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Decision-Making: Biases and Assumptions
Underlying Alternative Models of Strategic
Problem Formulation

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Problem Formulation and Organizational Decision-Making:
Biases and Assumptions Underlying Alternative Models
of Strategic Problem Formulation

This paper reviews the major theoretical approaches to strategic problem formulation and provides some constructs for further theory development. It proposes a number of models for structuring and analyzing strategic problem formulation processes and identifies the biases and assumptions that provide the foundations for these models. Successful strategic problem formulation is described and proposed as a beginning point for future research.

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Introduction

Strategic management is concerned fundamentally with how strategic decisions are made. Researchers in strategic decision processes stress the need to examine how strategic decisions arise, are perceived, and are formulated by management. A critical task of upper-level management involves the identification and structuring of the most important problems threatening the organization's ability to survive and adapt in the future. These are not the everyday, routine problems but the problems and issues that are unique, important and frequently ambiguous (McCaskey, 1982).

Mason and Mitroff (1981) specify the characteristics of these vexing strategic problems, which they call 'wicked problems.' They are distinguished by interconnectedness to other problems, complexity with recursive feedback, uncertainty in a dynamic environment, ambiguity dependent on viewpoint, conflicting trade-offs of alternative solutions, and societal constraints to theoretical solutions. Every problem is inextricably united to the environment in which it is embedded.

Thus in today's rapidly changing environment, the ability to sense the emergence of, and to assign meaning to, unanticipated environmental events which may be signals of these "wicked problems" describes a critical strategic capability (Ansoff, 1984). This ability enhances a firm's opportunities to surpass its competition and to ensure the coalignment of the organization and its environment (Thompson, 1967). This is not merely "opportunistic" surveillance but an organizational process that encompasses the firm's approach to developing awareness of its most important strategic problems and their characteristics.

Strategic problem formulation, the process of resolving the nature of these major strategic problems, is not a new activity for organizations (Lyles, 1981; Mintzberg, Raisinghani and Theoret, 1976; Pounds, 1969). All organizations face problems that have a major impact on the firm's ability to survive and to adapt to environmental changes. Indeed it could be argued that those organizations which have successfully adapted and survived through time must have devised very effective systems for strategic problem identification and formulation.

Therefore, the issue of how to identify a good strategic problem formulation process has become an important dilemma identified by a range of management researchers (Lubin, 1977; Ramaprasad and Mitroff, 1984; Rumelt, 1978; Volkema, 1983). In an attempt to predict and forecast environmental changes, organizations have established forecasting models and issues management departments. However, it is not always clear that these necessarily improve the organization's ability to anticipate, make sense of and formulate critical and strategic problems (Lenz and Engledow, 1985).

This paper will examine strategic problem formulation from a number of perspectives. First, areas of consensus regarding strategic problem formulation will be reviewed. Second, a range of problem formulation approaches that exist within the theoretical literature will be identified. Third, the biases and assumptions that underlie each approach will be discussed and fourth, some ideas for future research regarding the nature of successful strategic problem formulation will be outlined.

AREAS OF AGREEMENT

Although there are probably many more areas of disagreement than areas of agreement in research about strategic problem formulation, it is useful to outline the areas of agreement in order to lay a foundation for the later discussion of alternative problem formulation approaches. The purpose here is to identify major concepts rather than offer an exhaustive literature review.

Nature of Strategic Problems

Strategic problems have frequently been referred to as "unstructured," messy or wicked problems (Ackoff, 1974; Mitroff and Mason, 1980). They have a significant influence on the organization as a whole and are more complex and ill-defined than other problems. There is no proven algorithm for formulating these problems, no clear relationship between problem definition and best solution, no single way to explain discrepancies in understanding and no replicability (Mason and Mitroff, 1981; Thomas, 1984).

Some strategic problems are well structured (i.e., there is relatively widespread consensus as to the single best definition of the problem). These are frequently problems that have been imposed on the organization, as in the case of governmental regulations or union negotiations (Lyles and Mitroff, 1980). However, most strategic problems are unstructured, and no single "best" way for formulating the nature of the problem exists. In these problems, the formulation process becomes a critical aspect of the strategic decision-making process.

