

How Decision Makers Evaluate Alternatives and the Influence of Complexity

Author(s): Paul C. Nutt

Source: *Management Science*, Aug., 1998, Vol. 44, No. 8 (Aug., 1998), pp. 1148-1166

Published by: INFORMS

Stable URL: <https://www.jstor.org/stable/2634692>

REFERENCES

Linked references are available on JSTOR for this article:

https://www.jstor.org/stable/2634692?seq=1&cid=pdf-reference#references_tab_contents

You may need to log in to JSTOR to access the linked references.

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <https://about.jstor.org/terms>



INFORMS is collaborating with JSTOR to digitize, preserve and extend access to *Management Science*

JSTOR

How Decision Makers Evaluate Alternatives and the Influence of Complexity

Paul C. Nutt

Fisher College of Business, The Ohio State University, Columbus, Ohio 43210

The evaluation of alternatives during organizational decision making was investigated to uncover evaluation tactics used by decision makers and how these tactics and complexity influenced success. Evaluation tactics that relied upon subjective, judgmental, bargaining, and analytical inferences were uncovered from 317 strategic decisions. The complexity of these decisions was measured by the numbers of alternatives considered, number of criteria used, and perceived difficulty of the evaluation task to identify conditions under which the evaluation tactics were successful. The managerial implications of evaluating alternatives with the tactics that used judgmental, bargaining, analytical, and subjective inferences under different levels of complexity are discussed.

(Decision Making Process; Evaluation; Complexity)

Introduction

Decision making is thought to unfold as a nonlinear process in which managers gather intelligence, set directions, uncover and evaluate alternatives, and implement a favored alternative (Cyert and March 1963, Mintzberg et al. 1976, Nutt 1984). There has been little research into how managers go about evaluating alternatives and the success of these practices. A study of evaluation practices is valuable because it provides a window to picture desirable or "best practices" and how practices could be improved. Such a study should address several questions. First, can "evaluation tactics" be identified from the evaluation practices of managers? Second, can these tactics be linked to evaluation approaches noted in the literature? Third, how successful are these evaluation tactics? Fourth, does decision complexity prompt the use of particular evaluation tactics and influence their success? To conduct such a study, actual decisions were needed to get the researcher close to the phenomena of interest: the evaluation practices of strategic decision makers, the complexity of the task, and decision outcomes. A case study approach was applied to uncover what decision makers do to evaluate alternatives, determine the difficulty of making each evaluation, and identify outcomes.

Statistical analysis was then used to link decision outcomes to these practices and conditions.

The Evaluation of Alternatives During Strategic Decision Making

Studies of decision making suggest that decision makers evaluate alternatives to pave the way for implementation (Mintzberg et al. 1976, Nutt 1984, Bryson and Cullen 1984). Evaluation is carried out for political and pragmatic reasons (Pfeffer 1992). Organizational politics call for decision makers to have well-conceived arguments should higher-ups question their actions and pragmatics call for decision makers to look for the best course of action (Starbuck 1983). Complexity would seem to influence how this is done (March 1994).

Mintzberg et al. (1976) found that decision makers select among alternatives by using judgment, bargaining, or analysis approaches. *Judgment* was used when decision makers applied their intuition to select among courses of action without explaining (or being able to explain) their reasoning or rationale. *Bargaining* had parties to the decision reach a consensus. Decision makers who carried out factual evaluations applied *analysis*.

Judgment was used frequently in these cases, and analysis infrequently. Bargaining was limited to situations that required the support of powerful stakeholders. Nutt (1984) examined 78 decisions and found evaluation practices that could be linked to Thompson's (1967) computational, compromise, and judgment approaches. Most (93 percent) of the decisions applied judgment to evaluate alternatives. Compromise (bargaining) was used in 4 percent of these decisions, and a computational (analytical) approach in 3 percent of the decisions. These studies suggest that the evaluation of alternatives relies upon judgment.

Several research issues merit attention. First, descriptions of the evaluation practices of decision makers need sharpening. Past studies (e.g., Mintzberg et al. 1976, Nutt 1984) have isolated tactics, such as judgment, from macro descriptions of decision processes. Delving into the details of the approaches used to evaluate alternatives may yield new insights into how tactics, such as judgment, are carried out, uncover additional tactics, and offer important qualifications. By offering more clarity, the link of practice to the normative literature (e.g., Janis 1989) can be explored. Second, decision-making research seldom measures success. The use of judgment and bargaining was recommended without empirical evidence of success. Third, decision-making research seldom considers how situational factors, such as complexity, influences tactic selection and tactic success. Finally, decision making research rarely examines enough decisions to make inferences, raising questions about the generalizability of the findings offered by these studies. A larger data base of decisions may tease out new insights into evaluation practices and their success.

The practices used to evaluate alternatives may lead to good or bad outcomes because of their features, or because circumstances made success more or less likely (Cohen et al. 1976, Brunsson 1982). A key factor is complexity (Alexander 1979, Bryson and Cullen 1984, Nutt 1989, Eisenhardt and Zbaracki 1992), which prompts difficult decisions. A decision would seem more complex when the technical difficulty of the evaluation task increases or when perceptions of difficulty are present. *Technical difficulty* grows as the number of alternatives and the number of criteria increase (Bryson and Cullen 1984). This has prompted Vroom and Yetton (1976), Nutt (1989), and others to develop con-

tingency frameworks that match evaluation approaches to features of the evaluation task. However, this stream of research has not considered the size of the evaluation task (numbers of alternatives and criteria) and measured its effect.

Perceived difficulty stems from an evaluation task that appears daunting to a decision maker. Bryson and Cullen (1984) identify two key features that make up perceived difficulty. An evaluation would be viewed as difficult when decision makers fail to see how they can assess the alternatives, even though a procedure may be clear to others (Thompson 1967). Decisions with political overtones arising from conflict among key players, objections to making proposed changes, historical battles, and the like would also create decisions with high perceived difficulty (Brunsson 1982, Starbuck 1983).

An indicator of "perceived difficulty" was constructed from beliefs about the political situation surrounding a decision and the procedural difficulty of making an evaluation. When evaluation steps must be discovered by a decision maker, the evaluation of alternatives would seem procedurally difficult. If steps were clear at the outset, perceived procedural difficulty would be low. When opposition is present, the decision would appear to be politically difficult and less likely to succeed. When opposition is missing, political difficulty would seem to ease. Perceived political difficulty and perceived procedural difficulty can be combined to identify four types of perceived complexity that can surround a decision. "Understood" decisions lack both political and procedural difficulty and thus would seem to have the least complexity. "Complicated" decisions would appear to be more complex because an appropriate evaluation approach must be found. In discouraged decisions, forces are at work to oppose the changes a decision would bring. Any plan of action suggested by a strategic choice would require compelling evidence of workability to be accepted. Evaluation would have to provide particularly convincing arguments to overcome this opposition, making this decision seem more complex than the "complicated" type. In a "blocked" decision, both opposition and perceived difficulty are present. Opposition makes it essential to construct compelling arguments that support a favored alternative. Because decision makers have yet to find an approach that can differentiate among the alternatives according

to merit, arguments that support a favored alternative would be difficult to construct.

A decision maker's perceived complexity would increase with a shift from understood decisions to complicated decisions, complicated to discouraged decisions, and discouraged to blocked decisions. As perceived complexity increases, decision makers seem more apt to use shortcuts to cope with unmanaged uncertainty and ambiguity (Nutt 1989). This could explain why judgment was observed so often in past studies. If so, judgment is a consequence of complexity and not necessarily a desirable way to evaluate alternatives.

