

Making Trade-offs Under Risk Explicit

SRAI Executive Pathway | Module 2

Executive presentation

Expected utility • hard constraints • value of information • sensitivity



The executive question

02

When outcomes, risks and stakeholder consequences differ, what should the institution value and how much uncertainty should it accept?

The output is a governed Value Consequence and Risk Profile

The decision is ACCEPT, REVISE or ESCALATE

A favorable average can conceal an unacceptable outcome

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Alternative A

Higher average savings

Small probability of severe service denial

Alternative B

Lower average savings

Lower severe-loss probability

The executive decision needs more than expected money

- Whose value is represented?
- Which harms cannot be traded away?
- Which assumptions reverse the recommendation?

Outcomes, value and utility

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Concept	Meaning	Executive control
Outcome	What may happen under an alternative	Unit, horizon, affected group and source
Value	Why and how much the consequence matters	Whose priorities and obligations apply
Utility	Numerical representation of preferences	Authorized function, range and parameter
Hard constraint	Condition that cannot be compensated	Rights, safety and legal feasibility gate

Confusing these categories creates false objectivity

Expected value is a benchmark

05

$$E[X] = \sum p_i x_i$$

- A probability-weighted average
- Not a guaranteed outcome
- Not automatic authorization

Outcomes

0 50 100

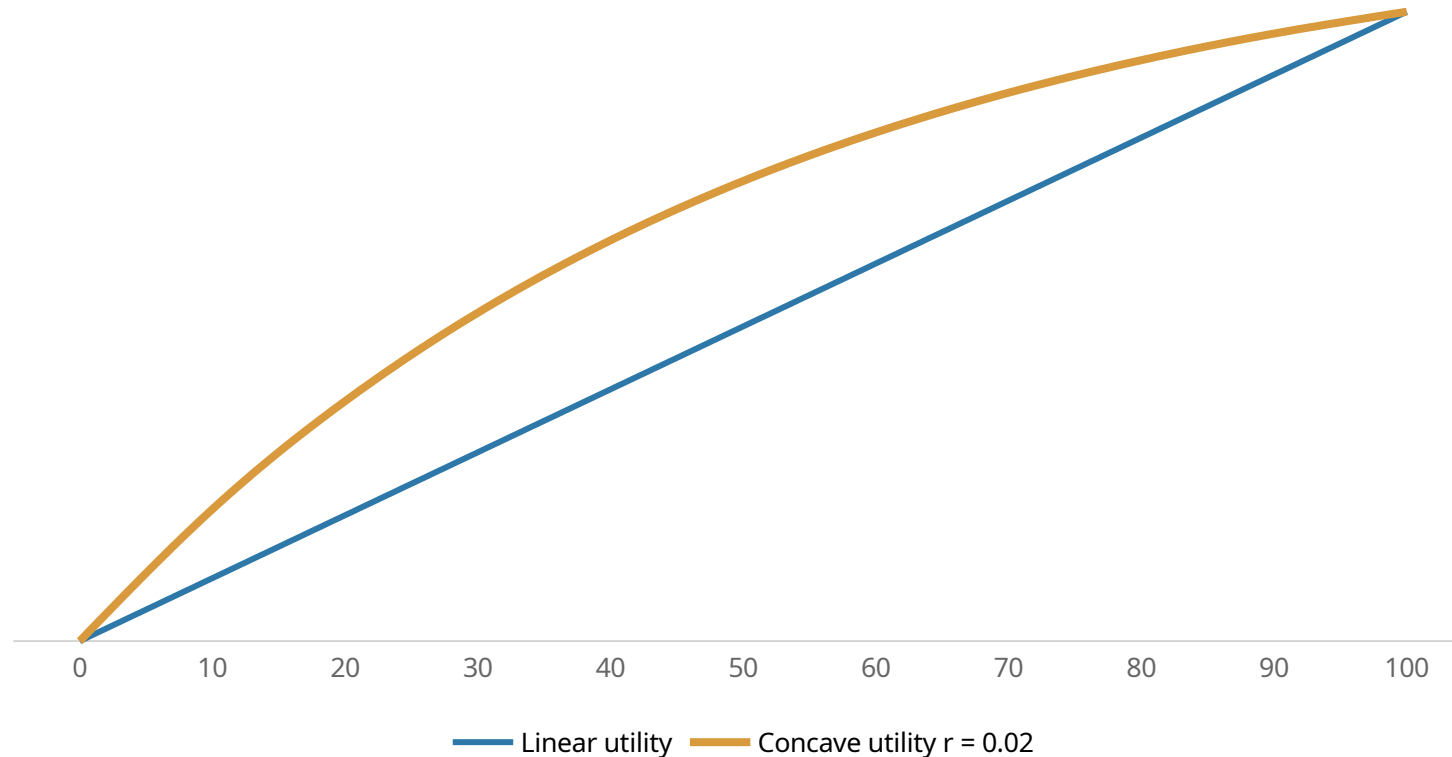
Probabilities

0.20 0.50 0.30

**Expected value =
55**

Utility changes how uncertain outcomes are compared

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Linear

Equal increments in outcome produce equal utility increments

Concave

Diminishing marginal utility represents risk aversion over the declared range

Expected utility is conditional on the complete model

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$$EU(a) = \sum p_i u(x_i)$$

