



# Risk Computation Automation

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# Current Calculation Methods

- Simple definition of risk
- Compliance focused
- Do not properly address interactions
  - Do not properly address causality
  - Tend to rely on detailed subject matter expertise that is not readily explained to non-experts that rely on the assessments for decision support
  - Are not focused on uncertainty quantification
  - Are backward looking
    - Reliant of statistical approaches
    - Capture what has happened
- Tend to be siloed – need to manually integrate assessments from many disparate systems

# Move to intelligent automated integrity calculations

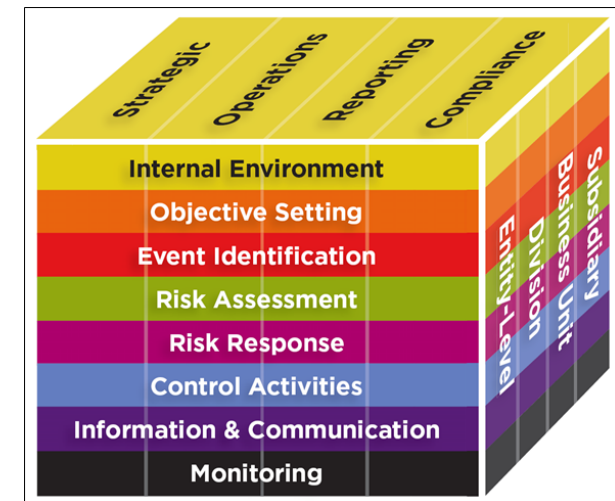
- To achieve high quality automated risk calculation systems we need to:
  - Have a well defined governance framework
  - Understand interactions between human and physical systems (Safety Management Systems)
  - Understand the intent of the calculations
  - Understand how the results of calculations impact the decision making process
  - Understand the interactions between the separate decision making process
  - Understand the impact on enterprise risk management

**Speed superintelligence:** A system that can do all that a human intellect can do, but much faster.

**Collective superintelligence:** A system composed of a large number of smaller intellects such that the system's overall performance across many very general domains vastly outstrips that of any current cognitive system.

**Quality superintelligence:** A system that is at least as fast as a human mind and vastly qualitatively smarter.

Bostrom, Nick. Superintelligence (p. 52-56). OUP Oxford. Kindle Edition.

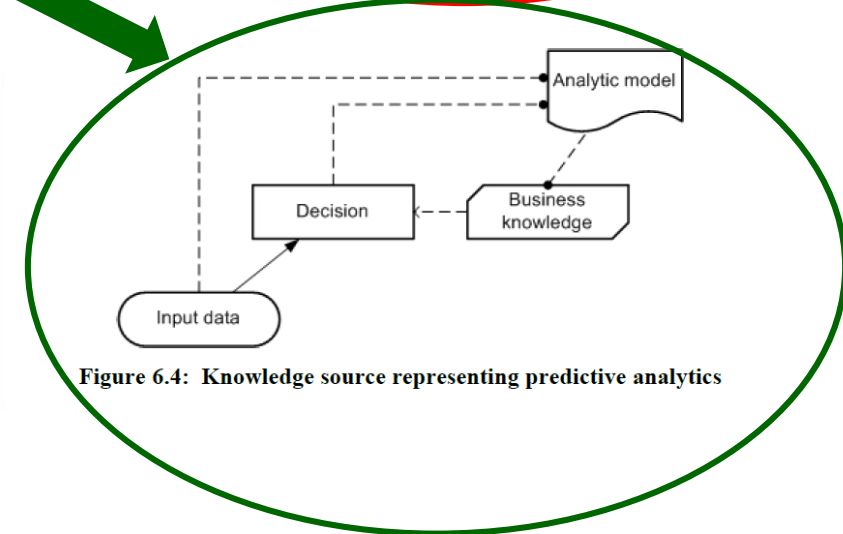
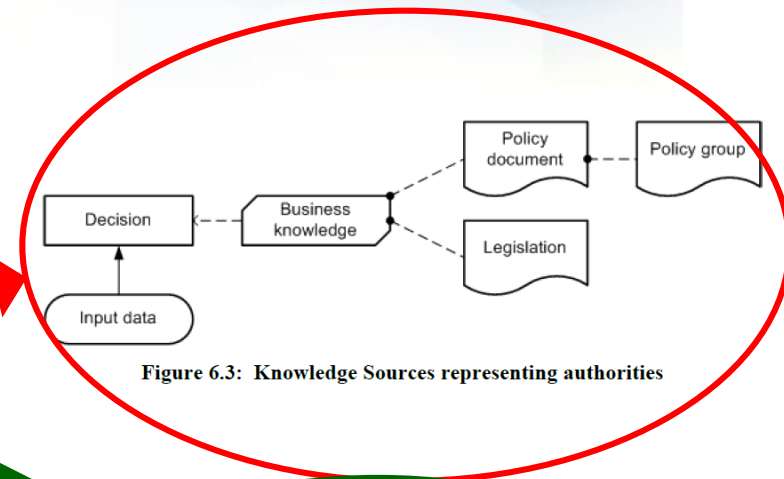
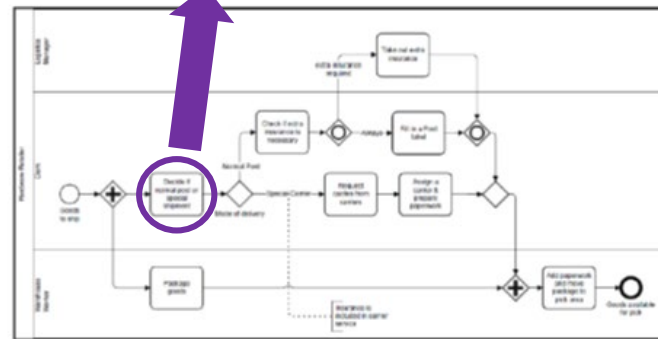
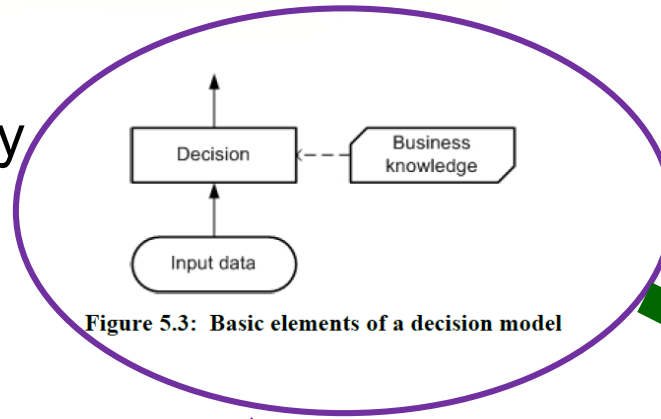