Research Methods

A database made up of 317 strategic decisions was examined to determine how indicators of complexity influence the use of evaluation tactics and their success. The decisions in the database had comparable numbers of profit (41 percent) and not-for-profit (59 percent) organizations. The decisions were drawn from public, private, and third sector organizations, with a single decision taken from each organization. Organizations were medium to large in size, and none was a new start up, suggesting that all had a history of successful operation. All the types of decisions identified by Hickson et al. (1989) were included in the database. These include decisions involving technology (18 percent), controls (14 percent), products or services (30 percent), personnel policy (5 percent), support services (18 percent), reorganizations (9 percent), and domains (4 percent). This diversity of decision types and organizations demonstrates the range of decision-making practice contained in the database. Data were collected using interviews and questionnaires. Two-thirds of the primary informants (the strategic decision makers) were top executives (CEOs, COOs, or CFOs). The secondary informants were line managers, subordinate to the primary informant, in 57 percent of the decisions; a staff person in 35 percent of the decisions, and a task force member in 8 percent of the decisions.

Creating the Database of Decisions

To ensure interest and first-hand knowledge, the contact person was asked to select a decision. The contact person was then asked to identify three people involved in the decision who could be interviewed, including the

person who had primary responsibility for the decision. In most cases, the contact person suggested a strategic decision for which he/she was responsible and became the primary informant.

The Interview Procedure. Two informants were interviewed to uncover the steps taken in each strategic decision. To initiate the interview, the primary informant was asked to describe the decision. Then the informant was asked to recall what first captured his or her attention. Questioning proceeded from this point by asking "what happened next." For example, after informants described what captured their attention, they were asked why this seemed important and merited action. Information gleaned from the other informant was used to corroborate information obtained from the primary informant and to triangulate. (Lincoln and Guba 1985).

Triangulating the responses of multiple informants was undertaken to improve reliability and to increase the prospect that responses were truthful (Lincoln and Guba 1985). A narrative was prepared that described the decision and the steps taken as recalled by each informant. The informants reviewed the narrative and made changes that they believed were warranted. Also, documents such as notes, proposals, or files that still existed were reviewed. A comparison of existing documents (when available) and the narratives identified inconsistencies and gaps in the "story" that depicted a decision. These inconsistencies and gaps were explored in a follow-up interview with the primary informant (the decision maker). In this interview, attempts were made to reconcile differences and fill in gaps. Thus, method and two types of informant triangulation were used to test the reliability of each narrative. A one-page summary, listing all decision-making steps, was prepared for each of the 317 decisions considered in the study before the research effort reported in this paper was undertaken.

Identifying Evaluation Practice. For this study, the author examined each decision summary, looking for actions taken to choose among alternatives. The author reviewed the summaries, looking for evaluation practices, classifying them according to type. Classification was then repeated, with the author working back and forth between the decisions, attempting to make sharper

Table 1 **Evaluation Tactics**

	Assessment Approach			
	Quantitative Inference	Qualitative Inference	Subjective Inference	Intuitive Inference
Information Source	<i>QN-Data</i>	<i>QL-Data</i>	<i>Subj-Data</i>	Not observed
Data Records	Manipulate data from records 21% use	Prioritize after viewing data from records 6.0% use	Conclusions drawn after a review of data 11.4% use	
Field Trials	<i>QN-Pilot</i> Manipulate pilot data 8.8% use	<1% use	<1% use	Not observed
Mock ups	<i>QN-Simulation</i> Manipulate data in a simulation 4.7% use	<1% use	<1% use	Not observed
Sponsor Views	Not observed	<2% use	<i>Subj-Sponsor</i> DM* notes features that support the preferred alternative 8.8% use	<i>None-Sponsor</i> DM takes unilateral action 14% use
Expert Testimony	Not observed	<2% use	<i>Subj-Exp</i> DM cites expert testimony to support an alternative 8.5% use	<1% use
User Preference	Not observed	<1% use	<i>Subj-User</i> DM cites user views and preferences to argue for an alternative 6.3% use	<1% use

DM: Decision Maker.

distinctions that clarified the practices discovered. These distinctions lead to modifying old categories and creating new ones.

Two key categories emerged: the sources of information depicting performance and the approach used to make an assessment with this information. Additional sorts were then carried out, one for information source and one for assessment, placing with others that

used a similar approach. Sorting for information and assessment types was repeated until the last two sorts produced complete agreement. Interrater reliability was determined by asking a colleague to review the decisions and list the types of information and assessment that were used. This classification produced 97-percent agreement with mine. The types of information sources and assessment approaches that were uncovered

combine to identify a set of evaluation tactics that could be influenced by perceived and technical complexity.

Measuring Success

Pragmatics suggest adoption as a success indicator. Success for a manager is bound up in use (Hickson et al. 1986). The institutionalization of new practices called for a new system to be substituted for an old one. An important qualification stems from changes in the status of a decision. Delays in use, proportion of use, and terminated use suggest important adoption qualifications that capture downstream changes in the status of a decision. Two measures, called *sustained* and *complete* adoption, were created from these insights. "Sustained adoption" adds ultimate adoptions and deletes ultimate rejections, making it a measure of downstream use. The "complete adoption" measure treats all partial adoptions as failures, making it an indicator of the degree of use. Decisions were followed for two years after the first installation attempt to identify the changes in use needed to construct these measures.

Objective data describing the economic returns or benefits of a decision are preferred, but most organizations were reluctant to provide access to this type of information or claimed that reconstructing it would be prohibitively expensive. Alexander (1986) offers a way around these difficulties, noting that a manager's subjective estimates of value are highly correlated with objective measures. This has prompted researchers to measure decision value subjectively (Bryson and Cullen 1984). To avoid self-serving evaluations by the decision maker, the two secondary informants were asked to provide value ratings. An anchored rating scale with five anchors was used. The scale anchors defined a rating of 5 as *outstanding*, which was assigned to decisions that made a decisive contribution by providing exceptional perceived quality. A rating of 1, termed *poor*, was assigned when a decision had no impact or merit. The remaining scale points for the decision value measure were termed *good* for ratings of 4, *adequate* for ratings of 3, and *disappointing* for ratings of 2. The secondary informants were asked to check anywhere along a rating scale with these anchors to indicate their views of decision value.

To improve recall and precision, the estimate-reflect-estimate (ERE) procedure was used. The informants

filled out the questionnaire and reviewed their average responses. If a decision value rating seemed too low, informants were implicitly encouraged to increase their rating and visa versa. Multiple informants also helped to control for "common method variance," often found in questionnaire data. Decision value was determined by an average of the informants final rating.

Efficient changes are desirable. This suggests duration as a measure of success. Two different time periods are relevant. The first determines the duration of plan development, from need recognition to the completion of a plan. The second determines the elapsed time from when a plan's development had been completed to its use or abandonment by the organization. This latter measure was used because this time period followed evaluation of alternatives, and thus could be influenced by the evaluation tactics that were applied. A more persuasive evaluation may reduce this time period; a less persuasive one may increase it. The implementation time in months was used in the analysis.

Measuring Perceived Difficulty

The information used to determine the four types of perceived difficulty was obtained from a questionnaire given to the primary informants. The questionnaire asked the primary informants to characterize the decision's "political difficulty" (defined as degree of conflict, extent of objections, or historical difficulties among key stakeholders) and "procedural difficulty" (defined as the extent to which evaluation procedures were available when evaluation was begun). To characterize political and procedural difficulty, the primary informants were asked to check along an anchored rating scale that ran from 1 = least to 5 = most, following common practice in scaling such factors (e.g., Hickson et al. 1986, Bryson and Cullen 1984). A factor rating of 1 or 2 was interpreted as "low" and a rating of 4 or 5 "high." Perceived difficulty was then identified determined for each decision. "Routine" decisions lacked political and procedural difficulty (both rated low). "Discouraged" decisions had a high political rating and a low procedural difficulty rating. "Complicated" decisions were low on political difficulty and high on procedural difficulty. "Blocked" decisions had both procedural and political difficulty (both rated high).

