DECISION MAKING

5 STEPS TO
BETTER RESULTS

BY HARVARD BUSINESS REVIEW

Contents

FIGURE 1-1

The decision process

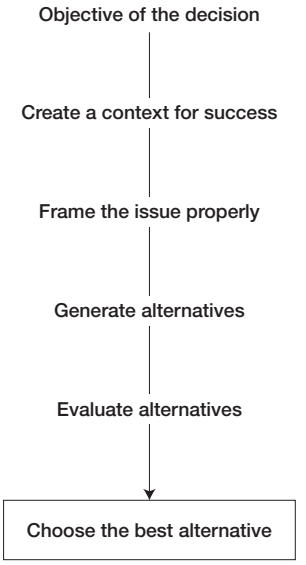


FIGURE 2-1

Task force leaders are members of the decision group

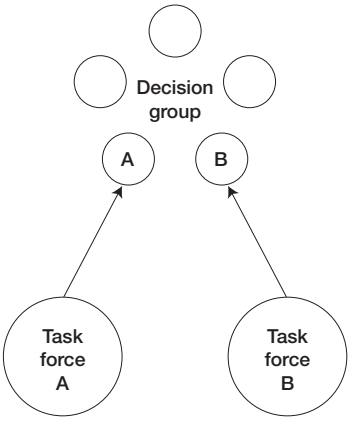


TABLE 2-1

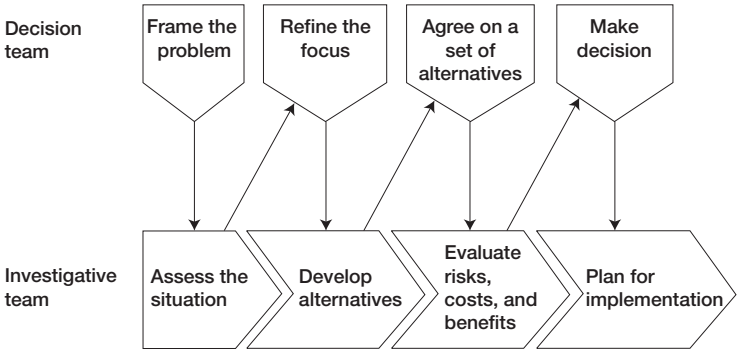
Advocacy versus inquiry

Element	Advocacy	Inquiry
Concept of decision making	A contest	Collaborative problem solving
Purpose of discussion	Persuasion and lobbying	Testing and evaluation
Participants' roles	Spokespeople	Critical thinkers
Patterns of behavior	• Persuade others	• Present balanced arguments
	• Defend your position	• Remain open to alternatives
	• Downplay weaknesses	• Accept constructive criticism
Minority views	Discouraged or dismissed	Cultivated and valued
The outcome	Winners and losers	Collective ownership

Source: David A. Garvin and Michael A. Roberto, "What You Don't Know About Making Decisions," *Harvard Business Review*, September 2001, 110. Reproduced with permission.

FIGURE 2-2

The dialogue decision process



Source: David Matheson and Jim Matheson, *The Smart Organization* (Boston: Harvard Business School Press, 1998), 178. Adapted with permission.

TABLE 5-1

Net present value example (in thousands of dollars)

Year	0	1	2	3	4	5
Cash flows	–250	+70	+70	+70	+70	+70
PV at 10% discount rate	–250	+63.63	+57.82	+52.57	+47.81	+43.47

NPV = 15.3 (or $15,300)

TABLE 5-2

The prioritization matrix

Alternative	Increase profits (4)	Maintain low customer costs (3)	Implement quickly (2)	Use few internal resources (1)	Total score
Alternative A	$9 \times 4 = 36$	$2 \times 3 = 6$	$7 \times 2 = 14$	$2 \times 1 = 2$	58
Alternative B	$2 \times 4 = 8$	$9 \times 3 = 27$	$8 \times 2 = 16$	$3 \times 1 = 3$	54

Source: Harvard ManageMentor® on Making Business Decisions, adapted with permission.

