



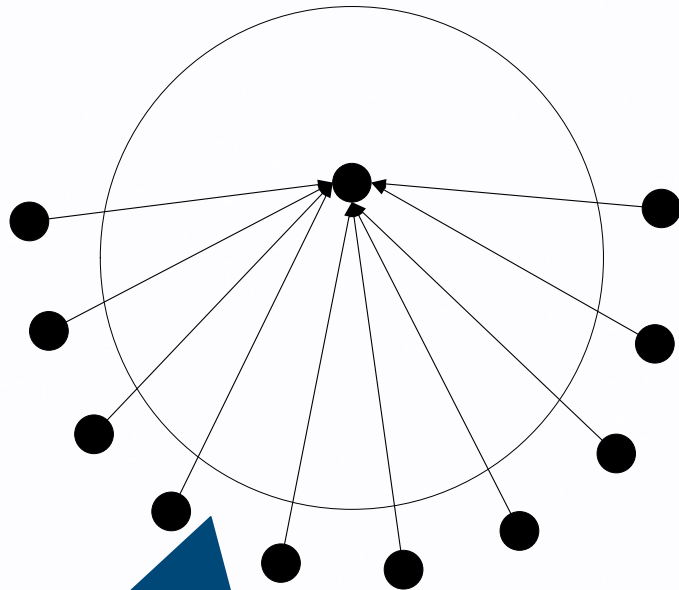
Modelling Risk ERM Research

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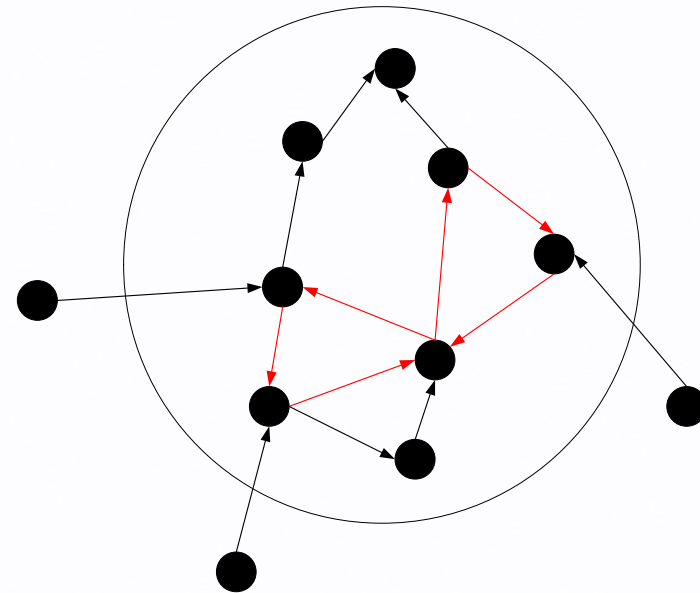
Risk Model

Endogenous Risk Dynamics & Exogenous Risk Factors



Exogenous Risk (Factors)

All the sources of uncertainty arise from outside the system (model). Distributions are fitted to external data. Risk from god (or at least the database administrator!)

