

Optimizing health or health service delivery: What is the proper role of AI?

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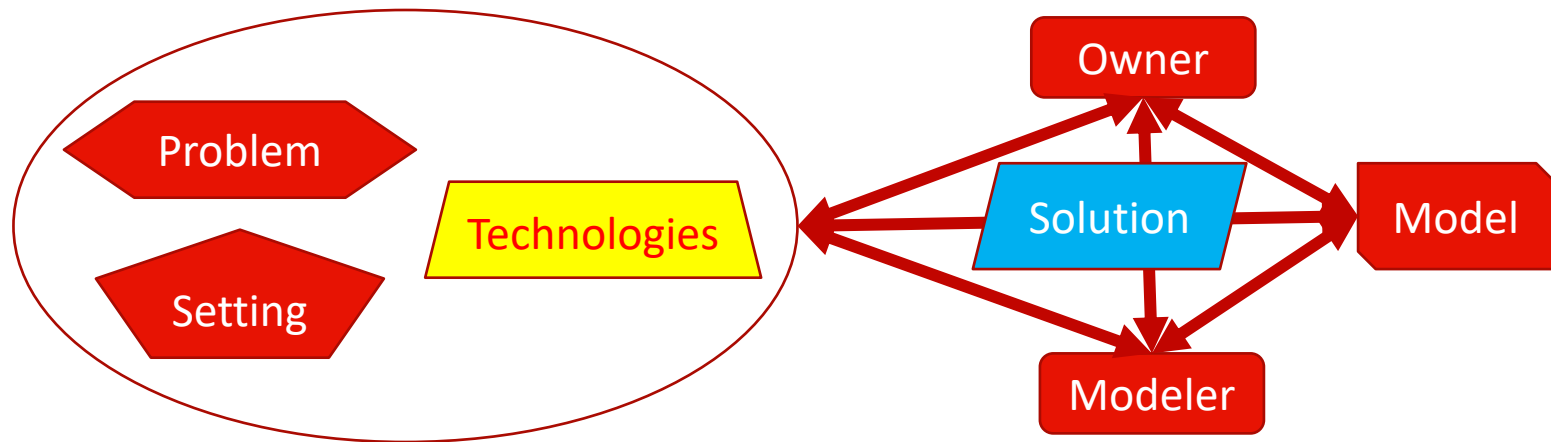
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**ARTIFICIAL INTELLIGENCE FORUM HUNGARY
INAUGURAL WORKSHOP**