The number of alternatives considered and the number of criteria applied to make a choice among the al-

ternatives were identified from a review of the supporting documentation developed for each decision.

Analysis

Data analyses were carried out using ANOVAs for each of the success measures (sustained adoption, complete adoption, value, and implementation time) as the dependent variable. In these analyses, the explanatory variables were made up of the evaluation tactics, the number of alternatives, the number of criteria, the perceived difficulty measure, and interactions of these variables. A Duncan multiple range test was used to isolate significant differences in the tactic categories, the complexity categories, and combinations found in the tactic-difficulty interaction.

Practices Applied to Assess Alternatives

The study found that most decision makers evaluated alternatives with four assessment approaches applied to six types of information. Table 1 summarizes how the assessment approaches and information sources combine to form evaluation tactics. As shown in Table 1, information sources were used with some assessment approaches, and not others. In addition, some combinations occurred infrequently (less than 2 percent of the cases), making it impossible to draw inferences about the nature of these tactics and their outcomes. Table 2 lists key features of tactics that stem from frequently used combinations and provides examples of how each of these tactics was used in a decision.

The frequently used tactics were grouped according to how inferences were made. Tactics were termed *analytical* when information was combined in some way to create new information using analytical tools such as cost-benefit, mathematical models, or rate of return to draw an inference. Tactics were termed *subjective* when decision makers made interpretations of information that considered the views of people (e.g., experts or users) or interpreted archival data. These inferences were called subjective because decision makers selected arguments that supported a choice according to how persuasive and compelling they seemed to be. Judgmental tactics made intuitive inferences. No overt attempts were made to collect or sum up information. Decision makers who made a choice in this way said things

like, "it was clear that. . ." or "it was politically unacceptable to . . ." as they defended their strategic choice. Bargaining was used when stakeholders were asked to reach a consensus about a choice. In each decision using bargaining, key people debated the merits of alternatives and voted in some way to make a strategic choice.

Analytical Tactics

Analytical tactics called "quantitative-data," "quantitative-pilot," and "quantitative-simulation" applied a computational approach to draw an inference. These tactics differ in terms of the types of information that were collected for analysis.

The Quantitative-Data Tactic. A quantitative-data tactic was found in 21 percent of the cases, making it the most frequently used tactic uncovered in the study. Inferences made with archival data relied upon quantitative assessments, extracting data from records and manipulating it to draw a conclusion about the merit of alternatives. Data sources included the organization's files and databases, supplier and vendor documents, bids responding to RFPs, standard reference sources (e.g., Dunns, Value Line), data from another organization obtained in a site visit, and data found in publications. Decision makers subjected archival data to financial analysis, cost-benefit studies, proforma income determinations, multiattribute utilities, and the like. For example, a proforma income statement of potential oil sites was prepared using historical data on yields from comparable sites. The "quantitative-data" tactic had some of the better (but not the best) decision outcomes observed in the study. As shown in Table 3, a 64-percent sustained adoption and a 51-percent complete adoption, in an average of 7 months, for decisions just below good (3.7) were noted when this tactic was used.

The Quantitative-Pilot Tactic. A quantitative-pilot tactic was used in 8.8 percent of the decisions (Table 1). A quantitative approach was the preferred way to examine information obtained from a pilot, suggesting that the time invested to obtain this performance information called for the appearance of an "objective" evaluation to make conclusions defensible. This tactic tries out alternatives in field settings and uses quantitative approaches to drawn conclusions about performance

Table 2 Features and Illustrations of Frequently Used Evaluation Tactics

Evaluation Tactics*	N	Freq.	Distinctive Features	Illustrations
Analytical				
Quantitative-Data	67	21.0%	Choice based on conclusions drawn from manipulating data in records	<ul style="list-style-type: none"> • Unit dosing proposal tested to determine magnitude of cost saving with archival data on drug use and cost • Cost-benefit analysis of computer aided design (CAD) systems using advertised system features
Quantitative-Pilot	28	8.8%	Choice based on conclusions found by manipulating data extracted from a field test	<ul style="list-style-type: none"> • Try out messenger service in hospital to see if the rate of missed calls is reduced • New plan for intimate apparel line tested in a few stores to determine sales, turns, profits, demographics
Quantitative-Simulation	15	4.7%	Choice based on conclusions found by manipulating data drawn from a mock-up	<ul style="list-style-type: none"> • Feasibility study of scheduling system in automotive plant to determine if cost was reduced and output was increased • Forecast parking needs with user survey to determine best/worst case usage for each parking option
Bargaining				
Qualitative-Data	19	6.0%	Choice based on conclusions drawn from considering performance features found in data records and prioritizing alternatives	<ul style="list-style-type: none"> • Debate merits and then rank several systems to pool client data for a brokerage • Prioritize several inventory control systems after examining and debating the attributes of each system
Subjective				
Subjective-Data	36	11.4%	Choice based on making value judgments about the meaning of archival performance data in records, which created new performance conclusions	<ul style="list-style-type: none"> • International market for OCLC found have low use and hard to service, due to time differences • Weekly and monthly pay periods compared to see if worker preferences for weekly pay were outweighed by the lower cost of monthly check processing
Subjective-Sponsor Opinion	28	8.8%	Choice based on sponsor citing "facts" that support a particular alternative	<ul style="list-style-type: none"> • Fire dept. chief expanded EMS system with federal monies to ensure survival of service • Sponsor selected best practices with benchmarking and sole sourced an architect to design this system
Subjective-Expert Opinion	27	8.5%	Choice based on "facts" that support a particular alternative provided by an expert	<ul style="list-style-type: none"> • Model new way to solicit new customers at CompuServe on existing one developed by company founders • Consultant brought in to argue for sponsor's plant location idea
Subjective-User Opinion	20	6.3%	Choice based on views of the merits of the alternatives provided by users	<ul style="list-style-type: none"> • Ask customers if new dairy products were improved with an informal survey • Present idea to increase productivity to staff that must use it to get feedback
Judgmental				
None-Sponsor Opinion	45	14.0%	Sponsor makes a choice without any justification	<ul style="list-style-type: none"> • Sponsor purchased a production planning system • President saw idea for resealing package that could be used for candy and bought it
Not considered further				
Unclassified	32	10.0%	Various	
TOTAL	317	100.0%		

* Found in at least 15 cases, about 5%.

