



A technocratic approach to effective decision making in policy design

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Science of Laws Conference

San Diego, CA






Scientia est potentia – Knowledge is power

- Information Utility
  - Complex information flows
- Humans operate under bounded rationality
    - Intellectual resource scarcity
    - Temporal constraints
- How can we address these concerns?
    - Behavioral fix
    - Technological fix
      - Systems Engineering



1. Complex Adaptive System
2. Democracy, Meritocracy and Technocracy
3. Constraint Based Model
4. Case Study



Aim of this study

- Illustrating decision making productivity when using systems engineering in public policy design

Systems Dynamic Modeling and Simulation

- Why use modelling and simulation
- Constraint based model (example)



Democracy, Meritocracy and Technocracy

Democracy

How it is

- Ruled by the people
- Elected representation
- Ideologically based decisions

Meritocracy

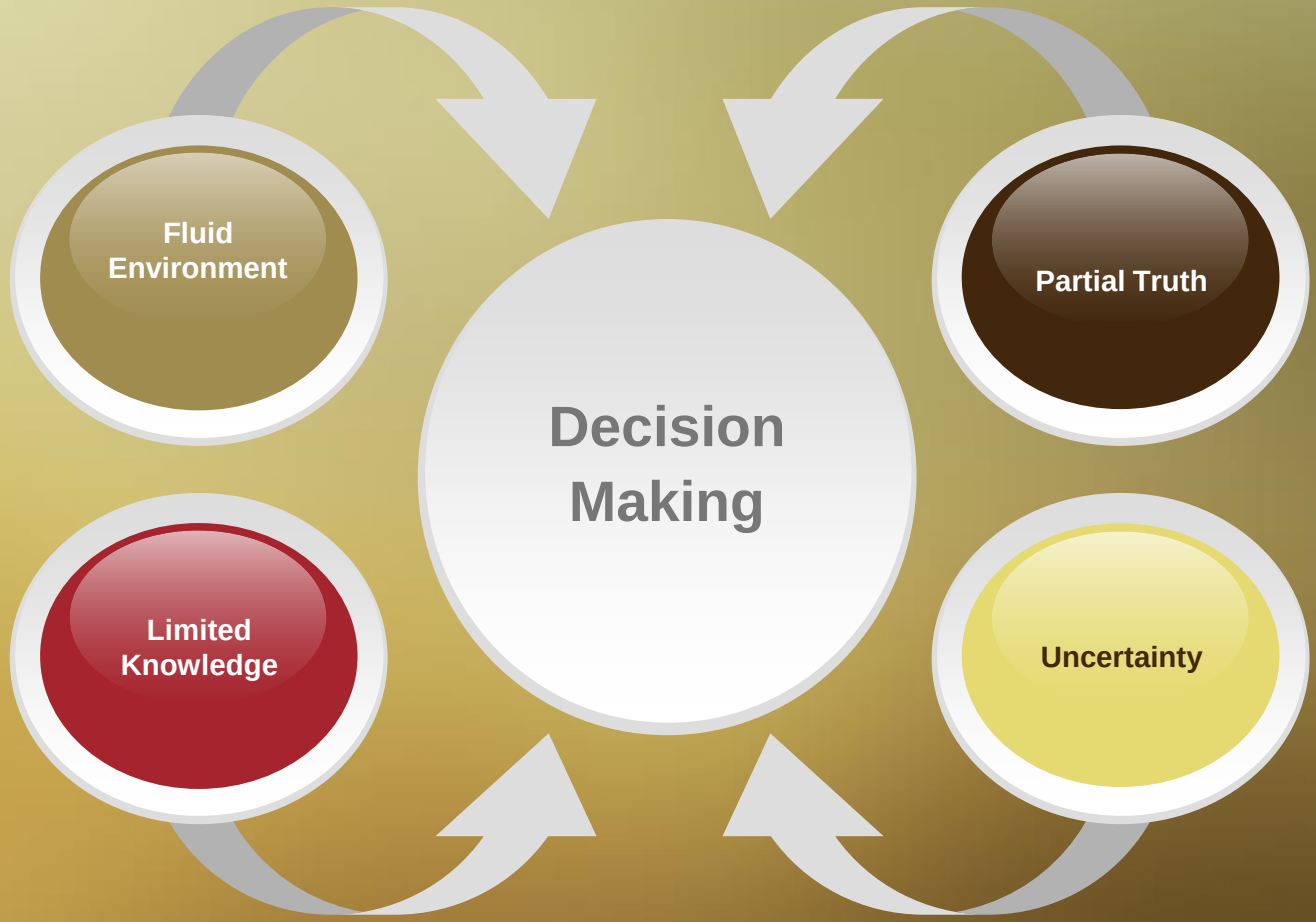
- Best qualified by notion of expertise
- Merit hard to measure
- Subjective