TABLE 5-3

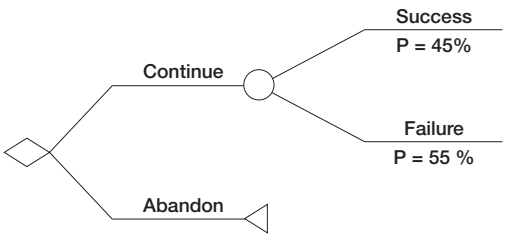
Trade-off table

Alternative	Profits	Customer costs	Time to implement	Internal resources
Alternative A	Profits increase by $100,000	Cost to customer increases by $1 per unit	6 months to implement	20 people required
Alternative B	Profits increase by $10,000	Cost to customer increases by $0	4 months to implement	15 people required

Source: Harvard ManageMentor® on Making Business Decisions, adapted with permission.

FIGURE 5-1

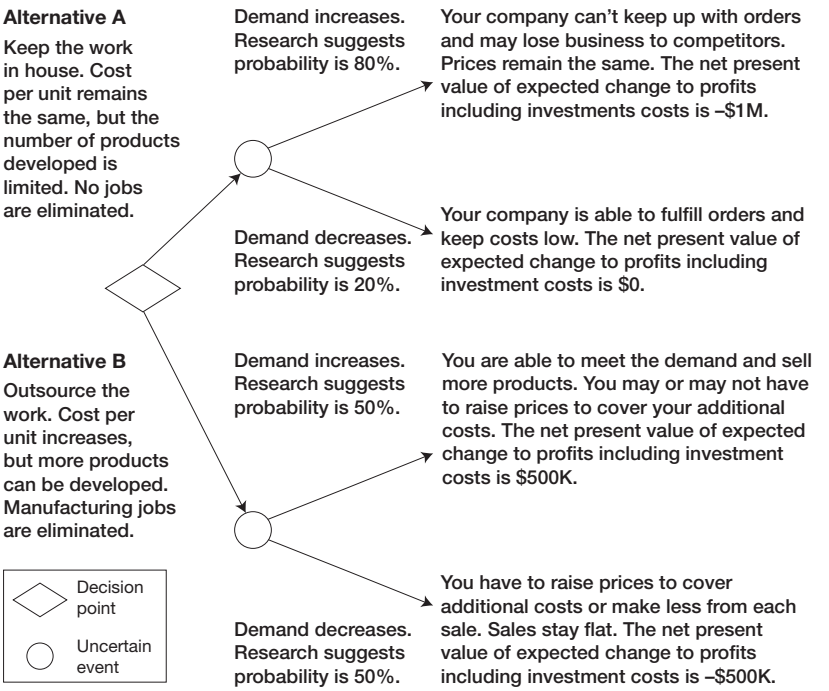
Basic decision tree



Source: George Wu, "Decision Analysis," Note 9-894-004 (Boston: Harvard Business School, revised December 4, 1997), 6. Adapted with permission.

FIGURE 5-2

Expanded decision tree



Source: Harvard ManageMentor® on Making Business Decisions, adapted with permission.

FIGURE 6-1

Catchball

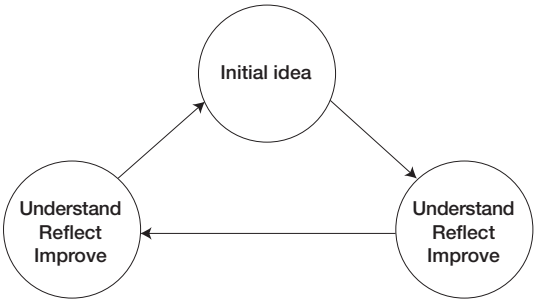


TABLE 7-1

Listing of uncertainties

Risk	Alternative A	Alternative B	Alternative C
First-year unit sales	35,000–75,000	40,000–70,000	70,000–80,000
Net unit sales revenue	$15–$20	$15–$20	$12–$15
Manufacturing cost per unit	$6–$6.50	$5–$8	$5–$6
Time to commercialize	8–12 months	10–12 months	4–6 months