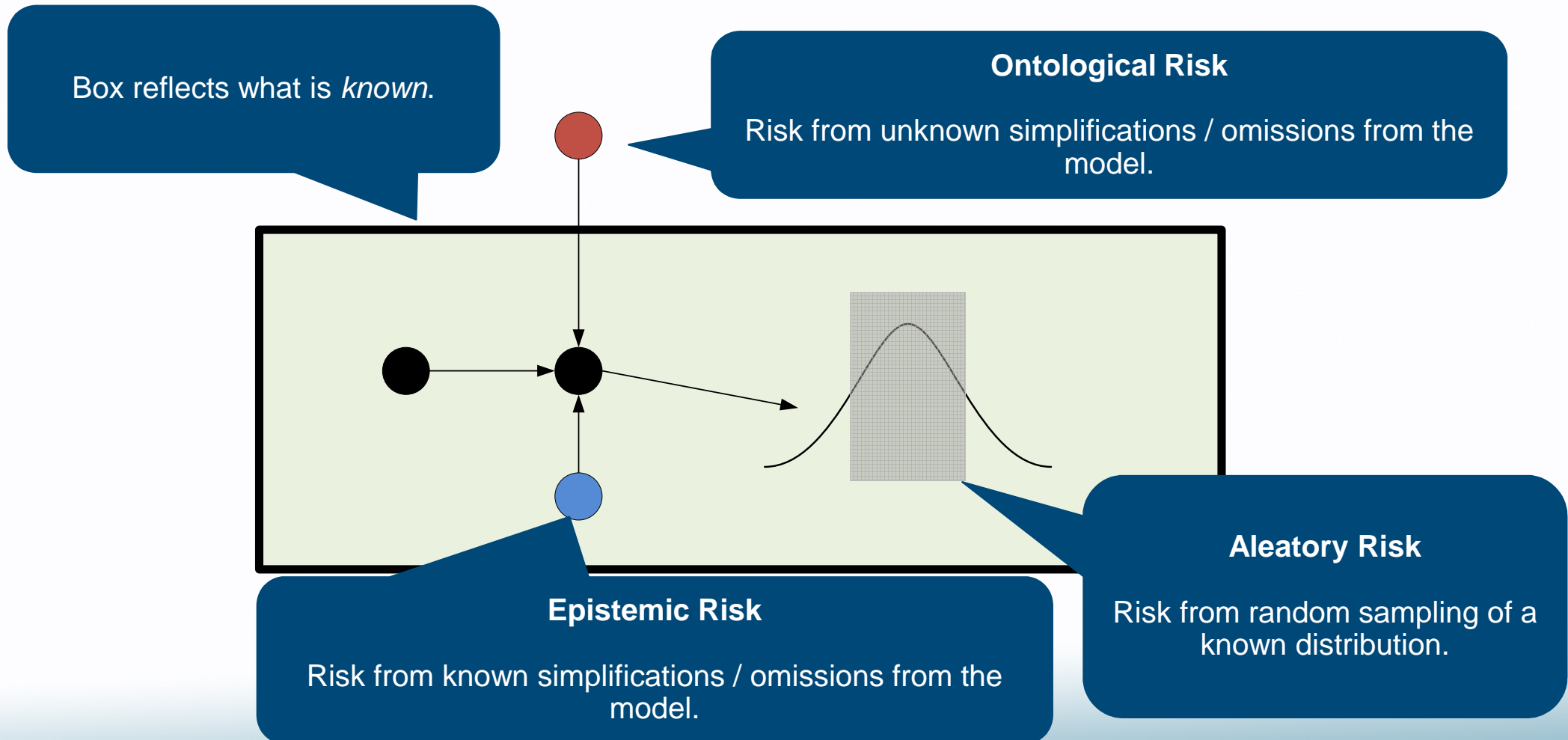


Endogenous Risk (Dynamics)

Some source of risk / uncertainty arise from the dynamics inside the model. Some risk caused by the *system*.