Technocracy

What it should be

- Selected by technical knowledge
- Science and Engineering based
- Augmented by technology




Fluid Environment
Partial Truth
Decision Making
Limited Knowledge
Uncertainty



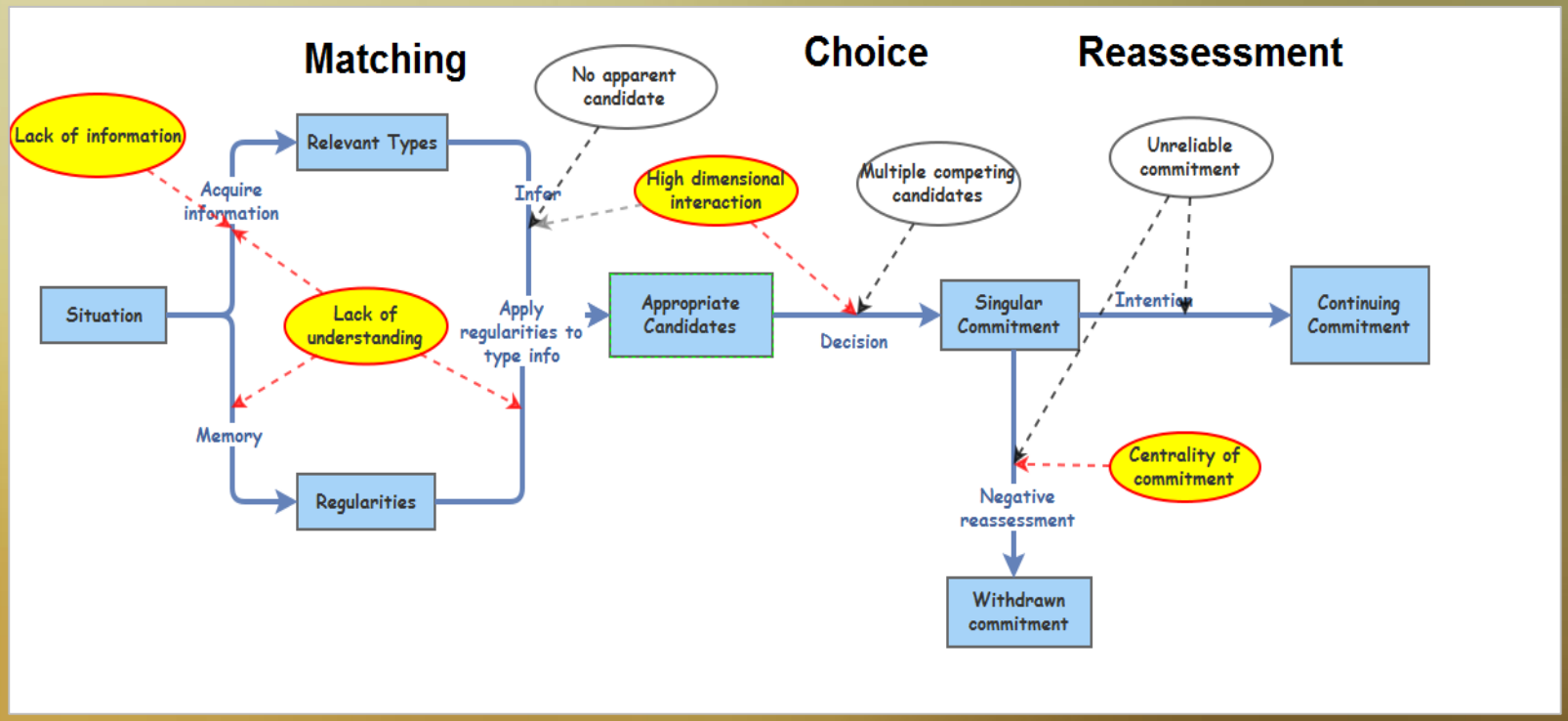
Modeling and Simulation

- Modeling and simulation discipline was introduced so scientists and researchers could have a more in-depth understanding of the interactions of parts of the system and of the system as a whole
    - the details should represent reality in some capacity and should reflect all the characteristics to model a particular system.