Awareness Process

Figure 1 addresses the process by which organizations become aware
of environmental events. Formalized processes keep the organization
aware of environmental events that have been preidentified or antici-
pated, at least in the broadest sense (Fahey and King, 1977). As the
environment becomes more uncertain and more complex, it becomes diffi-
cult to anticipate all environmental events. These unanticipated events
are usually sensed through informal means (Ansoff, 1984; Cowan, 1984;
Lyles and Mitroff, 1980; Mintzberg, 1973; Quinn, 1980). The managers
who become aware of these events assign meaning and definition to
them. In the study by Lyles and Mitroff (1980), about 80 percent of
the managers said they became aware of a problem's existence from in-
formal indicators. Quinn (1980) suggests that executives become aware
of these changes primarily through personal networks that are used to
short-circuit the formal indicators.

Insert Figure 1 about here

Resolving the nature of strategic problems becomes an important
task of upper level management. Making sense of complex situations
requires specific cognitive and experiential skills. Managers have to
assign meanings to unanticipated events by making inferences about the
interrelatedness of these events to other important events and to the
organization's environment and context.

The Role of Executives in Strategic Problem Formulation (SPF)

It has been well documented that the process of defining the nature
of a problem is dependent upon the histories, backgrounds and experiences

of those responsible for defining the problem (Bruner and Kresch, 1950;
Hayes and Simon, 1977; Herden and Lyles, 1981; Taylor, 1975).
Ackoff's (1969) famous description of the elevator problem exemplifies
this through its demonstration that engineers will define the problem
as an engineering problem with an engineering solution while psycholo-
gists will define the problem through their own framework.

Hambrick and Mason (1984) note that strategic decisions are
affected by the cognitive frames and maps of the organization's senior
executives. Thus upper level managers can be expected to define the
nature of strategic problems and solutions through their own frame-
works (Ramaprasad and Mitroff, 1984). The way that problems are
defined limits the set of solutions that are considered relevant.
Hence the way firms sense the existence of strategic problems and
resolve the nature of them has an impact on their strategic alter-
natives. Hedberg (1974) suggests that an "organizational decision-
maker's choice of strategy is determined by the perceived problem, the
available degrees of freedom (the action space) and a preference
function." Starbuck and Hedberg (1977) expand this concept further by
suggesting that organizations will invent the environment to which the
firm will respond by deciding which aspects of the environment are
important or unimportant.

Thus the process of defining strategic problems influences the
firm's capabilities for long-term survival. The process by which upper
level executives sense and evaluate these critical problems places con-
straints on the firm's choice of appropriate strategic alternatives.

The SPF Process

Several ideas have emerged recently concerning the strategic problem formulation process and the factors that affect it. First, there appears to be agreement that firms do not explicitly define unanticipated problems (Lyles and Mitroff, 1980; Volkema, 1983; Ansoff, 1984). In applied settings, solution generation is often adopted as a means of problem sensing and understanding and appears to be more important and widespread than consideration of different problem perspectives (Mitroff and Betz, 1972; Hertz and Thomas, 1983). Second, the complexity of strategic problems leads to differing assumptions regarding the nature of these problems, and this leads to stakeholders supporting varying views (Mitroff and Emshoff, 1979; Freeman, 1984). Consequently, research on individual differences regarding problem formulation has generated little insight into the sociopolitical and the social psychological factors affecting the formulation of strategic problems. As firms spend less time explicitly defining these messy problems, the sociopolitical dynamics become more important (Pfeffer, Salancik and Leblebici, 1976).

Third, although research on individual and cognitive decision-making does not aid in the understanding of the social dynamics, it does explain why strategic problem formulation is a dilemma. Individuals will view the same situation or environmental cues differently. Thus, given that there will be multiple cues, there will also be multiple interpretations of these cues. An individual's interpretation will be a function of his/her background and prior experiences (MacCrimmon and Taylor, 1976; Morgan and Ramirez, 1984). Further, individuals have

many factors influencing their perceptions of the cues including expert

opinions, stress, timing, frequency of cues, additional cues, and so

on. These factors may lead to cognitive biases (Schwenk, 1984;

Hogarth and Makridakis, 1981) in the problem formulation process.