Model Risk

Illustrating Ontological, Epistemic and Aleatory Risk



Ontological / Epistemic Risk

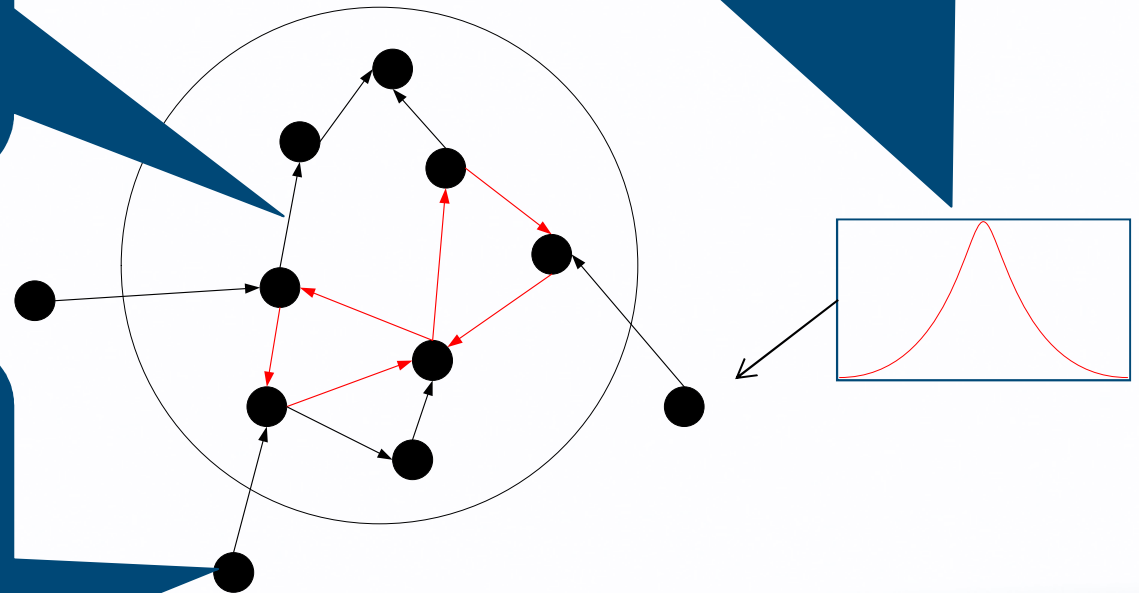
What is missing from the model?

Missing Dynamics

We may be missing some important variables. Not least every non-zero correlation we accept implies some process that delivers the dependency. Do we always know what that process is?

Missing Data / Information

We may be using only a fraction of the information available to us in setting the distribution.

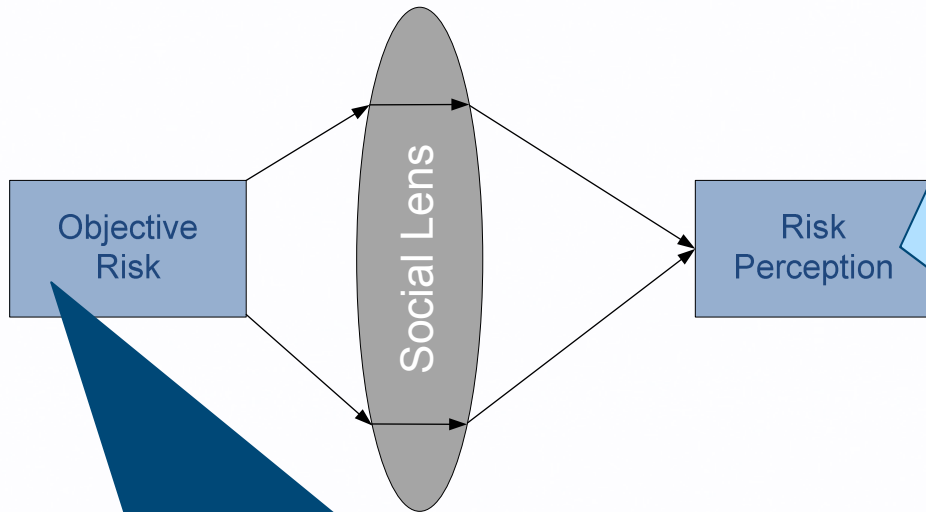


Missing Parameters / Risks

If we have missed some dynamics then we may also have missed some important parameters that have important consequences for our system (model).

Is Risk Objective?