FIGURE 7-1

Probabilities are cumulative

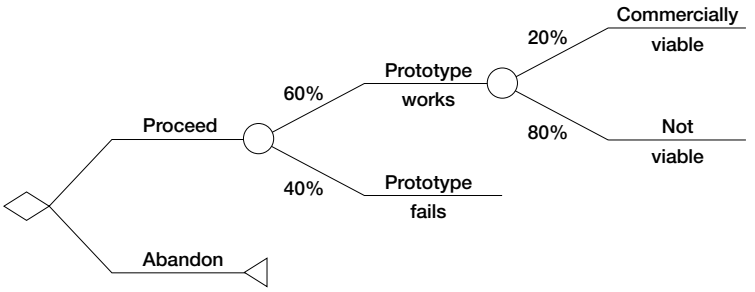


TABLE 7-2

Range of impacts on revenue

Range	Alternative A	Alternative B	Alternative C
Low	35,000 units × $15 per unit = $0.525 million	40,000 units × $15 per unit = $0.6 million	70,000 units × $12 per unit = $0.84 million
High	75,000 units × $20 per unit = $1.5 million	70,000 units × $20 per unit = $1.4 million	80,000 units × $15 per unit = $1.2 million
Revenue estimates (millions)	$0.525–$1.5	$0.6–$1.4	$0.84–$1.2

FIGURE 7-2

Staged decision approach

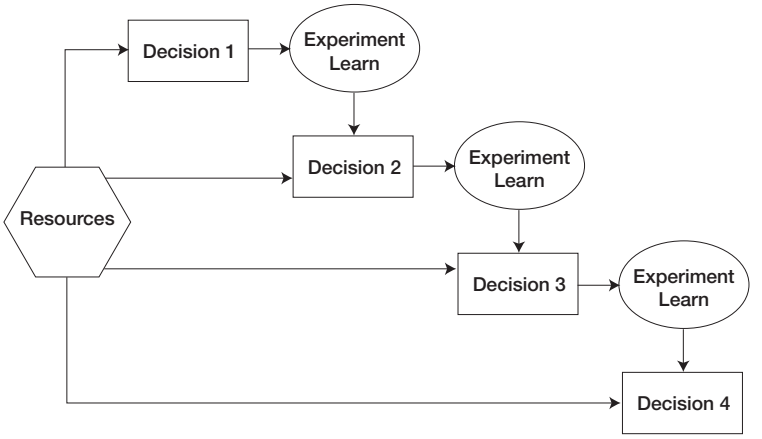


FIGURE 7-3

A stage-gate system

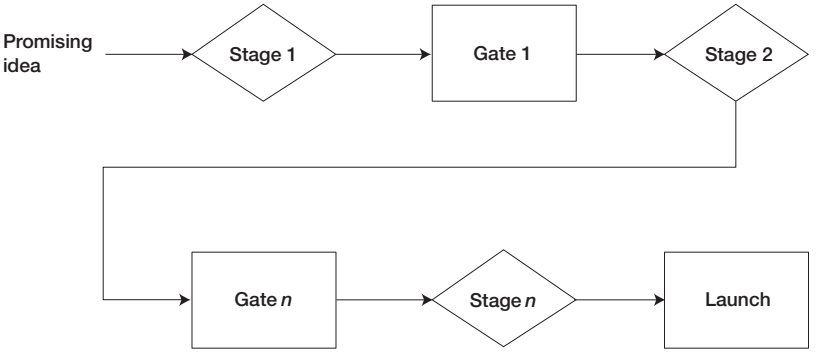
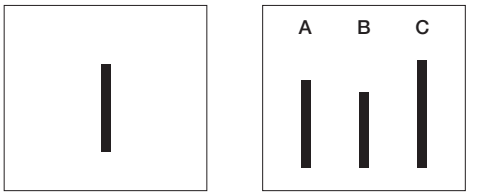


FIGURE 9-1

Asch's cards



Card 1 Card 2

APPENDIX A

Useful Implementation Tools

This appendix contains two worksheets you may find useful. Both are adapted from Harvard ManageMentor®, an online product of Harvard Business School Publishing. "The Ten Worst Things That Could Happen List" can be downloaded without charge from the Harvard Business Essentials series Web site: www.elearning.hbsp.org/businesstools. You can freely access this and other worksheets, checklists, and interactive tools found on that site.