Table 3 Evaluation Tactics, Complexity, and Success

Main Effects	N	Freq	Sustained Adoption		Complete Adoption		Decision Value		Implementation Time	
			Rate	DMRT ^a	Rate	DMRT	Rating ^b	DMRT	Months ^c	DMRT
Evaluation Tactics										
Analytical tactics:										
• Quantitative-Data	67	21.0%	64%	B	51%	C	3.7	A	7.0	B
• Quantitative-Pilot	28	8.8%	75%	A	64%	B	3.9	A	12.7	D
• Quantitative-Simulation	15	4.7%	53%	C	47%	C/D	3.9	A	7.3	B
Bargaining tactic:										
• Qualitative-Data	19	6.0%	74%	A	74%	A	3.9	A	6.6	B
Subjective tactics:										
• Subjective-Data	36	11.4%	64%	B	52%	C	3.6	A	9.9	C
• Subjective-Expert	27	8.5%	59%	B/C	37%	E	4.0	A	9.8	C
• Subjective-User	20	6.3%	65%	B	67%	A/B	3.6	A	5.0	A
• Subjective-Sponsor	28	8.8%	50%	C	39%	E	3.3	A/B	11.7	D
Judgmental tactic:										
• None-Sponsor	45	14.0%	47%	D	36%	E	3.3	A/B	7.5	B
Significance			$p \leq 0.05$		$p \leq 0.01$		$p \leq 0.07$		$p \leq 0.04$	
Complexity Indicators										
1. Number of Alternatives										
One	201	64%	58%	B	44%	B	3.5	A/B	8.9	A
Two	35	11%	66%	A/B	51%	A	3.9	A	8.9	A
Three or more	80	25%	69%	A	56%	A	3.8	A	11.1	B
	316		$p \leq 0.05$		$p \leq 0.05$		$p \leq 0.07$		$p \leq 0.05$	
2. Number of Criteria										
One	174	57%	55%	B	42%	B	3.5	B	9.4	A/B
Two	66	22%	74%	A	59%	A	3.8	A	8.8	A
Three or more	65	21%	63%	A/B	53%	A	3.7	A	10.8	B
	305		$p \leq 0.05$		$p \leq 0.05$					
3. Perceived Difficulty ^d										
None (Understood decisions)	154	49%	63%	A	49%	A	3.7	A	7.8	A
Discouraged decisions	53	17%	45%	B	36%	B	3.6	A	7.7	A
Complicated decisions	94	30%	65%	A	52%	A	3.4	A/B	10.8	B
Blocked decisions	13	4%	69%	A	46%	A/B	3.9	A	14.0	C
	314		$p \leq 0.06$		$p \leq 0.08$		$p \leq 0.07$		$p \leq 0.05$	
TOTALS	317	100%	63%		50%		3.6		8	

a. Duncan Multiple Range Test (DMRT): Letter codes indicate significant differences in category means, $p \leq 0.05$.

b. Scale: 5 = outstanding
4 = good
3 = adequate
2 = disappointing
1 = poor

c. Time measured in months from end of development to use or abandonment.

d. Routine decisions had low political and procedural difficulty. Discouraged decisions were political. Complicated decisions were procedurally challenging. Blocked decisions were seen as procedurally and politically difficult.

with the pilot information. For example, a plan to sell an intimate apparel line in a retail store chain was field tested in a few stores to determine sales, turns, and demographics as a basis to forecast expected profit. The "quantitative-pilot" evaluation tactic had some of the best and one of the poorest outcomes observed in the study. This tactic was not timely, taking an average of 12.7 months to complete. This time period was 150 percent more than the most efficient tactic and 42 percent more than the average implementation time (see Table 3). However, success rates were the best observed in the study: 75 percent sustained adoptions and 64 percent complete adoptions for decisions judged to produce good results (3.9). This tradeoff of efficiency with increased use poses interesting questions for decision makers seeking to improve their prospects of success.

The Quantitative-Simulation Tactic. A quantitative-simulation tactic was infrequently used, appearing in only 4.7 percent of the decisions. Data from simulations, like a pilot, were examined with a quantitative assessment to draw inferences. Such a tactic constructs a mock-up to produce performance information. For example, a feasibility study of a proposed scheduling system in an automotive plant was tested by tracing the required steps and proposed step changes to determine where costs could be reduced and output increased. Scenarios and sensitivity analyses were also used to determine cost and / or benefits from a mock-up, so actual performance data was not obtained. The "quantitative-simulation" tactic was much less successful than the other tactics that used a quantitative approach to make an inference about the merit of alternatives. Its 53 percent of sustained adoptions and 47 percent complete adoptions (for decisions judged to be good) were below that of other quantitative-base evaluation tactics. The 7.3 month implementation time, although efficient, was matched by several other tactics. Simulations seem much less convincing than tactics using actual performance data.

Bargaining Tactics

A bargaining tactic was used when stakeholders came to an agreement about a strategic choice. *Bargaining* was defined as *formal consensus building* in this study. When decision makers lacked power, or when key stakeholders demanded a role in the selection process, bargaining

was used to find an alternative that key players would support. In these decisions, a period of negotiation and information sharing preceded ranking or voting to make a strategic choice. The result is similar to what Thompson (1967) called compromise and was employed in 6 percent of the decisions. This tactic was carried out by having key stakeholders (or decision body) vote, rank, or prioritize alternatives after discussing performance-related data. For example, a brokerage company had its key associates first review and discuss bids and then rank systems that vendors had offered to integrate data describing their client base. Although used infrequently, the "qualitative-data" tactic had an outstanding success record. Seventy-four percent sustained adoptions and 74 percent complete adoptions were obtained in 6.6 months for decision viewed as "good" (3.9). This tactic had the highest adoption rates observed in the study and an implementation time that was well below the average. Of particular interest is the increased rate of full adoption, in a comparatively short time period. This might stem from the cooptation that results when parties to a decision reach a consensus (Thompson 1967), which improves the prospects of acceptance. This study found that the quality and efficiency of a decision also improve.

Subjective Tactics

Many strategic choices were made by decision makers who drew subjective inferences about information that they had collected. Information was examined to cull out the most persuasive and compelling arguments supporting each alternative as the basis to make a strategic choice. Four tactics were identified which varied by the type of information examined.

The Subjective Data Tactic. A subjective-data tactic was used in 11.4 percent of the decisions. Nearly one-third of the decisions using archival data followed data collection with a subjective comparison of the alternatives (Table 1). Subjective approaches were used more often with data (30 percent) than any other source of information. A subjective evaluation imposes a value judgment about the meaning of performance-related data that creates new information. This "new information" is then used to argue for the adoption of an alternative. The benefits of developing an international market in Pacific Rim countries for computer services in a

one-line information service company was shelved. The decision maker found the new market hard to service, due to time differences, and inferred a low use. In each of these cases, objective performance data were given a subjective interpretation by the decision maker. The "subjective-data" tactic produced 64 percent sustained adoptions and 52 percent complete adoptions for decisions between average and good in an average of 9.9 months. Although workable, this tactic had a somewhat lower rate of complete adoptions and takes 10 percent more than the average implementation time and twice the time of the most efficient tactic.

The Subjective-Sponsor Opinion Tactic. A subjective-sponsor opinion tactic was observed in 8.8 percent of the decisions and in 23 percent of the decisions using a subjective interpretation. Decision making relied on the insight of sponsors who drew on unspecified personal beliefs and experiences to select an alternative. In these cases, the sponsor often got an idea and attempted to sell it to others. For example, the CEO of a major department store got an idea for an "employee day," in which employees got a special store discount, and sold the idea using arguments supporting the prospect of an increase in morale *and* sales. What seemed to be good ideas often drove the sponsor to pursue such a tactic. For example, the chief of a fire department applied for funds to expand an EMS system to ensure its survival. The decision to apply for these funds was based on a subjective evaluation of a survival threat, drawn from his views of the system's status and its prospects for continuation. This tactic often was linked to sponsors who sole-sourced with consultants and architects and sponsors that benchmark, drawing inferences about what works best and why from a site visit. To justify a preferred course of action, decision makers presented selected information that supported their favored plan. The "subjective-sponsor opinion" tactic was found to have a poor success record. Its 50-percent sustained adoptions and 39 percent complete adoptions in 11.7 months was below that realized by other tactics. In addition, the decision's value declined somewhat to just above "average" (3.3). Sponsors who failed to support their conclusions with all available facts seem prone to making decisions that take 30 percent more than the typical implementation time, with a 50-percent failure rate and a 60-percent incomplete adop-

tion. The arguments used in these decisions seem tainted, leading to the decline of acceptance and adoption and a drawn out implementation.