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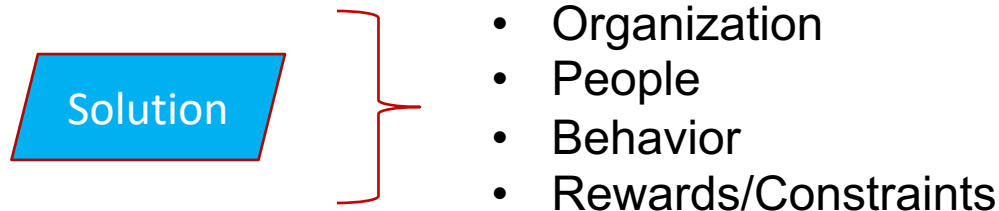
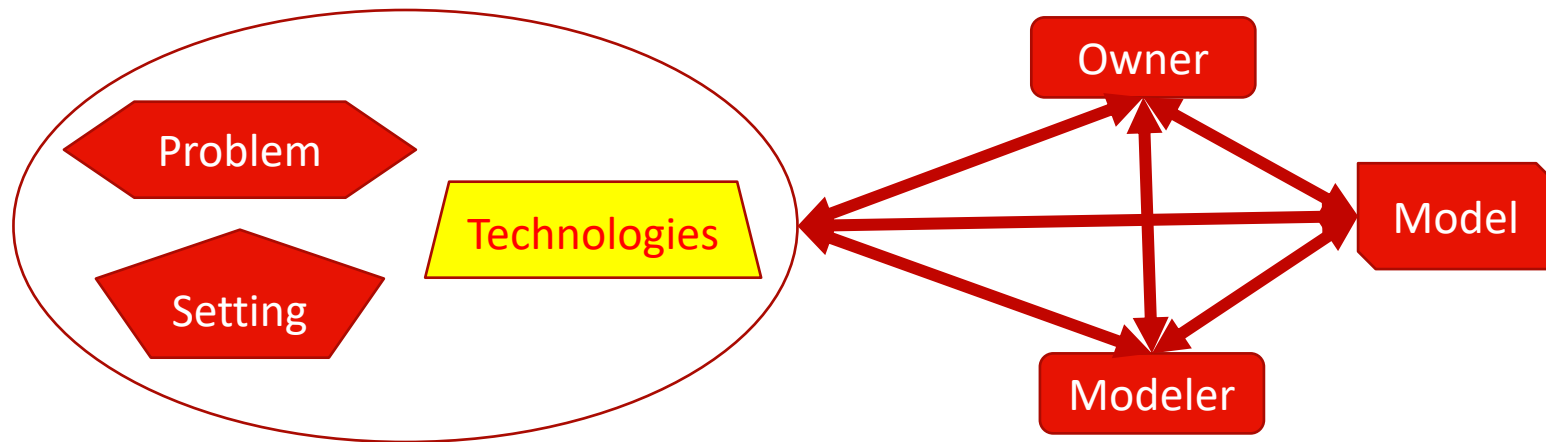


An Owner and a Problem Walk Into a Modeling Shop...

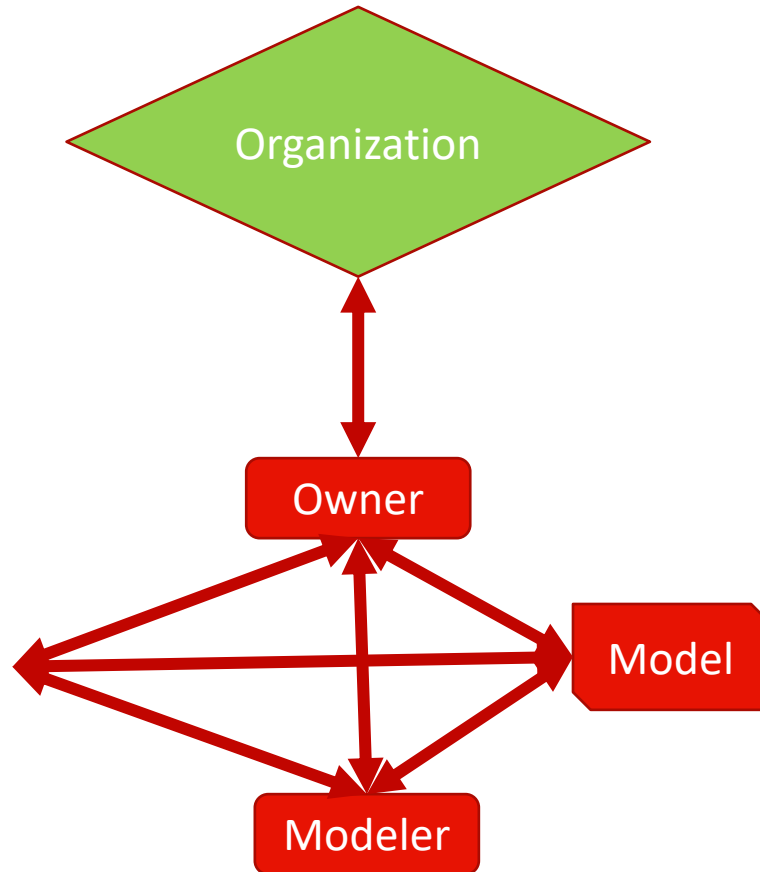


- Organization
- People
- Behavior
- Rewards/Constraints

An Owner and a Problem Walk Into a Modeling Shop...