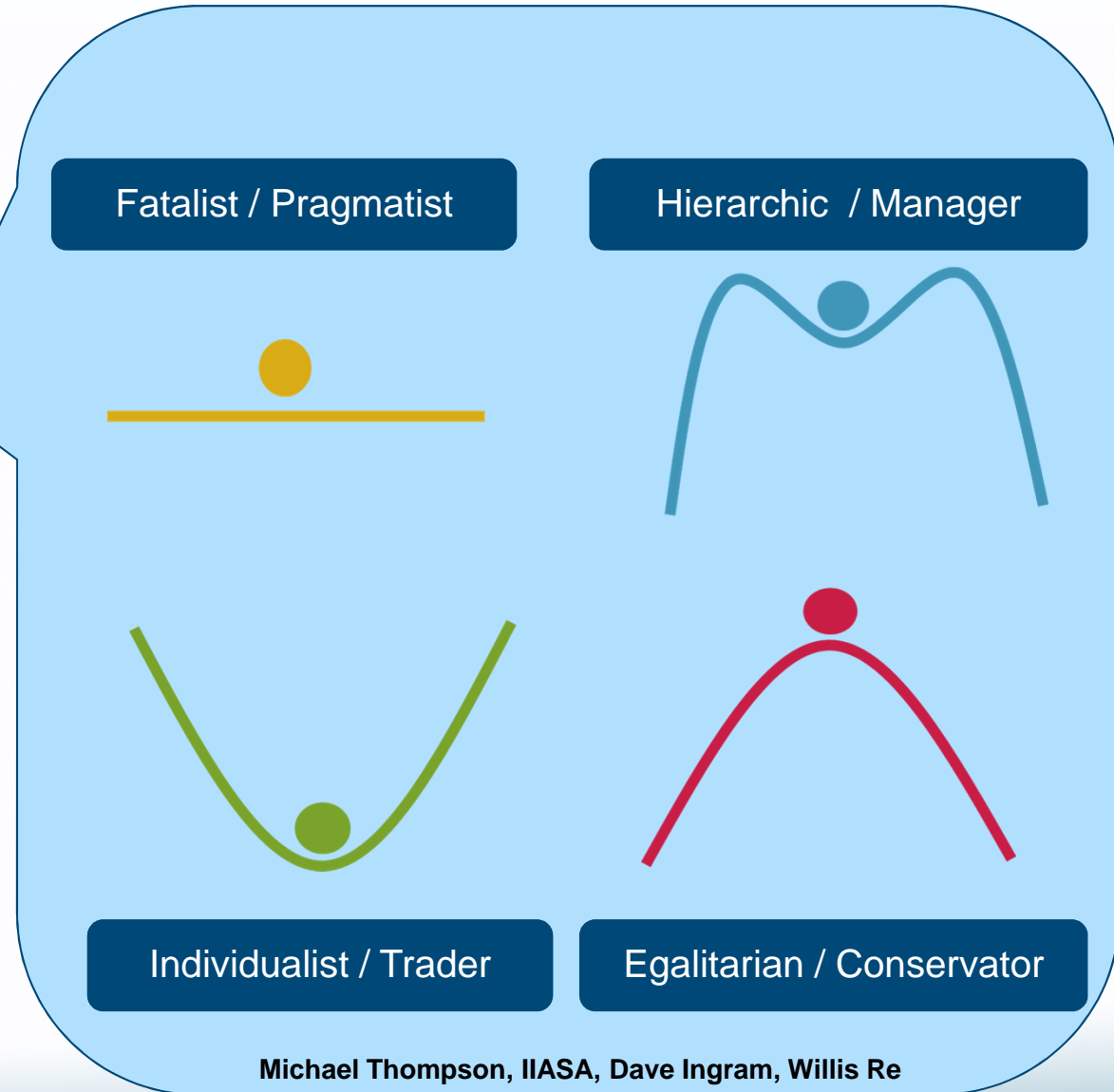
Risk as a Social Construction



As physicists / mathematicians / (and actuaries and risk managers!) we are trained to believe in objective risk .

However anthropologists teach is that that risk is socially constructed and our view of risk as objective is a cultural bias.