1. **Stage-Setting Worksheet (figure A-1)** Use this worksheet to think through how you will approach the decision-making process.

2. **The Ten Worst Things That Could Happen List (figure A-2).** Some managers find it helpful to create and have available a list of the ten worst things that could happen at work and what they would do about them. Use this to record your own list, or have a team or work group develop its list.

FIGURE A-1

Stage-setting worksheet

Use this worksheet to think through how you will approach the decision-making process.

Description of decision

Describe a decision that you and your group needs to make:

Participants

List the names and roles of the people you will include in your decision-making group. Identify key stakeholders, experts, and opponents (individuals who may oppose the decision or block its implementation).

Time

How much time is available to make this decision? Does the decision need to be made by a specific date?

Setting

Where will you meet? (If possible, consider using a location that is different from your usual meeting place.)

Decision-making approach

Which approach will you use to make the decision: consensus, majority vote, qualified consensus, directive leadership, or a combination? (Consider the importance and implications of the decision. You may need to reserve the final decision for yourself.)

How will you make the choice if the group reaches an impasse?

Climate

List some questions you might ask to encourage debate:

1.
2.
3.
4.

Anticipate some positions on the proposed courses of action that are up for decision.

How will you strike a balance between advocacy- and inquiry-based debate?

Source: Harvard ManageMentor® on Making Business Decisions, adapted with permission.

FIGURE A-2

The ten worst things that could happen list

Some managers find it helpful to create and have available a list of the ten worst things that could happen at work and what they would do about them. Use this tool to record your own list or have a team or work group develop their list.

Situation	What I/we would do about it
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Source: Harvard ManageMentor® on Crisis Management, adapted with permission.

APPENDIX B

Financial Tools for Evaluating Alternatives

Business decisions are often driven by financial concerns.

> Should we continue operating our U.K. distribution center, or should we outsource that activity to a supplier?
>
> How long will it take to recoup our investments in alternatives A and B?
>
> Product A and product B are both attractive alternatives for our company, but how many units must each of them sell before we start making money? Which represents the greatest long-term value and rate of return for our company?
>
> It appears that replacing the heating system in our Chicago headquarters makes economic sense, given projected energy costs. But what if energy costs rise only 5 percent, and not the 10 percent you've projected?
>
> What are the rates of return on the three alternatives you've identified?

This appendix explains tools you can use to answer questions like these by means of the following:

- Return on investment
- Payback period
- Net present value (NPV)

- Internal rate of return (IRR)
- Breakeven analysis
- Sensitivity analysis

Return on Investment (ROI) and Payback Period

Returns from an investment can take the form of cost savings, incremental profit, or appreciation in value. To calculate the net return from an investment, simply subtract the total cost of the investment from the total benefits. To calculate the ROI—the ratio of the net return to the cost of the investment—divide the net dollar amount of the return by the total cost of the investment.

Essentially, ROI is a means of comparing returns on money a company spends internally with returns available elsewhere. Generally speaking, an investment's ROI should be reasonably high—more than the company could expect to get by investing, for example, in government bonds.

Let's suppose that the new $100,000 computer-controlled lathe that you are considering would enable the company to save $18,000 per year over the lifetime of the machine, which is estimated to be seven years. The total savings would thus be $126,000, making a net return of $26,000 ($126,00 – $100,000). Applying the formula—$26,000/$100,000—the ROI for the investment is a very attractive 26 percent.

