

CATALYST

S.Chapel Associates

Stephen W Chapel
Project Manager

Applied Decision Analysis, Inc.

Philip G. Abrahamson
Allen Cohn
Peter A. Morris
Dean M. Murphy

The Brattle Group

A. Lawrence Kolbe

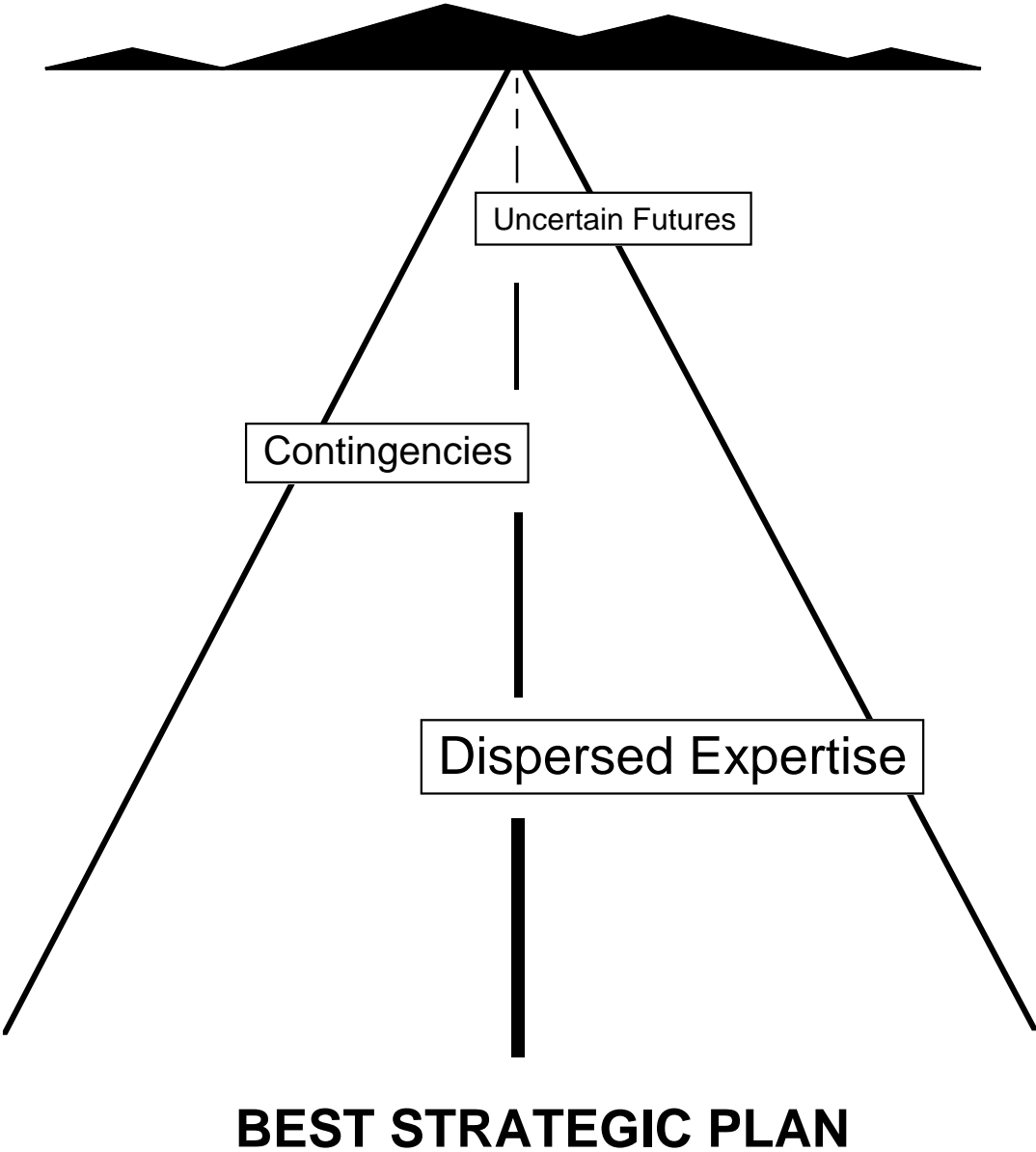
Welcome to CATALYST

CATALYST is

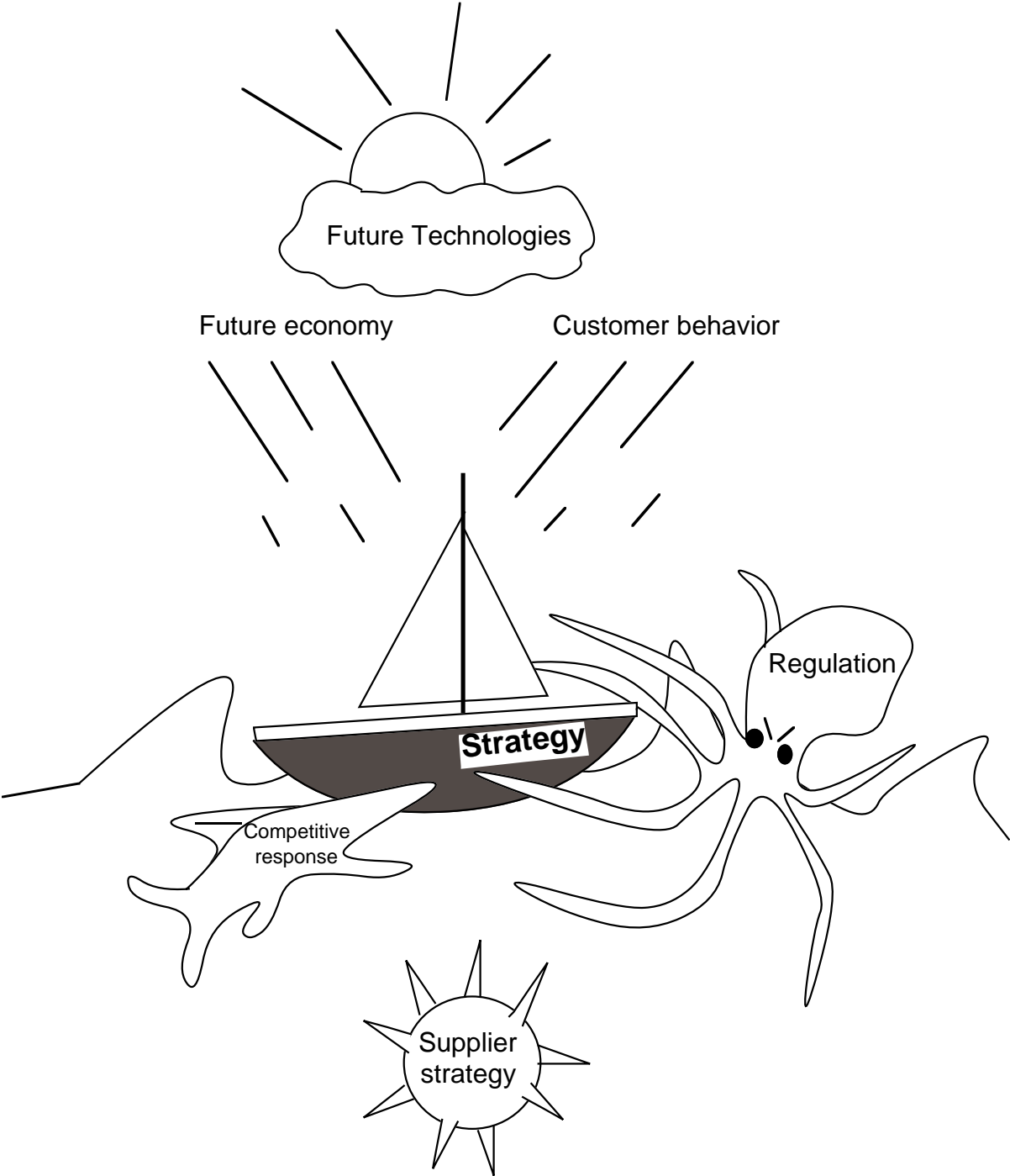
- A process for analyzing complex, high-level decisions
- Typically implemented as a two- or three-day, off-site meeting of key decision makers and analysts

Motivation for CATALYST

CATALYST addresses three key roadblocks to strategic planning:



Examples of Uncertainties



Why Uncertain Futures Hinder Planning

The success of most strategies depends on future events.

So picking the guaranteed best strategy requires knowing the future.

But long-range forecasts of the future are *always* wrong.

So plans based on “the nominal forecast” are risky.

The CATALYST Solution to Uncertain Futures

CATALYST uses the concepts of decision analysis to plan for uncertainty:

- CATALYST recognizes that a range of futures may occur.
- It chooses a strategy that best balances opportunities and risks.