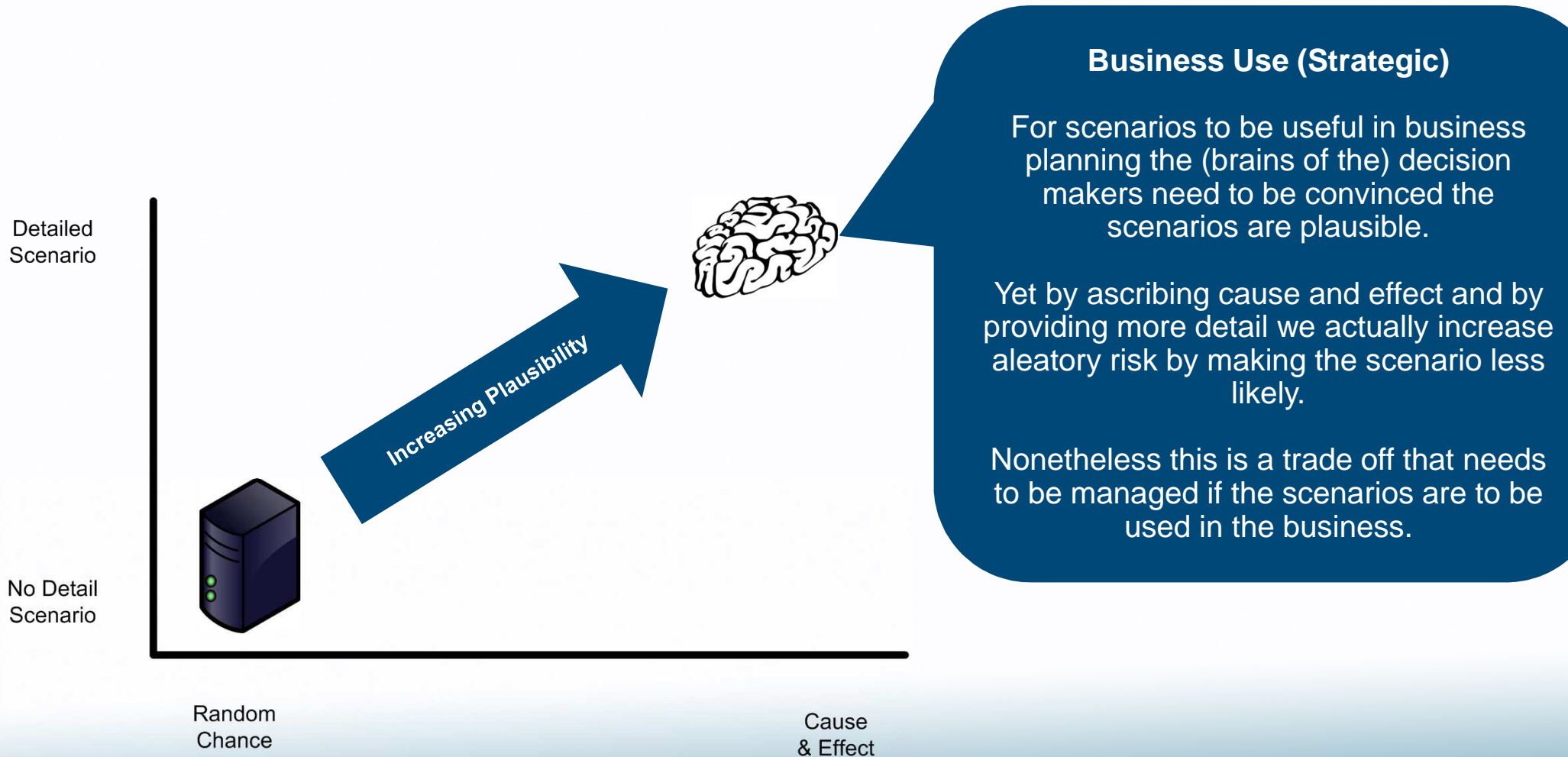
We come back to this time and again as models interact with other *cultures*.