However, companies also want to know the payback period: how long it will take an investment to pay for itself. We already know that the lathe is expected to save you $18,000 a year. To determine the payback period, divide the total amount of the investment by the annual savings expected. In this case, $100,000/$18,000 = 5.56. In other words, the lathe will pay for itself in 5.56 years. Table B-1 provides a year-by-year illustration.

Note that you will not truly begin to reap the benefits of the investment for more than five years. But what if the life-span estimates are wrong, and the extruder wears out after five years? The invest-

TABLE B-1

Cumulative annual savings

Year	Savings	Cumulative savings
1	$18,000	$18,000
2	$18,000	$36,000
3	$18,000	$54,000
4	$18,000	$72,000
5	$18,000	$90,000
6	$18,000	$108,000
7	$18,000	$126,000

ment now appears to be a loser; the company will not even recoup its initial investment.

As analytical tools, ROI and payback period have several benefits:

- They're easy to convey to upper management.
- They remind everyone that wise expenditures pay off financially.
- They adopt a long-term perspective.
- They help you compare various options.

However, there is a drawback to both methods: they ignore the time value of money. Time value is reflected in more sophisticated financial tools: net present value and internal rate of return.

Net Present Value

Net present value (NPV) was introduced in its simplest form in chapter 5; its treatment is expanded here. This analytical tool can be complicated. Because most calculators and spreadsheet programs can make these calculations for you, we'll dispense with the underlying math.

To begin, let's look at the principle that underlies both methods: the time value of money. In effect, this principle states that a dollar you receive today is worth more than a dollar you will receive in the future. The reason? Even assuming no inflation, the dollar you receive today can be invested to earn a return over the remaining years; the same cannot be said for a dollar received five years from now.

For example, consider $1 received today and another $1 received exactly five years from today. Which is more valuable in your view? If you received $1 today and invested it in a money market account with daily compounding interest at 5 percent per year, that dollar would be worth $1.28 at the end of five years. If you waited five years to collect your $1, you'd be $0.28 behind. Conversely, $1.28 received five years from today (a future value) is the equivalent of $1 received today (a present value) when discounted at 5 percent per year.

This time-value concept can be applied widely in business. For example, in evaluating a new business opportunity, you must analyze the cash flow you expect it to provide at various points in the future. But to perform that analysis, you must devise a method for expressing future dollars in terms of present dollars. That's what net present value and internal rate of return calculations allow you to do.

Let's say that your company expects a new product line of wooden coat racks to start generating $60,000 in annual profit beginning one year from now and continuing for the succeeding five years. The questions for the company can thus be phrased as follows: Given this expected profit stream and the $250,000 up-front cost required to produce it, is a new line of coat racks the most productive way to invest the initial $250,000? Or would you be better off investing it in something else?

A net present value (NPV) calculation begins to answer this question by recognizing that the $300,000 in profit ($60,000 per year over five years) that you expect to receive over five years is not worth $300,000 in present dollars; because of the time value of money, it is worth less than that. That future sum of $300,000 must be discounted before it can be expressed accurately in today's dollars. How much it

is discounted depends on the rate of return you could reasonably expect to receive had you chosen to put the initial $250,000 investment into something other than the line of coat racks (but similar in risk) for the same period of time. This rate of return is often called the discount rate. In our example, let's assume a discount rate of 6 percent.

The NPV function on your calculator or spreadsheet takes into consideration your initial investment, your yearly cash flow (in this example, profit), your discount rate, and the number of years over which you will receive cash flows. If the resulting NPV is a positive number and if no other investments are under consideration, the investment should be pursued. In our case, the NPV for the line of coat racks is $2,587, a number that suggests it would be an attractive investment.

But what about an alternative investment your company is considering (and good decisions demand that you consider alternatives)? You are still considering the purchase of the $100,000 computer-controlled lathe described earlier. That investment is forecast to produce cost savings of $18,000 each year for seven years into the future. When discounted at 6 percent, this cash flow stream has an NPV of $456, which is just barely positive. When we compare NPVs for the two investments, we see that both are positive, but the one for the coat racks is greater. If you can afford only one of these investments, you should go with the new line of coat racks and put the new lathe investment on hold.