The Subjective Expert Opinion Tactic. A subjective-expert opinion evaluation tactic was observed in 8.5 percent of the decisions and 23 percent of the decisions relying on subjective inferences to determine the merit of alternatives. Justifications often stemmed from past practices that have been shown to be effective or were developed by well-regarded insiders. Norming against such a practice was used to show how a proposed plan is true to these accepted beliefs or tenants. For example, Compuserve modeled a new way to solicit customers on the approach used by company founders. Outsiders, such as change agents and other kinds of consultants, provide another form of legitimization. An outsider's view is solicited (or alleged) so the aura of expertise can be used to argue for a particular choice among alternatives. Often, outsiders are "told" of the preferred alternatives by sponsors and asked to fashion arguments that support it. Decision makers also used expertise, such having sales people give arguments for and against new products. These arguments were interpreted to make a final judgment. The "subjective-expert opinion" tactic was associated with low rates of success. Fifty-nine percent sustained adoptions and 37 percent complete adoptions resulted, for decisions termed good (4.0), in an average of 9.8 months. The adoption rates were 25 percent below the better performing tactics, and implementation time was 10 percent above the average time. The reliance on experts seems to provide a weak platform to argue for adoption. Outsiders seem to have less credibility that decision makers imagine and, when arguing about future plans, past practices also seem to have limited credibility.

The Subjective User Opinion Tactic. A subjective-user opinion tactic was observed in 6.3 percent of the decisions and 17 percent of the decisions relying upon subjective evaluation. This tactic asked the intended users of a plan for their views of its fitness. This was done by presenting an idea to get feedback about what works (or doesn't) and why. For example, ideas to increase productivity of customer service activities were presented to airline clerks, asking for a list of each

plan's strengths and weaknesses. The decision maker examined these views to find key areas of resistance and perceptions about matters of importance to the clerks. The choice among systems was made by selecting the alternative with the broadest base of support. The "subjective-user opinion" tactic had 65 percent sustained adoptions and 67 percent complete adoptions, which were obtained for decisions rated between good and average (3.6) in an average of just 5.0 months. The increased rate of complete adoptions (about one-third above the average) and efficiency (half the average implementation time) suggest that a user evaluation increases the prospect of success. A form or cooptation may explain this finding. When users were in a position to block a plan, they were less inclined to do so if asked about its value before a decision is made.

Judgmental Tactics

In some decisions there was no overt attempt to collect performance information. Choices were made intuitively by the decision makers, drawing on their prior experience or knowledge of the situation. The choice was defended with assertions about the decision makers knowledge of comparable decisions without offering specifics (e.g., no attempts were made to explore how a benchmark system worked or to describe a prior work experience). This tactic was observed in 14 percent of the cases. Decision makers identified a favored alternative without offering any supporting arguments or information to back their choice and implemented a plan without citing any justification. For example, the president of a candy company found a packaging innovation at a convention that provided a package reseal and bought it on the spot. A new product line, which provided a reseal package for some existing products, was given to the sales department for marketing. In each of these decisions, decision makers imposed their ideas and then asked for the compliance of people who must implement the plan. Judgment had the poorest results observed in the study. The sustained adoption rate was 47 percent, complete adoption 36 percent, in 7.5 months, and the decisions were rated just above "average" (3.3). The sustained and complete adoption rates were about one-third less than the average but were done efficiently, taking about 15 percent less time than the average.

Complexity and Decision Success

Analysis of the complexity factors followed the same format as that applied for tactics. The explanatory factors were the number of alternatives, number of criteria, and perceived difficulty, as shown in Table 3. Because the evaluation tactics explained more than twice the variance of any of the complexity factors, tactic was found to be the dominant explanatory variable in this study. However, the complexity factors provide an interesting commentary on an important condition that can influence the success of decision making.

Most organizational decisions considered a single alternative, using a single criterion (Table 3). Two-thirds of the decisions considered only one alternative, and 57 percent applied but one criterion. As noted in the literature, success improves when the number of alternatives increases (e.g., Alexander 1979, Gemunden and Hauschietd 1985). Nearly 70 percent sustained adoptions were obtained when three or more alternatives were considered, compared to 66 percent for two and 58 percent for one alternative. The same pattern resulted for the rate of complete adoption and decision value. However, the time to consider multiple alternatives increased by 20 percent. Although less pronounced, multiple criteria had a similar effect. A single criterion produced about 20 percent fewer adoptions and somewhat lower decision value. As the complexity of an evaluation increased, due to multiple criteria being applied, both success and the time to implement increased. Both a multicriteria evaluation and multiple alternatives were found to increase decision complexity and increase the prospects of success.

Perceived difficulty also influenced success, although not always in the expected directions. When *no* perceived difficulty was present, decisions could be characterized as understood. Understood decisions were observed in 49 percent of the cases. These decisions were efficiently implemented with above average adoption rates. "Complicated" decisions were observed in 30 percent of the cases, and "blocked" decisions in 4 percent of the cases. Surprisingly, complicated and blocked decisions had comparable adoption rates, but blocked decisions took twice as long to implement, comparing to the most efficient type of decision. Apparently, blocked decisions with their political undertones delayed adoption, but did not lower the prospects of a decision being

ultimately adopted. "Discouraged" decisions that had procedural and political difficulty were observed in 17 percent of the cases and had significantly lower adoptions in a short implementation time period, compared to the others. Decision makers seem to give up on the politically volatile decision and use the apparent difficulty in a blocked decision to maneuver around the political volatility. Because difficulty could be demonstrated, additional time to do evaluations could be justified. This suggests that different evaluation tactics may be used, with different results, for blocked decisions.

Qualifying Tactic Use and Success

The complexity factors provide two types of qualifications. Conditions of use can be inferred from how often evaluation tactics were used for more and less complex decisions. This was done with contingency tables that identified frequencies stemming from combinations of the particular indicators and the evaluation tactics. A chi-square test determined whether particular tactics were used more often under particular types of conditions. Second, a one-way ANOVA was applied to examine the statistical interaction between tactic and the complexity factors, for each success indicator. Combinations of tactic and "complexity" factors that had few or no observations were discarded, creating a new factor with categories defined by tactic-complexity combinations with sufficient observations to be compared. This gets around missing and infrequently observed combinations in the tactic-complexity interactions. Each of the three new factors (tactic-perceived complexity, tactic-criteria, and tactic-alternatives) defined in this way was tested with a DMRT to reveal tactics that were used under each type of complexity that had different patterns of success. The results are summarized in Tables 6 to 8.

Conditions of Use. Chi-square tests found that decision complexity was associated with the selection of an evaluation tactic. This association was observed for the number of alternatives that were evaluated, the number of criteria in this evaluation, and the perceived difficulty of the decision (Table 4). Examining the percentages that indicate frequency of tactic use in the column assigned to the categories for each complexity fac-

tor indicates which tactic was used more or less than the expected value of 1 in 9, or 11 percent.

When multiple (three or more) alternatives were considered, the likelihood of using the analytical quantitative-data tactic doubled. In contrast, the prospects of judgment (no-evaluation-sponsor opinion) was far more likely when a single alternative was considered. Thus, difficulty seems to encourage analytic (quantitative-data) based evaluations and discourage judgment.

Multiple criteria had a similar effect, encouraging analytic (quantitative-data) based evaluations and discouraging judgment. Also, the less complex, single criterion, decisions were more apt to prompt a subjective tactic that considered sponsor, user, and expert views of the best alternative. However, subjective evaluations of data were more common with multiple criteria as were bargaining tactics, suggesting that short cuts may seem justified when evaluations seem more difficult. In the next section, the success of this practice will be examined.

The perceived difficulty of a decision also prompted the selective use of evaluation tactics. Decision makers preferred to use judgment when decisions were blocked. When faced with a blocked decision, decision makers frequently took control by taking unilateral action and making a judgment about what to do. The effectiveness of this practice should be interesting. Analytic tactics were more common when there was no perceived difficulty.