Clearly, strategic problem formulation is a complex process that

starts with cues being sensed by individuals. The process emerges into

an organizational process in which biases are commonly introduced.

Although some normative approaches have been suggested (Mitroff and

Mason, 1980; Schwenk and Thomas, 1983), it is still not clear what

variables are involved, how these interact and what debiasing procedures

exist.

PROBLEM FORMULATION APPROACHES

Studies of the strategic problem formulation process (Lyles and

Mitroff, 1980; Mintzberg, Raisinghani, and Theoret, 1976) lead to the

identification of many confounding factors in the process. These

include the level of analysis, selection of variables, measurement of

variables, and types of methodologies. The nature of the alternative

conceptual frameworks and underlying assumptions must be specified in

order to clarify current approaches and to make them explicit so that

they can be tested. Table 1 summarizes these approaches which repre-

sent the primary categories for multiple perspectives of strategic

decision-making as identified by Allison (1971), Cohen, March and

Olsen (1972); Janis and Mann (1977), and Pfeffer and Salancik (1978).

Insert Table 1 About Here

A range of alternative perspectives are used in the following section to develop an organizing model for strategic problem formulation. They range from rational models of decision-making which assume that problems are already pre-formulated and that the decision task involves choice amongst alternative options to political models (Cyert and March, 1963)) which assume that relevant coalitions have essentially pre-formulated the problems according to their own interests and that social interaction and power will condition the choice among competing formulations. Even though garbage can models (Cohen, March and Olsen, 1972) recognize that problems are not pre-formulated, these models focus on the decision process rather than on the nature of problem formulation. Clearly, therefore, variations in problem formulation by organizational participants are a neglected issue in research on organizational decision-making and organizational performance.

Rational Approach

The Rational Approach corresponds to the classical economic view of decision-making. It is the benchmark against which other approaches are evaluated. It is grounded in rationality, optimality, and consistency (Allison, 1971) and assumes that decisions emerge from a process of conscious choice.

In treating problem formulation, this approach assumes that full information is available and that the one right formulation of the problem will be determined after an examination of the symptoms. Social-psychological factors such as power, conflict, fears, credibility or turnover will not influence the process. The manager

provides the resources and personnel necessary to gather information about the symptoms and to analyze them.

This approach assumes that the correct formulation can be determined and that there are no biases inherent in the process. A problem can be determined by analyzing the deviation from the specified goals or objectives. Pounds (1969) expresses this approach. Problem formulation is not valued as a particularly important element of rational choice: the correct formulation of the nature of the problem is a given. Yet researchers such as Raiffa (1968) note the "error of the third kind" in rational approaches, namely, solving the wrong problem.

It is clear that many of the assumptions of this approach are problematic, and few theorists have accepted this view as descriptive of how organizations formulate the nature of strategic decisions.

Perhaps the most recent and well-quoted example of the relationship between the Rational view and strategic problem formulation is Porter's (1980) work on competitive strategy. Porter concentrates on the interaction between characteristics of industry structure and the firm's environment. The essence of the argument is that strategy is a match between the firm and industry characteristics and that firm strategy is constrained by industry structure and its evolution through time. Defining the problem is not an issue.

Some theorists are softening their positions about rational analytic models as being useful only for low-level managerial problems of a housekeeping variety. Mason and Mitroff (1981, p. 367) welcome the advent of user-oriented computer modelling systems (Keen and Wagner, 1979; Wagner, 1979) which allow the user to build almost

directly, in natural language, firm-level, business-level and competitive response models.

While such models do not yet incorporate differing stakeholder viewpoints, the trend towards analytical models as aids in a process of policy dialogue is being reflected by other authors. Hertz and Thomas (1983) and Thomas (1984) stress this strategic dialogue theme and argue that analysis and formulation are parts of a policy dialogue process which is iterative, adaptive and flexible. This dialogue involves the consideration by management of problem and policy formulation through a continual reexamination of potential alternatives strategies and problem assumptions using several passes of an analytic modelling framework. Based on a laboratory study, Schwenk and Thomas (1983) conclude that alternative analyses based on different assumptions may help decision-makers improve the quality of decisions.