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Alternatives

What can actually be selected

2

Probabilities

Credible uncertainty estimates

3

Consequences

Units, horizons and affected groups

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Utility

Authorized form, range and parameters

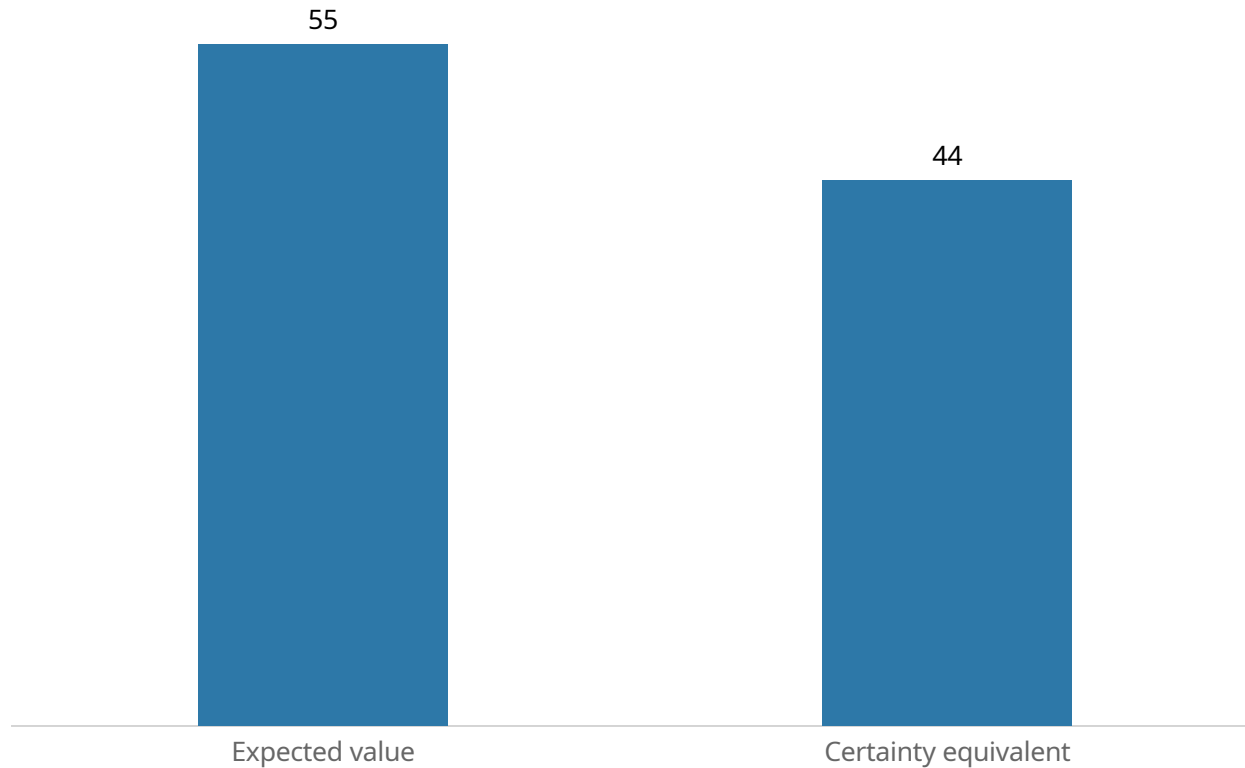
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Constraints

Feasibility before ranking

Certainty equivalent and risk premium

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$$\text{Risk premium} = 55 - 44 = 11$$

The model treats a certain 44 as equivalent to the risky prospect with expected value 55

This is not automatically an insurance price

Authority before arithmetic

A technically fitted curve cannot repair an illegitimate value process

- Name the decision body that owns the value model
- Record affected-group participation and dissent
- Declare the valid range and parameter source
- Use a sensitivity envelope when one curve lacks legitimacy

The analyst calculates implications. The institution owns the decision.

Rights and safety remain outside compensable scoring

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Condition	Treatment	Decision consequence
Legal right	Hard constraint	Reject or escalate
Mandatory safety threshold	Hard constraint	Infeasible until corrected
Material subgroup harm	Disaggregated evidence and review	Revise safeguards or escalate
Ordinary preference trade-off	Utility analysis	Compare transparently and test sensitivity

A high aggregate score cannot erase a prohibited harm

Aggregate results must retain subgroup consequences

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Overall

Positive aggregate benefit

Vulnerable group

Higher denial rate

Show uncertainty, severity, duration and safeguards by group before aggregation

Other groups

Lower denial rate

Information has value when it can change action

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Optimized value with
information

