to reignite a agent based model based on Culture Theory of Risk. The model explores how the a different assumptions about the way the world is lead to business cycles and different philosophies dominating in different parts of the economic cycle.

Wilmott, The Surprise Game, Ingram and Thompson

- In the insurance industry, this shifting can be delayed due to the time it takes to recognize losses – especially for long-tailed lines

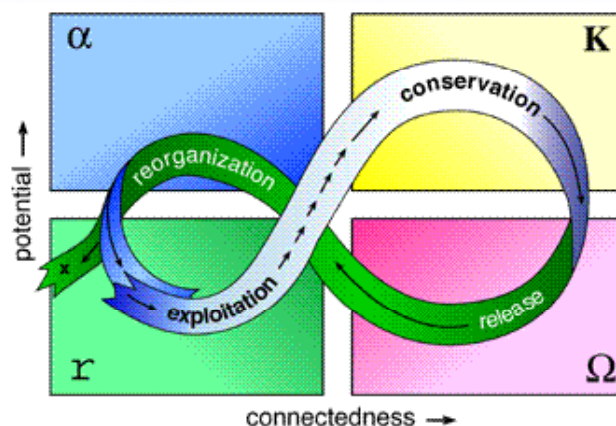


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## ERM Tools → Ecology

### Can we learn from the Adaptive Cycle?

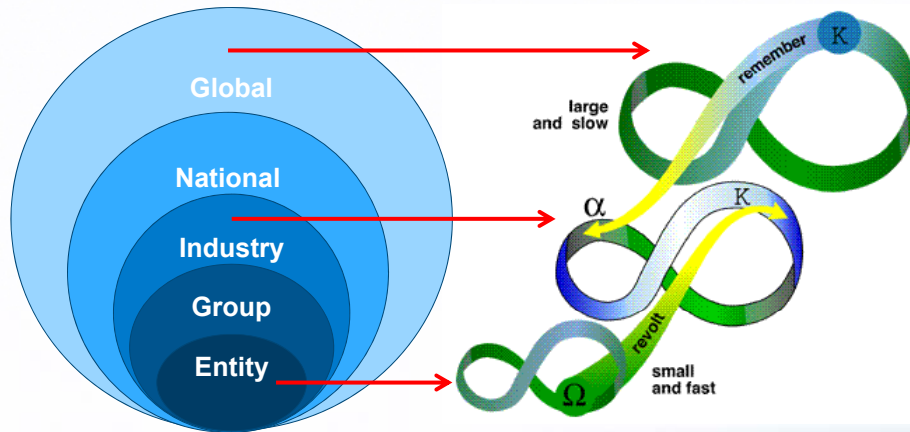


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## ERM Tools → Ecology

Panarchy and the interaction of levels



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## ERM and the Profession

An Invitation

- ERM R&D Group Broad Church (2 REG Members)
- Lots of exciting things to investigate.
- Non-actuarial science highly applicable.
- New meetings to go to!



Ask not what ~~your country~~ ERM can do for you but what can you do for ~~your country~~ ERM.

**Are you lonely?**  
Tired of working on your own?  
Do you hate making decisions?  
**HOLD A MEETING!**

You can —

- See people
- Show charts
- Feel important
- Point with a stick
- Eat donuts
- Impress your colleagues

All on company time!

**MEETINGS**

— THE PRACTICAL ALTERNATIVE TO WORK —

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