Michael Thompson, IIASA, Dave Ingram, Willis Re

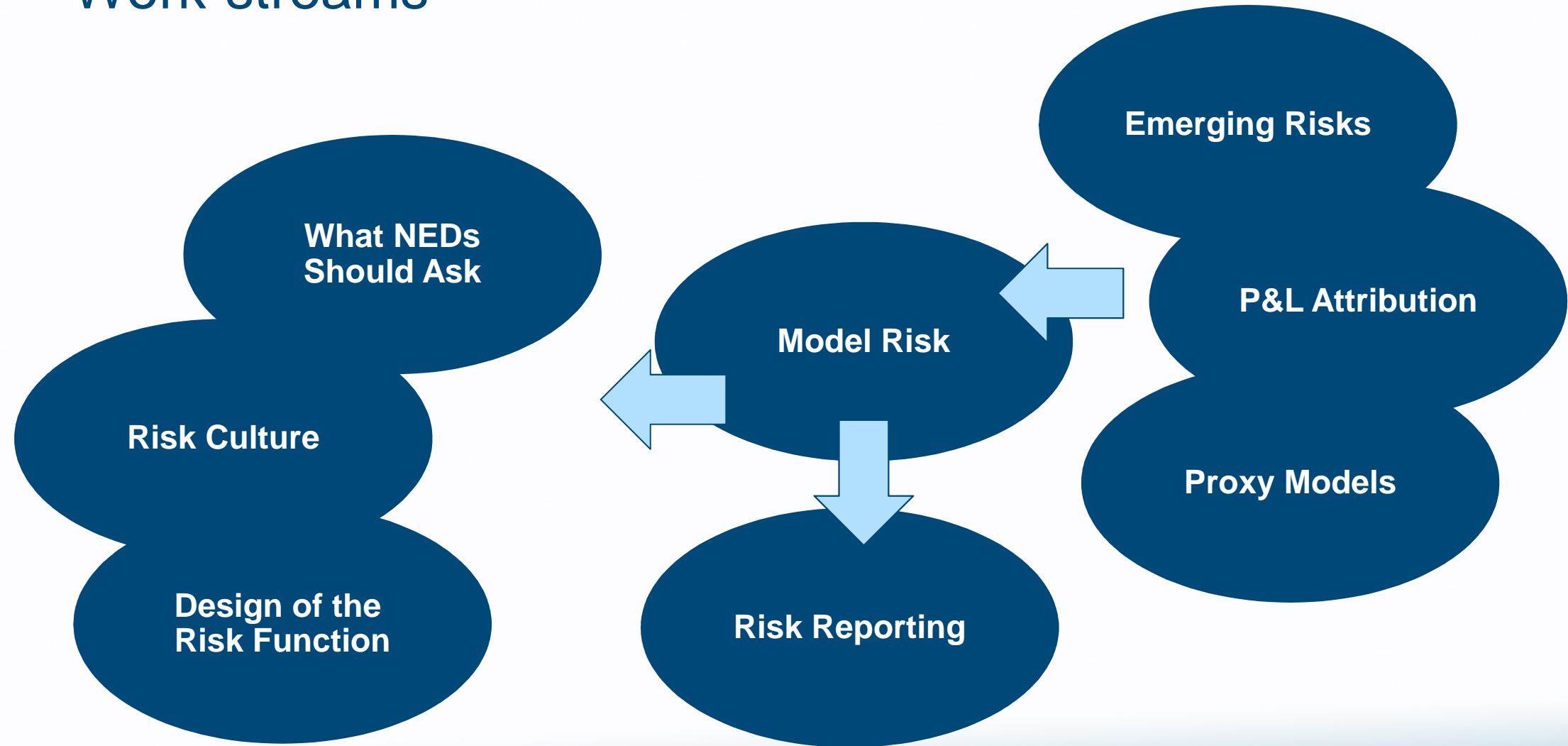
Using Cognitive Science

What sort of scenarios should we design?