- Simulation on the other hand, refers to the method of computerizing models which can be run over a period of time to study the inferences of defined interactions
    - Simulations are iterative in nature and are synonymous with model development



Constraint Based Model



Generalized constraint based uncertainty model – guided by Cohen, 2013



Constraint Based Model: Simulation Output

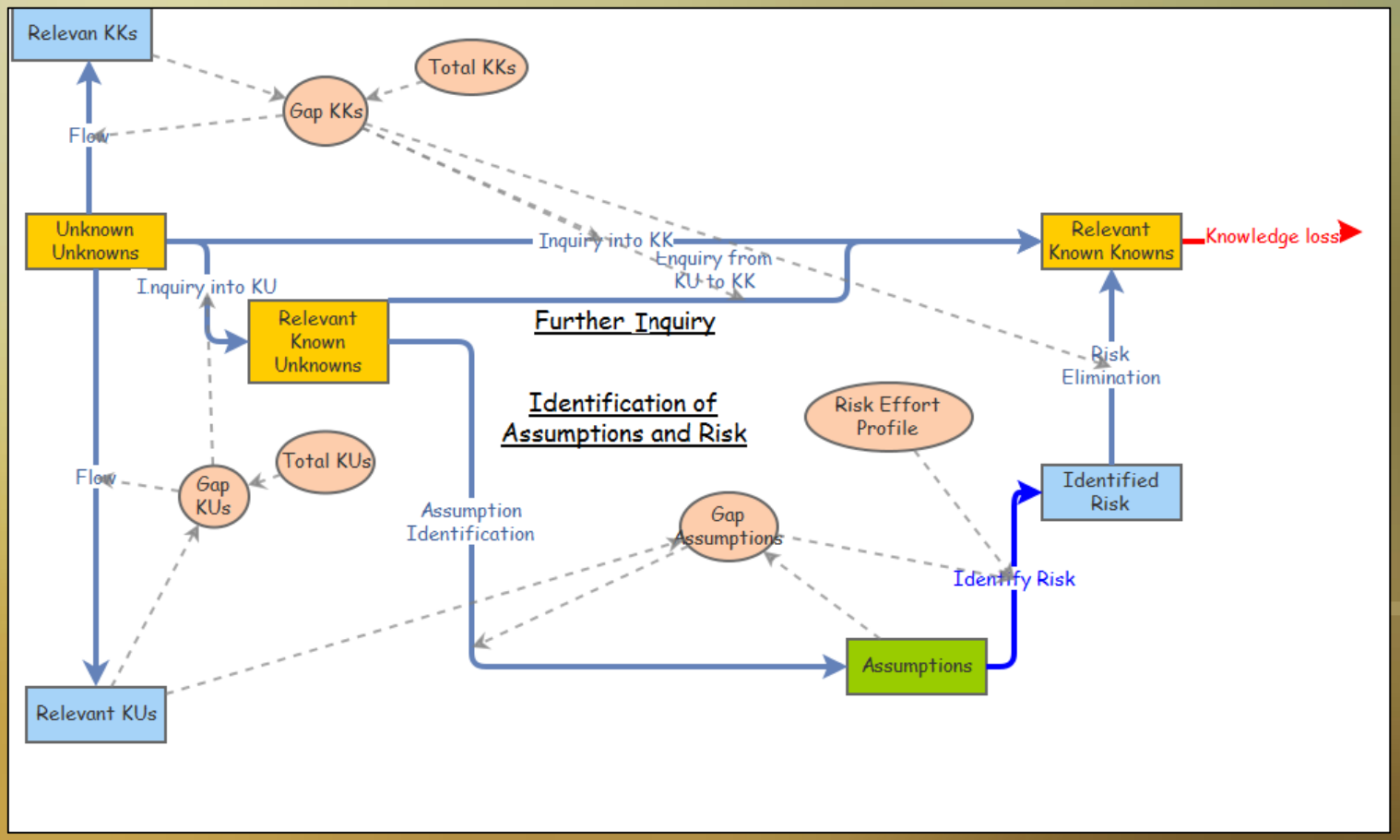
Generalized constraint based uncertainty model simulation – guided by Cohen, 2013