Subjective tactics drawing on sponsor, expert, and user views were more apt to be used for discouraged and complex decisions. In both types of decisions, a subjective evaluation may have been justified because of the decision's perceived difficulty or its low prospect of success, due to political activity.

Qualifications. Conditions stemming from complexity are shown in Tables 5, 6, and 7. The number of alternatives, number of criteria, and perceived difficulty were found to have significant statistical interactions with the evaluation tactics ($p \leq 0.05$).

Complexity was thought to increase as the numbers of alternatives and criteria increase. To examine this effect, trends in the success measures going from one, two or more, and three or more alternatives were examined.

Table 4 Conditions of Tactic Use and Complexity

Tactic	Alternatives			Criteria			Perceived Difficulty			
	One	Two	Mult	One	Two	Mult	None ^j	Dis ^k	Comp ^l	Blk ^m
Analytical										
QN-Data ^a	41*	7	50	20	21	26	52	5	8	1
QN-Pilot ^b	18	8	16	9	9	10	19	4	3	2
QN-Sim ^c	11	2	11	4	7	4	9	1	2	2
Bargaining										
QL-Data ^d	5	2	12	7	4	8	11	3	4	—
Subjective										
Subj-Data ^e	18	3	15	13	6	17	17	6	13	—
Subj-Spon ^f	21	3	4	24	2	2	7	6	15	1
Subj-Exp ^g	14	2	10	22	4	1	8	6	12	—
Subj-User ^h	15	1	4	16	3	1	5	5	9	—
Judgment										
None-Spon ⁱ	42	2	1	40	3	1	16	8	16	5
TOTAL	185	30	123	155	59	70	144	50	82	11
Analytical										
QN-Data	22%**	23%	41%	13%	36%	37%	36%	10%	10%	10%
QN-Pilot	10%	27%	13%	6%	15%	14%	13%	8%	4%	20%
QN-Sim	6%	7%	9%	3%	12%	6%	6%	2%	2%	20%
Bargaining										
QL-Data	3%	7%	10%	5%	7%	11%	8%	6%	5%	—
Subjective										
Subj-Data	10%	10%	12%	8%	10%	24%	12%	12%	16%	—
Subj-Spon	11%	10%	3%	15%	3%	3%	5%	12%	18%	10%
Subj-Exp	8%	7%	8%	14%	7%	1%	6%	12%	15%	—
Subj-User	8%	3%	3%	10%	5%	1%	3%	10%	11%	—
Judgment										
Non-Spon	23%	7%	4%	26%	5%	1%	11%	16%	20%	45%
Ave Use	11%									
TOTAL	100%									

* Number of Cases

** Percentage of column total

a. QN-Data: Quantitative evaluation of data from records (analytical).

b. QN-Pilot: Quantitative evaluation of a performance trial (analytical).

c. QN-Sim: Qualitative evaluation of simulated performance data (analytical).

d. QL-Data: Quantitative evaluation of data from records (bargaining).

e. Subj-Data: Subjective evaluation of data from records (subjective).

f. Subj-Spon: Subjective evaluation of data provided by the sponsor (subjective).

g. Subj-Exp: Subjective evaluation of data provided by experts (subjective).

h. Subj-User: Subjective evaluation of data provided by users (subjective).

i. Non-Spon: Sponsor makes choice without apparent justification (judgmental).

j. None: No apparent difficulty in assessing alternatives or political problems.

k. Dis: Action called for by decision was discouraged.

l. Comp: Determination of the merit of alternatives was complicated.

m. Blk: Decision seemed blocked because determining the merit of alternatives was complex and action was discouraged.

Table 5 The Joint Effect of Tactic and Number of Alternatives on Success

Sustained adoption				Complete Adoption			
Alternatives:	One ^l	Two ^k	Mult ^l	Alternatives:	One	Two	Mult
Tactics:				Tactics:			
Analytical				Analytical			
QN-Data ^a	66%	60%	63%	QN-Data	54%	47%	47%
QN-Pilot ^b	67%	73%	100%	QN-Pilot	55%	73%	100%
QN-Sim ^c	45%	50%	50%	QN-Sim	36%	50%	50%
Bargaining				Bargaining			
QL-Data ^d	40%	100%	83%	QL-Data	40%	100%	83%
Subjective				Subjective			
Subj-Data ^e	61%	75%	60%	Subj-Data	55%	50%	47%
Subj-Spon ^f	52%	33%	50%	Subj-Spon	38%	33%	50%
Subj-Exp ^g	64%	50%	70%	Subj-Exp	43%	13%	40%
Subj-User ^h	60%	83%*	75%	Subj-User	53%	83%*	75%
Judgmental				Judgmental			
None-Spon ⁱ	48%	75%	100%*	None-Spon	36%	50%	100%*
Decision Value Rating				Implementation Time			
Alternatives:	One	Two	Mult	Alternatives:	One	Two	Mult
Tactics:				Tactics:			
Analytical				Analytical			
QN-Data	3.7	3.9	3.7	QN-Data	7.2	11.9	5.3
QN-Pilot	3.6	3.6	5.0	QN-Pilot	13.1	11.8	12.5
QN-Sim	3.5	4.3	4.5	QN-Sim	9.3	3.5	4.0
Bargaining				Bargaining			
QL-Data	3.2	4.0	4.1	QL-Data	14.0	3.8	4.6
Subjective				Subjective			
Subj-Data	3.8	3.3	3.3	Subj-Data	8.5	5.0	12.0
Subj-Spon	3.3	3.0	3.5	Subj-Spon	12.5	4.8	14.5
Subj-Exp	3.9	4.4	4.1	Subj-Exp	5.1	16.3	17.8
Subj-User	3.4	4.2*	4.0	Subj-User	6.7	5.7*	9.0
Judgmental				Judgmental			
None-Spon	3.2	3.5	5.0*	None-Spon	7.9	9.0	9.9*

* Insufficient cases to do an assessment. DMRT excluded these combinations.

- a. QN-Data: Quantitative assessment of data from records (analytical).
- b. QN-Pilot: Quantitative assessment of a performance trial (analytical).
- c. QN-Sim: Quantitative assessment of simulated performance data (analytical).
- d. QL-Data: Qualitative assessment of data from records (bargaining).
- e. Subj-Data: Subjective assessment of data from records (subjective).
- f. Subj-Spon: Subjective assessment of data provided by the sponsor (subjective).
- g. Subj-Exp: Subjective assessment of data provided by experts (subjective).
- h. Subj-User: Subjective assessment of data provided by users (subjective).
- i. Non-Spon: Sponsor makes choice without apparent justification (judgmental).
- j. One: Only one alternative considered.
- k. Two: Two or more alternatives considered.
- l. Mult: Three or more alternatives considered.