Risk Management R&D @ IoFA

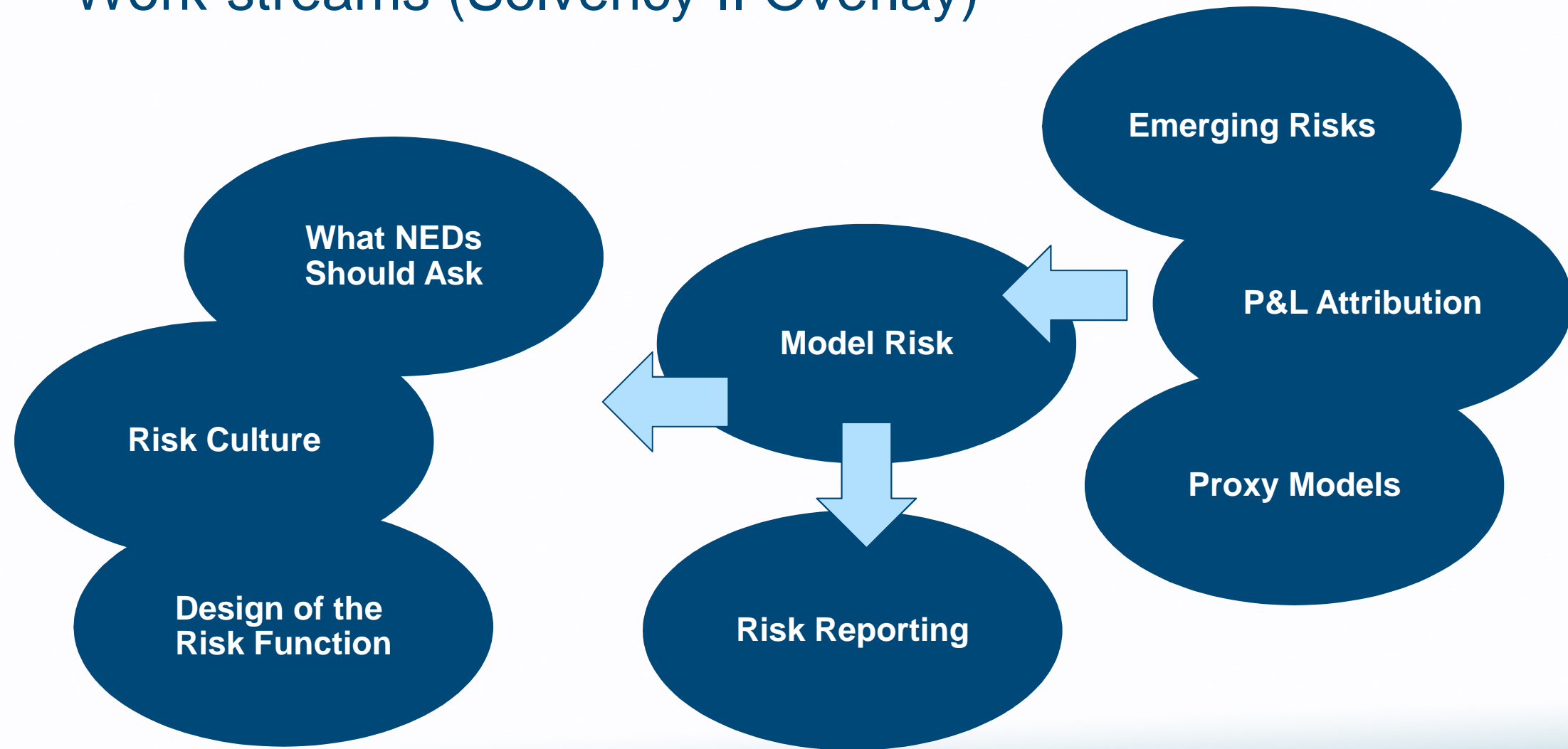
Work-streams



Risk Management R&D @ IoFA

Work-streams (Solvency II Overlay)

PILLAR 1



PILLAR 2

PILLAR 3

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