Why the Complexity of Analyzing Contingencies Hinders Planning

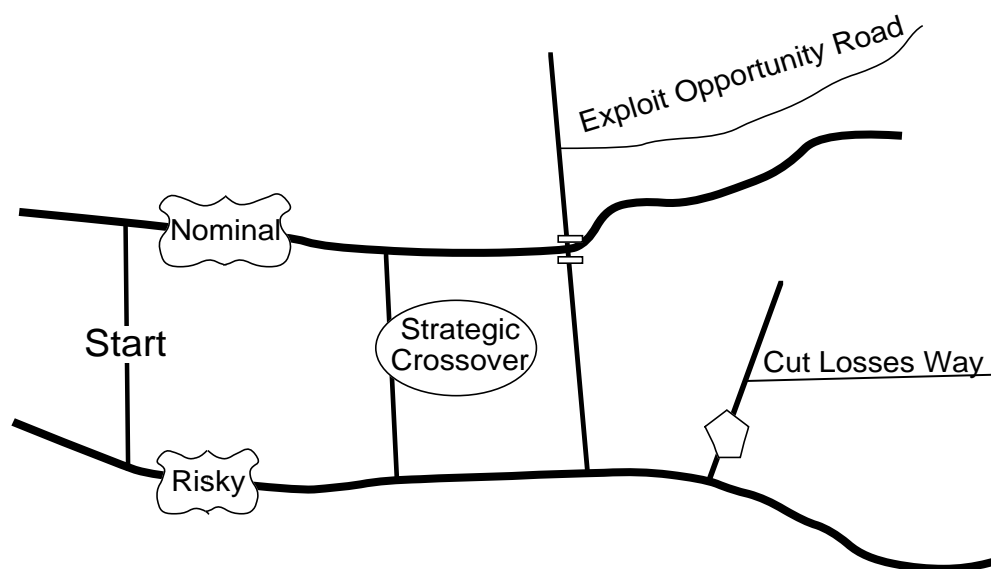
In planning, one tries to pick the strategy that will yield greatest value.

The value of a strategy is affected by its future “off ramps” (contingent actions).

Such off ramps allow a strategy to avoid risks or take advantage of opportunities.

So to choose between strategies, one must consider their many off ramps as well as their main paths.

Strategic Road Map



The CATALYST Solution to Contingency Planning

CATALYST has procedures to

- Plan how each strategy would respond to each contingency
- Include the benefits of the contingency plans when evaluating strategies

This yields

- An accurate comparison of strategies
- A head start on responding to any contingencies

CATALYST goes a step further by

- Asking what additional off ramps would be valuable
- Adding actions that create these off ramps

Why Dispersed Expertise Hinders Planning

The people best equipped to deal with a problem often

- Are very busy
- Work in different buildings, divisions, departments, or operating companies
- Have different opinions and perspectives on the problem
- Have different “languages” for talking about the problem

The CATALYST Solution to Dispersed Expertise

Face-to-face meeting

Off-site

Two- or three-days long

Structured process

Independent facilitator

Group problem-solving techniques

Detail matched to the time available

Benefits of CATALYST

CATALYST's solutions combine to

- Increase understanding of the problem by creating a logical structure for thinking about it
- Illuminate sources of risk and opportunity
- Forge consensus among key decision makers and analysts
- Ease communication of results by providing a common vocabulary and logical structure
- Accelerate decision making

The CATALYST Process

CATALYST is implemented in six stages.

The Strategy-Scenario Matrix summarizes CATALYST's results.

Let's build up a matrix to illustrate the stages.

Strategy-Scenario Matrix

Stage 1: Problem Scoping

Analyze and bound the problem.

Choose the decision criteria.

Brainstorm strategies.

Choose a representative set of candidate strategies.

Strategy-Scenario Matrix

Strategy A	Strategy B	Strategy C	

Stage 2: Uncertainty Identification

Stage 3: Scenario Development

Brainstorm uncertainties.

Identify relationships between uncertainties.

Combine key uncertainties into a representative set of scenarios.

Develop relative likelihoods of scenarios.

	Strategy A	Strategy B	Strategy C	Likelihood
Scenario 1				x%
Scenario 2				y%
Scenario 3				z%
				100%

Stage 4: Strategy Development

Stage 5: Strategy-Specific Risk Analysis

Tell a story about the impact of each scenario on each strategy.

Plan each strategy's response to each scenario.

	Strategy A	Strategy B	Strategy C	Likelihood
Scenario 1	impact & response	_____	_____	x%
Scenario 2	_____	_____	_____	y%
Scenario 3	_____	_____	_____	z%

				100%

These stages often create the most insights and enjoyment.

Stage 6: Evaluation

Quantify strategy value under each scenario.