More About the “Owner”



- “[A]ny method will produce benefits to an organization only to the extent that it actually changes the behavior of its actors in ways that improve organizational performance...”

- Luoma J. Model-based organizational decision making: A behavioral lens.
European Journal of Operational Research
249 (2016) 816–826

Luoma on the Impact of OR

- “To better understand where OR methods can and cannot help in organizations, one has to understand the **organizational realities** of decision making, how organizations **make decisions in practice**, and how OR methods could be **integrated** into those practices. The organizational realities with which OR needs to cope include limited managerial attention and organizational resources, complexity and causal ambiguity and diverse interests and mental models. These “situational features” vary across problem contexts, impacting what is demanded of OR and setting boundary conditions on what problem-solving procedures can be reasonably implemented.”
[emph. added]

Luoma

Routine Decision Making



Problem Solving

- “*Routine decision making* entails following an established decision-making procedure, developed over time through repeated exposure to similar situations. Routine decision making is usually efficient and reliable and, consequently, organizations have a tendency to routinize decision making. However, when new situations occur or routine decision making fails, organizations engage in *problem solving*, which refers to the process of arriving at a decision with less support from established problem framings and decision-making procedures.”

Utility of Modeling in Decision Making vs. Problem Solving

- Decision Making
 - “[M]odeling can *increase the efficiency and effectiveness of routine decision making*. In essence, model-based decision making has the capacity to enhance the speed and accuracy of decision-making calculations that are challenging for boundedly rational humans.”
- Problem Solving
 - “[M]odeling can *support problem-solving processes....[F]or example, through the ability of modeling to enable the exploration of one’s own mental models and focusing attention*. In these situations, models can also be used to reveal and reconcile organizational conflicts.”

Routine Decision Making: Luoma

1. “provide a process and recommendations that outperform unaided decision making”
2. “free the decision maker’s attention for more important matters”
3. “an important class of decision problems is simply impossible for humans to solve effectively in all their complexity”
4. “provide feedback about established patterns of decision making”

Problem Solving: Luoma

1. “generate insights”
2. “direct decision makers’ attention toward matters that are ambiguous while streamlining the processing parts of the decision problem that are more readily “solvable””
3. “facilitate the collaborative production and integration of knowledge”
4. “help surface and reconcile conflicts of interest among organizational actors”

Risks of Modeling in Decision Making vs. Problem Solving

- Decision Making
 - Costly/Time Consuming
 - “[T]he use of models to support routine decision making may lock organizational actors into **narrow problem framings** and can cause **failures to recognize change**. These uses of models also tend to suppress diversity, which can **limit the emergence of creative solutions** to problems. “ [emph. added]
- Problem Solving
 - Costly/Time-consuming
 - “[May] narrow the decision makers’ view of the problem situation [because they often] lack the capability to contest model assumptions and outputs.”

Table 2

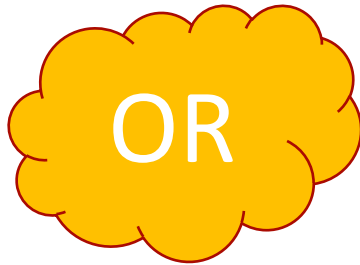
Examples of conditions impacting the benefits of modeling.