84

Optimized value without
information

76

Gross value

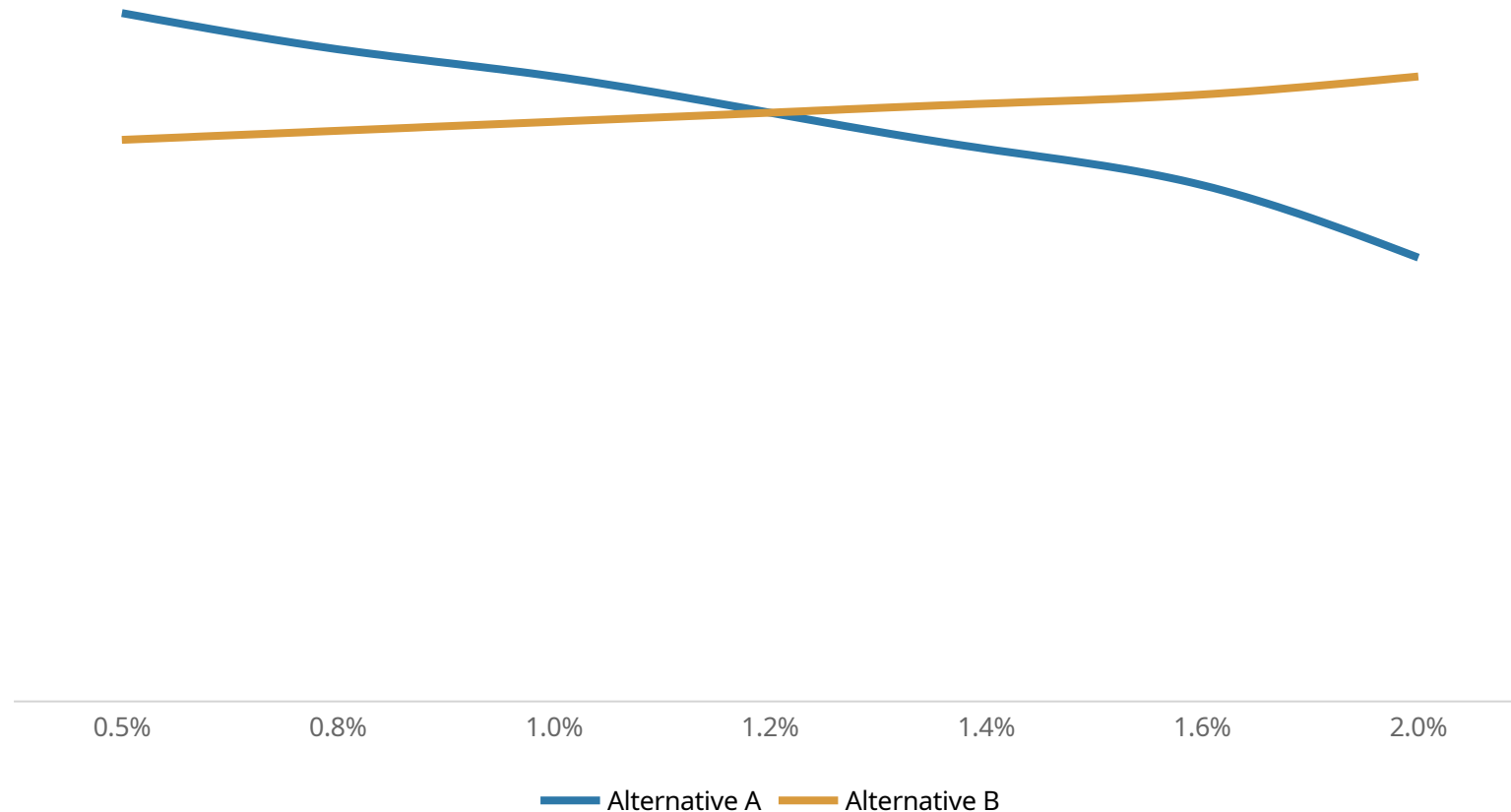
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Net value = 8 – acquisition cost 5 – delay cost 2 = 1

- Can the evidence arrive in time?
- Can the institution act on it?
- Does evidence collection create unacceptable harm?

Sensitivity reveals the assumptions that control the decision

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Ranking reversal

Near 1.2%

If both sides of the threshold are credible, the recommendation is fragile

The Value Consequence and Risk Profile

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- | | | | |
|---|----------------------------------|----|-----------------------------|
| 1 | Decision and alternatives | 6 | Hard constraints |
| 2 | Consequences and affected groups | 7 | Distributional consequences |
| 3 | Value authority | 8 | Information decision |
| 4 | Utility specification | 9 | Sensitivity and reversals |
| 5 | Quantitative comparison | 10 | Authorization and triggers |

One controlled record links the technical model to institutional authority

Decision meanings

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Decision	Use when	Required next step
ACCEPT	Evidence, authority, constraints and sensitivity are adequate	Authorize stated use with review triggers
REVISE	Correctable weaknesses remain	Assign changes, owners and due dates
ESCALATE	Authority, rights, safety or legitimacy cannot be resolved here	Refer to the competent decision level

Incomplete evidence cannot produce ACCEPT

Approval meeting output

- Completed Value Consequence and Risk Profile
- Named approver and recorded dissent
- Review date plus suspension and re-authorization triggers
- Attached calculations, sensitivity output and affected-group evidence

No calculation, score or notebook output substitutes for institutional authorization