Here we should emphasize the effect of the discount rate on NPV. Suppose the discount rate were 10 percent instead of 6 percent: in that case, the NPV for the lathe would be –$11,244. The lathe would go from being a modestly attractive investment to being a very poor one.

Notice something else about the NPV calculation for the new line of coat racks: even with a 6 percent discount rate, the NPV is far less optimistic than the rosy 26 percent ROI forecast. The point here is that although it's much more difficult to perform (and explain), the NPV analysis results in more sophisticated, more comprehensive evaluations of investment alternatives.

Internal Rate of Return

The internal rate of return (IRR) is another tool that managers can use in evaluating alternatives. It is defined as the discount rate, the rate at which the NPV of an investment equals zero. Typically, when the IRR of one alternative is greater than the expected return of another, the one with the higher IRR should be undertaken.

What's a reasonable rate of return for a business to expect on an investment? Typically, it's well above what it could get on a risk-free investment, such as a Treasury bond. In many instances, companies will set a hurdle rate: a minimal rate of return that all investments are required to achieve. In such instances, the IRR of the investment under consideration must exceed the hurdle rate in order for the company to go forward with it.

Breakeven Analysis

Breakeven analysis is another method that people use when evaluating alternatives. It is useful when you are considering an investment that will enable you to sell something new or to sell more of something you already make. It indicates how much (or how much more) you must sell in order to pay for the fixed investment—in other words, at what point you will break even. With that information in hand, you can look at market demand and competitors' market shares to determine whether it's realistic to expect to sell that much.

In more precise terms, the breakeven calculation helps you determine the volume level at which the total contribution from a product line or investment equals the total fixed costs of producing it. But before you can perform the calculation, you need to understand the components that go into it: contribution, fixed cost, and variable cost.

Contribution is defined as unit revenue minus variable costs per unit; it's the sum of the money available to contribute to paying fixed costs. Fixed costs are items such as insurance, management salaries, rent, and product development costs—items that stay pretty much the same no matter how many units of a product or service are sold. Vari-

able costs are those expenses that change depending on how many units are produced and sold; examples include labor, utility costs, and raw materials.

With these concepts, we can understand the calculation:

1. Subtract the variable cost per unit from the selling price; this equals the unit contribution.
2. Divide total fixed costs, or the amount of the investment, by the per-unit contribution.
3. The quotient is the breakeven volume, expressed as the number of units that must be sold in order for all fixed costs to be covered.

Let's look again at the proposed computer-controlled lathe. Suppose each item produced by the lathe sells for $75, and the variable cost per unit is $22. Here's the breakeven calculation:

$75 (unit price) – $22 (variable cost per unit)
= $53 (unit contribution)

$100,000 (fixed cost) / $53
= 1,887 units (the breakeven volume)

At this point, you must decide whether the breakeven volume is achievable: Is it realistic to expect to sell 1,887 additional hat racks, and if so, how quickly? Note that this volume must be incremental: because you have been producing this type of product all along and the lathe simply represents a way to improve the production process, the compensating sales volume must be above and beyond current sales volume.

The Harvard Business Essentials Web site has a free interactive software tool you can use to run your own breakeven analyses. It was initially created for the finance module of the Harvard ManageMentor® online publication. To access this tool, just go to www.elearning.hbsp.org/businesstools and look for the tools listed with the book titled *Finance for Managers*. And while you are at the site, check for any other downloads that might be useful to you and your business.

Appendix B

Sensitivity Analysis

Sensitivity analysis is a technique used to assess the financial impact, as measured by net present value (NPV), of changes in key parameters of a decision alternative. You conduct sensitivity analysis by identifying the important uncertainties and then setting up best-case and worst-case scenarios for each. The NPV for these scenarios is then calculated.