Table 6 The Joint Effect of Tactic and Number of Criteria on Success

Sustained Adoption			Complete Adoption		
Criteria:	One ^j	Mult ^k	Criteria:	One	Mult
Tactics:			Tactics:		
Analytical			Analytical		
QN-Data ^a	55%	68%	QN-Data	30%	60%
QN-Pilot ^b	78%	74%	QN-Pilot	67%	74%
QN-Sim ^c	0%	73%	QN-Sim	0%	63%
Bargaining			Bargaining		
QL-Data ^d	71%	75%	QL-Data	71%	75%
Subjective			Subjective		
Subj-Data ^e	54%	70%	Subj-Data	54%	52%
Subj-Spon ^f	46%	75%	Subj-Spon	38%	50%
Subj-Exp ^g	54%	80%	Subj-Exp	32%	60%
Subj-User ^h	75%	25%	Subj-User	69%	25%
Judgment			Judgment		
None-Spon ⁱ	50%	25%	None-Spon	38%	25%
Decision Value Rating			Implementation Time (months)		
Criteria:	One	Mult	Criteria:	One	Mult
Tactics:			Tactics:		
Analytical			Analytical		
QN-Data	3.4	3.8	QN-Data	7.7	6.8
QN-Pilot	4.0	3.9	QN-Pilot	11.8	13.2
QN-Sim	3.3	3.8	QN-Sim	12.0	5.2
Bargaining			Bargaining		
QL-Data	3.4	4.2	QL-Data	2.3	9.0
Subjective			Subjective		
Subj-Data	3.7	3.7	Subj-Data	7.3	12.0
Subj-Spon	3.2	3.7	Subj-Spon	12.6	5.0
Subj-Exp	4.0	3.6	Subj-Exp	9.6	10.5
Subj-User	3.7	3.2	Subj-User	5.6	1.5
Judgment			Judgment		
None-Spon	3.3	2.7	None-Spon	7.9	3.5

- a. QN-Data: Quantitative assessment of data from records (analytical).
- b. QN-Pilot: Quantitative assessment of a performance trial (analytical).
- c. QN-Sim: Quantitative assessment of simulated performance data (analytical).
- d. QL-Data: Qualitative assessment of data from records (bargaining).
- e. Subj-Data: Subjective assessment of data from records (subjective).
- f. Subj-Spon: Subjective assessment of data provided by the sponsor (subjective).
- g. Subj-Exp: Subjective assessment of data provided by experts (subjective).
- h. Subj-User: Subjective assessment of data provided by users (subjective).
- i. Non-Spon: Sponsor makes choice without apparent justification (judgmental).
- j. One: One criterion applied during evaluation.
- k. Mult: Two or more criterion applied during evaluation.

Table 7 The Joint Effect of Tactic and Perceived Difficulty on Success

Sustained Adoption					Complete Adoption				
Difficulty	None ^j	Dis ^k	Comp ^l	Blk ^m	Difficulty	None	Dis	Comp	Blk
Tactics					Tactics				
Analytical					Analytical				
QN-Data ^a	67%	60%	38%	*	QN-Data	54%	40%	38%	*
QN-Pilot ^b	74%	100%	67%	*	QN-Pilot	63%	75%	67%	*
QN-Sim ^c	55%	20%	67%	*	QN-Sim	44%	20%	67%	*
Bargaining					Bargaining				
QL-Data ^d	67%	33%	75%	*	QL-Data	82%	33%	75%	*
Subjective					Subjective				
Subj-Data ^e	53%	67%	77%	*	Subj-Data	35%	67%	69%	*
Subj-Spon ^f	57%	50%	47%	*	Subj-Spon	28%	50%	40%	*
Subj-Exp ^g	63%	50%	67%	*	Subj-Exp	38%	17%	50%	*
Subj-User ^h	60%	60%	78%	*	Subj-User	60%	60%	67%	*
Judgment					Judgment				
None-Spon ⁱ	44%	0%	63%	80%	None-Spon	38%	0%	44%	60%
Decision/Value Rating					Implementation Time (months)				
Difficulty	None	Dis	Comp	Blk	Difficulty	Non	Dis	Comp	Blk
Tactics					Tactics				
Analytical					Analytical				
QN-Data	3.8	4.2	3.1	*	QN-Data	6.6	12.5	8.3	*
QN-Pilot	4.0	4.5	3.3	*	QN-Pilot	13.2	2.9	27.0	*
QN-Sim	4.1	4.0	3.0	*	QN-Sim	8.0	8.9	9.0	*
Bargaining					Bargaining				
QL-Data	3.5	4.0	4.5	*	QL-Data	7.0	6.0	3.0	*
Subjective					Subjective				
Subj-Data	3.4	4.5	3.5	*	Subj-Data	5.8	12.2	15.3	*
Subj-Spon	3.7	3.2	3.1	*	Subj-Spon	12.5	7.8	13.2	*
Subj-Exp	4.2	3.3	4.0	*	Subj-Exp	12.2	2.8	11.6	*
Subj-User	3.4	4.0	3.8	*	Subj-User	4.3	1.5	7.0	*
Judgment					Judgment				
None-Spon	3.2	2.8	3.4	3.5	None-Spon	4.4	4.8	9.5	13.5

* Insufficient cases to do an assessment. DMRT did not include these combinations.

- a. QN-Data: Quantitative assessment of data from records (analytical).
- b. QN-Pilot: Quantitative assessment of a performance trial (analytical).
- c. QN-Sim: Quantitative assessment of simulated performance data (analytical).
- d. QL-Data: Qualitative assessment of data from records (bargaining).
- e. Subj-Data: Subjective assessment of data from records (subjective).
- f. Subj-Spon: Subjective assessment of data provided by the sponsor (subjective).
- g. Subj-Exp: Subjective assessment of data provided by experts (subjective).
- h. Subj-User: Subjective assessment of data provided by users (subjective).
- i. Non-Spon: Sponsor makes choice without apparent justification (judgmental).
- j. None: No apparent difficulty in evaluating alternatives or political problems.
- k. Dis: Action called for by decision was discouraged.
- l. Comp: Determination of the merits of alternatives was complicated.
- m. Blk: Decision seemed blocked because the merit of alternatives complex and action was discouraged.

These trends suggest that success tends to increase as the number of alternatives increased when analytic (quantitative-pilot and quantitative-simulation), bargaining (qualitative-data), subjective (subjective-data and the subjective user opinion), and judgment (sponsor unilateral action) tactics were used (Table 5). Typically, adoptions and value increased, with implementation time decreasing. Analytic (quantitative-archival data) evaluations were not influenced by the magnitude of the evaluation task. Subjective evaluations of archival data, sponsor views, and expert views were unaffected or had a declining record of success as the number of alternatives increased. This suggests that subjective evaluation tactics may be overwhelmed by complex decisions that stem from multiple alternatives.

Although the collection of performance information increased substantially when three or more criteria were applied, the impact of multicriteria evaluations was not as clear as that for number of alternatives (Table 6). The influence of multiple criteria was complicated and interpretation hindered by too few cases for some of the combinations. To simplify the analysis two categories were considered: single and multiple (two or more criteria). These results suggest that multi-criteria evaluation with subjective treatments of user views and judgments lowered adoptions and decision value, but also cut implementation time substantially. Analytic tactics (quantitative evaluations of data from records, pilot tests, and simulations) improved adoptions and decision value in multicriteria evaluations. However, pilots still required about the same implementation time as archival data, but simulations cut implementation time dramatically. Simulations provide a timely alternative to analytic tactics that use quantitative evaluations of data records and pilots. Bargaining tactics (quantitative-data) were also effective, but less timely.

Table 7 summarizes findings for the joint effect of the perceived difficulty and the evaluation tactics. The most surprising result was the success of the judgment tactic for "blocked" decisions. When political difficulties were compounded by difficulties in carrying out an evaluation, the blockage was often set aside by decision makers who took unilateral action. Judgment under these conditions was quite successful, leading to high adoptions, but took considerable time to implement. The judgment tactic lengthened the time to make a

"blocked" decision, but increased its prospect of success to well about the average success rates observed in the study (Table 4).

"Discouraged" decisions, which had opposition, were handled using various tactics. Analysis with quantitative evaluation of information from a pilot test was quite successful (high rates of adoption in short time period) for discouraged decisions, but the judgment tactic was unsuccessful (no adoptions and low decision value). Also, quantitative simulations and subjective evaluation of expert views had low adoptions for this type of decision. The judgment tactic and expert and simulated performance information were unable to overcome the objections of key people who opposed a decision.