Type of condition	Examples	
	Condition	Positive and negative effects reinforced or weakened
Task characteristics	Situations that involve making judgments about individuals (+) Situations where previous problem-solving efforts have failed (+)	De-biasing Enabling of insights
Individual-level skills	Individuals with (+) or without (-) skills related to those needed in building and using models	Consummation of organizational resources and time
Organizational capabilities	Organizations with (+) or without (-) capabilities that can be utilized in building and using models	Consummation of organizational resources and time
Organizational structure	Organizations with high degree of specialization (+/-)	Knowledge integration
Environment	Organizations in mature industries (+) or nascent industries (-) Organizations in intensely competitive environments (+/-)	Economizing on cognitive effort, solving cognitively intractable problems, narrowing problem framings, inflexibility Production of feedback, consummation of organizational resources and time

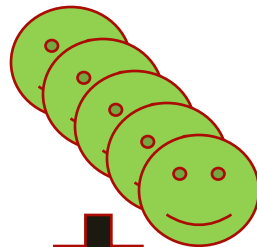
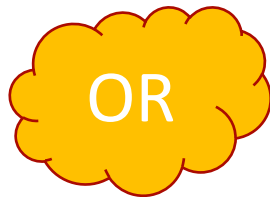
Note: The (+/-) signs indicate whether, in the examples provided, the condition increases or decreases the net benefits of modeling.

OR and Bounded Rationality

- “[T]he general point of the criticisms of OR is very important: unless OR methods are aligned with the actual circumstances of organizational decision making, they are unlikely to be adopted and, when they are, the results from using them might be disappointing.”
- “The notion of bounded rationality is at its heart of this perspective: “human behavior is *intendedly* rational but only limitedly so” (Simon, 1997, p. 88).”



versus



Organization



- Behavior
- Rewards
- Constraints
- Ethos
- Ethics

THE STUDY OF MACRO AND MICRO IMPLEMENTATION OF SOCIAL POLICY

Paul Berman

January 1978

RAND (Berman), 1978

Researchers, rejecting the simpler formulations of many policy analysts, operations researchers, and planners, seem to agree that a policy's implementation problem derives not only from its design; it derives also from the policy's relationship to its institutional setting.

With respect to outcomes, *technology* may dominate (e.g., vaccination's effects on the individual) or *Implementation of the technology* may dominate (e.g., educational interventions).

RAND (Berman)

- By definition, ***“policy” means behavior change***
- Proof: normal functioning does not continually require new policy to keep it in motion
- Two assumptions about the relation between policy and outcomes:
 1. Implementation effectiveness (If P, then I)
 2. Technical validity (If I, then O)

P=policy, I=implementation, O=outcome

RAND (Berman)

- Macro-implementation is composed of:
 1. Administration If P[olicy], then G[ovt. Program]
 2. Adoption If G, then A
 3. Micro-implementation If A, then I
 4. Technical Validity If I, then O

Where Berman gets interesting...

- “I”, (implemented program) depends on local context:
 $I = f(P, \text{Institution})$
- Institutional variation and the *adoption fallacy*
(assumption that the adopted policy is the implemented practice)
- Possibilities of practice for local entities
 1. *NOT* adopt
 2. Adopt *symbolically*
 3. *Contrary* adoption
 4. *Mutation* (adaptation to local organizational setting *during* implementation)
 $I_n = f(A, \text{Org [local organization]})$

Berman gets REALLY interesting...

- “[W]hat happens to a project depends not only on the project and the organizational characteristics, but also on what happens to the organization *because of* the project and because of the way the project is implemented.” [emph. added]

Project adoption (mutation)

$$I = f(A, \text{Org.})$$

Organizational adaptation

$$\text{Org.} = f(A, I)$$

Possibilities for Adaptation

	<u>I</u>	<u>Org</u>
• Non-implementation	-	-
• Cooptation	+	-
• Technological learning	-	+
• Mutual adaptation	+	+

Summary

- Franco and Hamalainen

“It is not enough to have a technically correct and valid model; we also need designed OR intervention processes in which human aspects have been taken into account.”

References

- Luoma J. Model-based organizational decision making: A behavioral lens. *European Journal of Operational Research* 249 (2016) 816–826
- Berman, P. The Study of Macro and Micro Implementation of Social Policy. RAND Report P-6071. 1978.
- Franco LA & Hamalainen RP. Behavioral Operations Research: Returning to the roots of OR. *EJOR* 249 (2016): 791-95.