For example, in the case of your new line of coat racks, several of the key parameters may be highly uncertain: the number of units that you can sell in a year and the selling price per unit. Any surprises here are bound to have a major impact on the NPV of the new product. In almost all cases, you can model these scenarios in an electronic spreadsheet. This approach makes it easy to run the numbers by simply changing one variable at a time.

Glossary

ADVOCACY APPROACH In decision making, a mode of behavior in which individuals argue in favor of their positions without considering the needs of other departments or the company as a whole. Advocates typically support their positions with favorable data and assumptions while omitting contrary data.

ANALOGY An inference that if two or more things in a new situation match what we experienced in the past, they will probably match in other respects.

ANCHORING A negotiation tactic that attempts to establish an initial position around which negotiations will take place. In the right circumstances, the first person to put a price on the table establishes a psychological anchor point around which discussion and counteroffers will take place.

CATCHBALL A cross-functional method for improving ideas and promoting buy-in among participants. An initial idea is "tossed" to collaborators for consideration. Whoever "catches" the idea assumes responsibility for understanding it, reflecting on it, and improving it in some way. That person then tosses the improved idea back to the group, where it is again caught and, hopefully, improved still further.

CONFIRMING-EVIDENCE BIAS A common bias that encourages people to seek out evidence that supports their point of view while discounting or dismissing contrary evidence.

CONTEXT The environment of interpersonal relationships and behaviors within which ideas and data will be considered and decisions will be made.

DECISION TRAPS Human biases that cause smart people to make poor choices. These include anchoring, overconfidence, confirming-evidence bias, and false analogies.

EVEN SWAP An alternative that is equal in value to one or more other alternatives in a trade-off.

FRAME A mental window through which we view reality or a particular problem.

GROUPTHINK A mode of thinking that afflicts highly cohesive groups whose members strive for unanimity to the point of overriding a realistic appraisal of alternative courses. People afflicted by groupthink are driven toward a convergent view less by objectivity than by social psychological pressures. In doing so, they inadvertently curtail critical thinking and debate and exclude information that conflicts with the group's view.

HYBRID ALTERNATIVE A new alternative formed from the best features of other choices.

INQUIRY APPROACH In decision making, an open process in which individuals ask probing questions, explore different points of view, and identify a wide range of options, with the goal of reaching a decision that the group creates and owns collectively.

INTELLECTUAL WATCHDOG A decision technique which begins by dividing the decision team into two groups. One group then asked to critique and ask for improvement in the other group's decision.

INTUITION The mental process of assessing situations and forming conclusions without the intervention of factual information or analysis. Many believe that what we call intuition is based on memories, pattern recognition, experience, conditioning, and long-held personal biases.

NET PRESENT VALUE (NPV) The present value of one or more future cash flows minus any initial investment costs.

PAYBACK METHOD A method of financial analysis that calculates how long it will take an investment to pay for itself.

POINT-COUNTERPOINT A process of iterative decision improvement involving two groups. One group proposes a decision and includes its reasoning, supporting information, and key assumptions; that proposal is then presented to the second group, whose job is to identify one or

more alternative plans and then present those to the first group. The two groups then debate the proposals until everyone agrees on a decision.

PRESENT VALUE (PV) The monetary value today of a future payment discounted at some annual compound rate.

PRIORITIZATION MATRIX An evaluation method used to compare how well various alternatives achieve an objective. It uses weighted scores to rank each alternative; the alternative with the highest score is most likely your best choice.

REFERENCE CLASS FORECASTING A method that requires forecasters to (1) identify a reference class of analogous past projects, (2) determine the distribution of outcomes for those projects, and (3) place the project being considered at an appropriate point along that distribution.

STAGE–GATE SYSTEM An alternating series of development stages and assessment gates that aims for early elimination of losing ideas and faster time to market for potential winners.

SUNK COSTS Investments of time or money that cannot be recovered.

TRADE–OFF TABLE A method for comparing the important attributes of alternatives.