"Complicated" decisions arose when decision makers were unsure of how to carry out the evaluation of alternatives. This initial groping to select an approach preceded information collection and its evaluation. Analytic (quantitative-data) tactics and subjective evaluations of sponsor views were unsuccessful for complicated decisions. Adoption rates and decision value fell, although implementation time was drawn out only for the subjective assessment of sponsor views. It appears that analysis with a quantitative evaluation of data records for decisions believed to be complicated is counter productive. The believability of conclusions drawn from an analytic tactic applied to complicated decisions seems minimal. Decision maker judgments about the best alternative may be seen as self serving for complicated decisions and thus set aside, also lowering adoption prospects.

Conclusions

Analytical tactics that called for a quantitative assessment of data from archives, pilots, and simulations were used far more often with better outcomes than previously reported (e.g., Mintzberg et al. 1976). Bargaining was rarely used but produced high rates of adoption and also had a short implementation time period and good decision quality. Judgmental tactics were observed in far fewer decisions than previously reported (e.g., Mintzberg et al. 1976, Nutt 1984) and had the poorest success record uncovered in this study. Subjective tactics cited data, sponsor experience, expert testimony,

or user views about what works and why, looking for persuasive arguments. When decision makers made these arguments using expert or personal views, the information seemed tainted by self interest, making stakeholders suspicious, which lowered success. In contrast, citing archival data and user needs appeared to be objective and bipartisan, which increased the prospect of success. Subjective evaluation approaches have no clear analog in the literature.

Decision complexity offers some additional insights into ways to improve practice. As the number of alternatives increased, decision makers used analysis (quantitative-data evaluations) more often and judgment less often. For multiple alternatives, the prospect of success was not always improved by switching to analytical tactics. However, analytical tactics with pilot testing or archival data were used for one-third of the decisions in the study that considered multiple alternatives, with good results. Subjective evaluations of user views and archival data also produced good results but were rarely used in multialternative decisions.

Multicriteria decisions enticed decision makers to use analytic with archival data or pilot testing, bargaining, and subjective-performance data approaches. These tactical preferences were associated with an increase in the prospect of a successful outcome. Multicriteria decisions were also successfully carried out by following most subjective evaluations, except when user views were obtained. Judgment was not successful for multicriteria decisions.

Blocked decisions had high perceived complexity due to political activity and ambiguity about how to evaluate the alternatives. Decision makers frequently used judgment to evaluate alternatives when blocked decisions arose and had considerable success. For *discouraged* decisions laced with political difficulty, judgment was unsuccessful and analysis (quantitative-archival and pilot data) preferred. For discouraged decisions, the best outcomes result when a field test was used to demonstrate merit. To make *complicated* decisions that had procedural difficulties, decision makers applied a variety of tactics. All but two of the tactics worked well. The analysis (quantitative-archival data) tactic, was less successful when there were perceived complications. Also, using a judgmental tactic for a complex decision seemed to lack believability. The value of judgment seems

linked to decision complexity. Judgment is not the best way to make a choice among alternatives, unless the decision is blocked. This seems to be an important qualification, not previously reported in the strategic decision making literature (e.g., Harrison and Phillips 1991, Eisenhardt and Zbaracki 1992).

These findings suggest that decision makers use evaluation tactics with a poor track record in nearly half of their decisions. To improve success, decision makers should use bargaining and analytic tactics more often. Both tactics have good track records, which argue for greater use in practice. Low effort approaches, using subjective tactics, were apt to produce poor outcomes, unless user views or archival performance data were interpreted. Judgmental approaches in which decision makers made a pronouncement about what to do reduced the chance of success, except for decisions that had political and procedural difficulties.

Pragmatic and political considerations, which prompt the evaluation of alternatives, offer a way to interpret the findings uncovered in this study and why they differ from past studies. Political considerations call for defensible arguments that support a choice to deflect criticism (Pfeffer 1992). Decision makers in past studies withheld their choices until arguments that confirm a preferred alternative could be tested and verified. Analysis was used to ratify a choice, not to make it in these studies. Decision makers balanced objective information, such as performance indicators, with information that indicated the prospects of resistance from key people. These trade-offs were handled with judgment to hold close sensitive information that decision makers did not want to reveal (March 1994). When opposition developed, decision makers involved others to coopt them, making bargaining a fall-back tactic when power limits were reached. Knowledge about the merits of alternatives helps to deal with decisions that become controversial. Analysis was effective when it provided carefully constructed arguments for complex decisions with multiple alternatives expected to meet multiple criteria. This information helped to head off political power games, but could not deal with decisions that were initially laced with politics. Judgment was helpful in establishing a basis to deal with blocked decisions, those with both procedural *and* political concerns. In other cases judgment seemed to create caprice, not insight.

Decision makers who failed to explain the logic behind a choice often prompted resistance.¹

¹ The Fisher College of Business at The Ohio State University provided crucial support to underwrite some of the costs of this study.

References

- Alexander, E. 1979. The design of alternatives in organizational contexts. *Admin. Sci. Quarterly* 24 382–404.
- Alexander, L. 1986. Successfully implementing strategic decisions. B. Mayon-While, ed. *Planning and Managing Change*, Harper Row, London.
- Brunsson, N. 1982. The irrationality of action and action rationality: decisions, ideologies, and organization action. *J. Management Studies*. 19 29–44.
- Bryson, J. M. and A. D. Delbecq 1979. A contingent approach to strategy and tactics in project planning," *J. American Planning Association*. 45 167–179.
- Cohen, M. D., J. P. March, and J. P. Olsen 1976. A garbage can model of organizational choice. *Admin. Sci. Quarterly*. 17 1–25.
- Cyert, R. M. and J. G. March 1963. *A behavioral theory of the firm*. Prentice-Hall, Englewood Cliff, NJ.
- Eisenhardt, K. and M. Zbaracki 1992. Strategic decision making. *Strategic Management J.* 13 17–37.
- Gemunden, H. G. and J. Hauschildt 1985. Number of alternatives and efficiency in different types of management decision. *European J. Operations Res.* 22 2 178–190.
- Harrison, M. and B. Phillips 1991. Strategic decision making: an integrated explanation," *Res. Sociology of Organizations*. Vol. 9 JAI Press. 319–358.
- Hickson, D., R. Butler, D. Gray, G. Mallory, and D. Wilson 1986. *Top decisions: strategic decision making in organizations*. Jossey Bass, San Francisco, CA.
- Janis, I. J. 1989. *Crucial decisions*. Free Press, New York.
- Lincoln, Y. and E. Guba 1985. *Naturalistic inquiry*. Sage, Beverly Hills, CA.
- March, J. G. 1994. *A primer on decision making: how decisions happen*, Free Press, New York.
- Mintzberg, H., D. Raisinghani, and A. Theoret 1976. The structure of unstructured decisions. *Admin. Sci. Quarterly*. 21 2 246–275.
- Nutt, P. C. 1989. *Making tough decisions*. Jossey-Bass, San Francisco, CA.
- , 1984. Types of organizational decision processes. *Admin. Sci. Quarterly*. 29, 3 414–450.
- Pfeffer, J. 1992. *Managing with power: politics and influence in organizations*. Harvard University Press, Boston, MA.
- Starbuck, W. H. 1983. Organizations as action generators. *American Sociological Review*. 48 91–102.
- Thompson, J. D. 1967. *Organizations in action*, McGraw Hill, New York.
- Vroom, V. and P. W. Yetton 1973. *Leadership and decision making*, University Pittsburgh Press, Pittsburgh, PA.

Accepted by Linda Argote; received November 1, 1995. This paper has been with the author 5½ months for 2 revisions.