COSO (Committee of the Organizing Sponsors of the Treadway Commission) provides a good framework for risk governance

# Good definition of business and decision processes is required

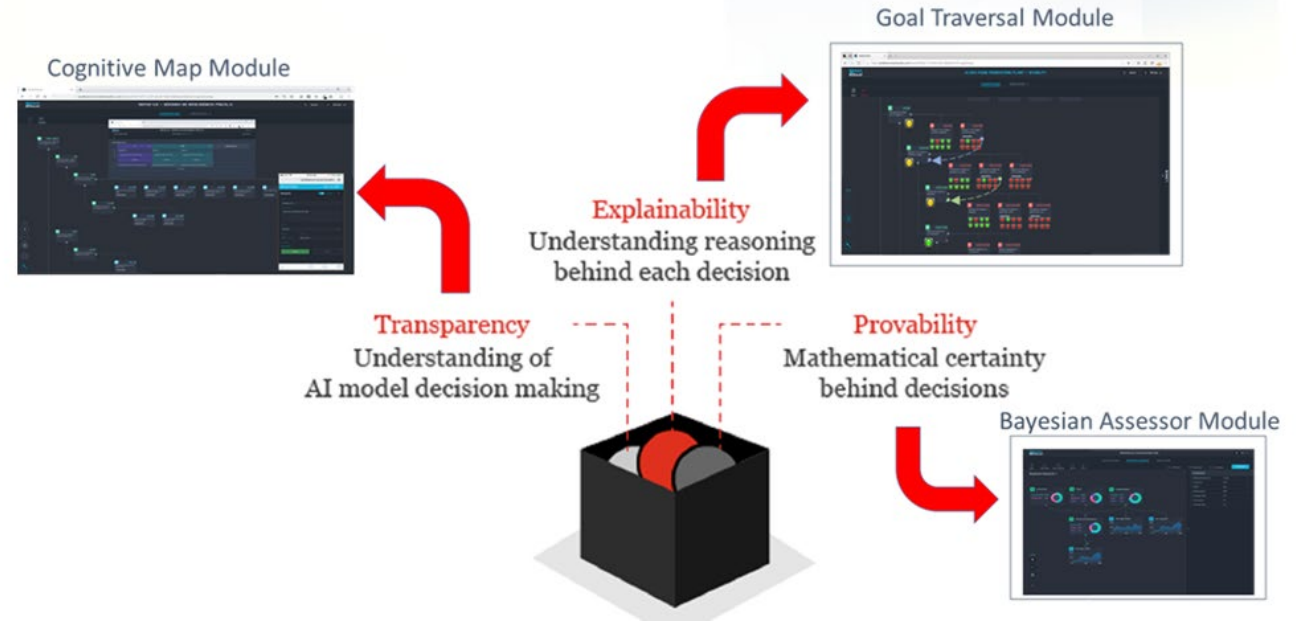
- Business processes need to be well defined
- Decisions points need to be clearly delineated
- Decisions need
  - Data
  - Business knowledge
    - Account for authority
      - Policy
      - Legislation
    - Analytic models need to be integrated with data and business knowledge to enable

**wise decisions**



# R&D Focus

- Structure research effort to:
  - Define knowledge space (existing, gaps)
  - Identify value chains
  - Develop agents to support goals
- Develop intelligent and automated data collection methods
- Develop appropriate simulation methods
- Encourage cross-functional policy evaluation
- **Support better human reasoning**



To implement new AI methods that reflect human reasoning, we need to develop automatic learning models that address potential reliability issues. The deployment of an AI solution must therefore take into account three specific aspects

**Transparency.** The ability to fully understand the model on which AI decision making is based.

**Provability.** The level of mathematical certainty behind AI predictions.

**Explicability.** The ability to understand the behavior behind each individual decision.

Ramy Sedra, Data and Analytics Consulting Leader, PwC Canada, Aug 23 2018  
<https://medium.com/pwc-canada/how-to-trust-ai-in-decision-making-826fe883bb22>