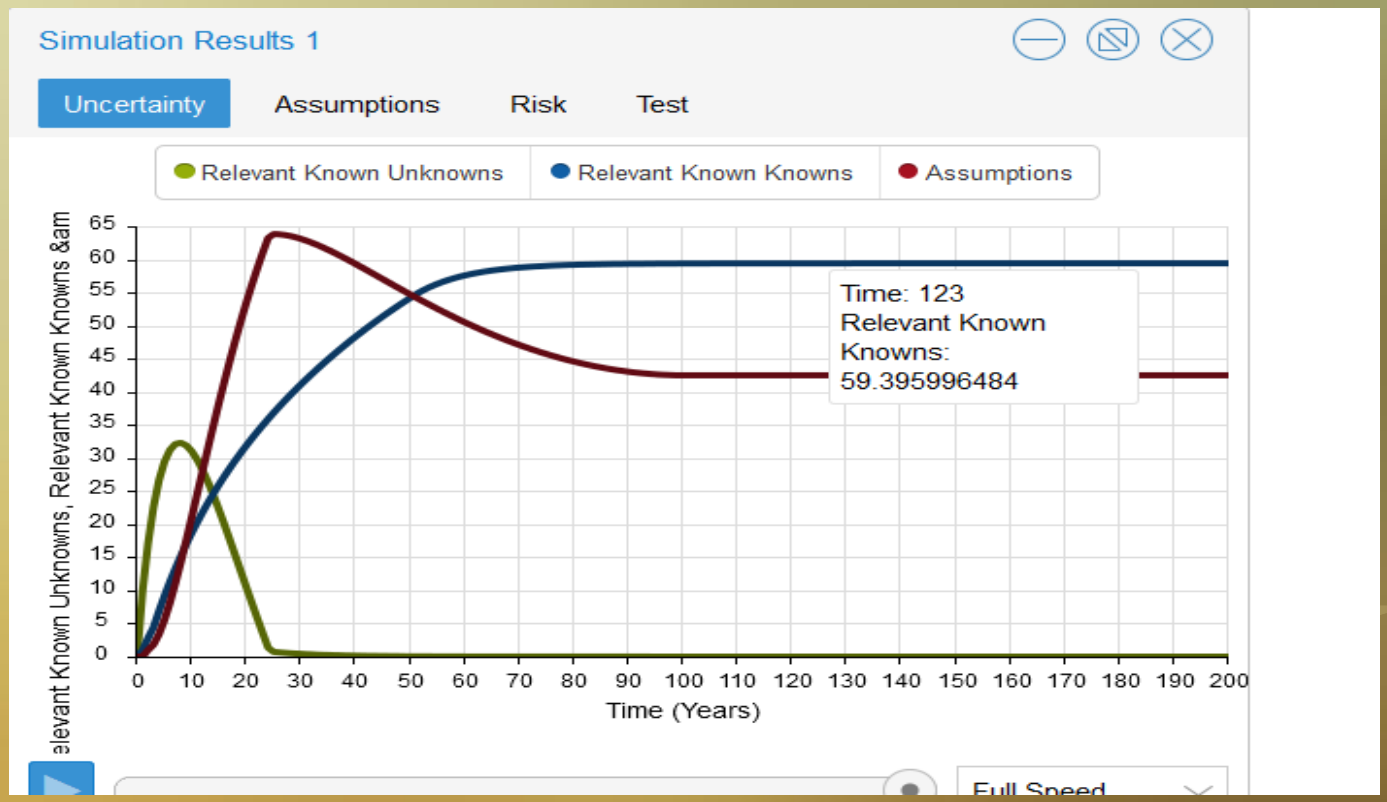
Role of Knowledge Management

Information	10%
Knowledge	65%
Risk	25%

Effective Decision Making



Knowledge Management Knowns and Unknowns Model – guided by Crawford, 2012



Knowledge Management Knowns and Unknowns Model – guided by Crawford, 2012



Knowledge Management and Outcome of Productivity: Case Study

-Two events occurred in the university centers in New York in 2007-2008 that could have affected the number of publications and number of grants produced by the university:

the first event was the adoption of KM tools for information sharing

the second event was a sharp reduction in the number of PIs due to the 2008 recession.

This study confirmed a gradual increase in productivity before KM adoption which we associated with the marginal increase in the number of PIs.

Notable changes were evident after KM adoption: the number of PIs decreased, and productivity significantly increased.

	2003	2007	2005	2006	2007	2008	2009	2010	2011	2012	2013
Publication Rate Pre KM	1.93	1.92	2.00	2.05	2.41						
Publication Rate Post KM						2.56	2.80	2.71	3.09	3.51	3.37
Grant Rate Pre KM	.93	.96	1.11	1.01	1.17						
Grant Rate Post KM						1.12	1.12	1.14	1.28	1.29	1.42





Thank You!