Compute summary measures.

Make a tentative strategy choice.

Decide if further analysis is worthwhile.

Decide on next steps.

	Strategy A	Strategy B	Strategy C	Likelihood
Scenario 1	impact & response value	_____	_____	x%
Scenario 2	_____	_____	_____	y%
Scenario 3	_____	_____	_____	z%
Average	value	value	value	100%
Range	value	value	value	

End Products of CATALYST

Alternative strategies

Representative set of future scenarios

Contingency plans — each strategy's response to each scenario

Comparison of strategy outcomes across the range of futures

List of next steps: actions and analyses

Structure for further analyses

Structure for communicating results

CATALYST Works by Multiple Passes

Preliminary Pass

Work on strict time limit.

Show where the analysis is going.

Surface issues early.

Pass 1

Complete Stages 1 through 6.

Develop solid analytical foundation.

- Characterize uncertainties.
- Create flexible strategies.
- Produce rough quantification.

Pass 2

Refine analysis.

Role of the Facilitator

To explain the CATALYST process

To guide the session

To listen, explore, clarify, or repeat what participants say

To ask devil's advocate questions

To record and display

To keep group on schedule

Not to provide information about the problem

Not to analyze

Not to form opinions

Not to make decisions

Role of the Participants

To provide expert information and opinions

To provide brainpower and common sense

To listen to each other

To challenge each other

To speak up when confused

To point out recording errors by facilitators

To keep comments brief and on topic

To use No Detail flags

CATALYST Needs Precision

All descriptions created during the session must be precise.

This prevents misunderstandings and aids later stages.

Example

Imprecise: Fuel prices will rise next year.

Precise: West Texas Intermediate crude oil prices will rise 5% next year.

or

Precise: 10% chance West Texas Intermediate crude oil prices up 2%,
80% chance West Texas Intermediate crude oil prices up 5%, and
10% chance West Texas Intermediate crude oil prices up 15%.

The last example shows how one can be precise, but still reflect uncertainty.

Precise Definition of “Strategy”

Strategy Initial actions and a course of contingent actions over time.

Elements of a strategy are directly controllable.

Example Build two 250 MW AFB units on a single site.

Start construction on first unit, but delay second unit until demand reaches 9,000 MW.

Contract for 80% of fuel, buy additional fuel on spot market.

Precise Definition of “Scenario”

Scenario A completely specified possible future state of the world.

Elements of a scenario are not directly controllable.

Example

- | | |
|-----------|--|
| 1993–1994 | Normal conditions
– Peak electricity demand growth 2% per year |
| 1995 | Oil embargo
– Oil prices up 30% |
| 1995–1998 | National economy depressed
– Peak electricity demand growth 0% per year |
| 1999 | Weakening of oil cartel
– Oil prices down 20%
– Peak electricity demand growth 2% per year |

CATALYST Three-Day Agenda

Day 1

Introduction	8:30–9:15 AM
Prob. Descrip. and Background	9:15–10:00 AM
Preliminary Pass	10:00–11:30 AM
Stage 1: Problem Scoping	11:30 AM–Noon
Lunch	Noon–1:00 PM
Stage 1: Problem Scoping	1:00–3:00 PM
Stage 2: Uncertainty Identification	3:00–5:00 PM

Day 2

Stage 3: Scenario Development	8:30 AM–Noon
Lunch	Noon–1:00 PM
Stage 4: Strategy Development	1:00 PM–5:00 PM

Day 3

Stage 4: Strategy Development	8:30 AM–Noon
Lunch	Noon–1:00 PM
Stage 5: Strategy-Specific Risks	1:00–2:00 PM
Stage 6: Evaluation	2:00–4:30 PM
Next Steps	4:30–5:00 PM

CATALYST Two-Day Agenda

Day 1

Introduction	8:30–9:00 AM
Prob. Descrip. and Background	9:00–9:30 AM
Preliminary Pass	9:30–11:00 AM
Stage 1: Problem Scoping	11:00 AM–Noon
Lunch	Noon–1:00 PM
Stage 2: Uncert. Identification	1:00–2:00 PM
Stage 3: Scenario Development	2:00–3:30 PM
Stage 4: Strategy Development	3:30–5:00 PM

Day 2

Stage 4: Strategy Development	8:30 AM–Noon
Lunch	Noon–1:00 PM
Stage 5: Strategy-Specific Risks	1:00–2:00 PM
Stage 6: Evaluation	2:00–4:30 PM
Next Steps	4:30–5:00 PM