Avoidance Approach

One approach is Avoidance of the problem and is based on the assumptions that the status quo must be maintained and that, if symptoms to a problem are ignored, the problem will eventually go away. If symptoms change frequently over time, why spend time or energy on defining the nature of the problem?

The decision-making norms of an organization may be to avoid the identification of new problems (Janis and Mann, 1977). New problems may indicate that management is not doing its job or that someone powerful is responsible for a major problem (Lyles and Mitroff, 1980).

Additional support for the existence of this approach relies on the belief that organizations will avoid uncertainty (Cyert and March,

1963) and will avoid making decisions (Barnard, 1938). Butler, et. al.
(1979) suggest that Avoidance occurs in organizations where there is
no pressure for new activities or no competition for resources.
Recognition of a problem will occur only when the organization must
acknowledge it because of the threat or disruption to the status quo.

If it is perceived that the recognition of a problem will result
in a loss of power or prestige, avoidance will be likely. In fact
the larger the perceived threat, the more likely will be avoidance
behavior (Hermann, 1972).

Biases that appear to be inherent in this approach are selective
perception and attention, as well as rationalization. Organizations
will focus their attention on factors which are unchanging, positive
reporting mechanisms, and hopeful assertions about the future as
mechanisms to avoid the recognition of the problem.

Adaptive Approach

An extension of the previous approach is the Adaptive approach.
It values the status quo but for different reasons than the Avoidance
approach. The Adaptive approach is based on the assumption that since
the environment is highly uncertain and rapidly changing, organiza-
tions can move too quickly at identifying new problems. Thus it does
not suggest that maintaining the status quo is the most important
criterion but that change must be introduced slowly and incrementally.
Quinn summarizes this:

> To improve both the information content and the process
> aspect of decisions surrounding precipitating events,
> logic dictates and practice affirms that they are nor-
> mally best handled carefully and consciously incremen-
> tally, to make decisions as late as possible consistent
> with the information available and needed. (1980, 22)

A shared social perception of the state of the organization de-
fines the status quo. This corresponds to Weick's (1969) retention
system or Billings, et. al.'s (1980) existing state. It is accepted
that identifying new problems is a necessary evil and that some change
may be necessary as well. This should not, however, create dramatic
change in the status quo.

Another underlying assumption is that organizations can make
decisions too quickly about the nature of the problem. It is better
to go slowly, take incremental steps, and be flexible to new informa-
tion (Braybrooke and Lindblom, 1970; Lindblom, 1959; Vickers, 1965). A
necessary component of this approach is the presence of sufficient time
for problem recognition, a moderate amount of discontinuity in starts
and stops when problems are formulated, and cycles and recycles over
time involving problem re-formulation. There would be no simple
sequence of steps (Butler, et. al., 1979; Lyles, 1981; Mintzberg, et.
al., 1976) in the problem formulation process.

Biases introduced in this approach would be escalating commitment
(Staw, 1981) to the first view and utilizing new data to support this
view; the illusion of better control by moving slowly; and selective
perception of information. Identification of problems that would
create major change would often be avoided.

Political Approach

The essence of the Political approach is the subjective construction
of reality (Berger and Luckmann, 1967). Coalitions within organiza-
tions will use their own histories and experiences to construct a view

of the problem (Axelrod, 1976; Taylor, 1975). As a result each will represent the nature of the problem in light of their own domain or interests (Hayes and Simon, 1977; Cyert and March, 1963). Hence, coalitions will be politically motivated to support one view of a problem over other views since the way the nature of the problem is resolved will have an impact on the way future resources will be allocated (Abell, 1977; Allison, 1971; Bower, 1970; Pfeffer, 1981). Groups will attempt to get the support of the powerful people for confirmation of their view of the world (Bower, 1970; Burgelman, 1983; Lyles, 1981; Lyles and Mitroff, 1980).

The assumptions of this view are contrary to those of the Rational approach. Here it is assumed that people are biased and personally motivated. Even if everyone looks at the same symptoms of a problem, they will commonly adopt different viewpoints about its nature and characteristics. Full information will never be available and there is no way to determine the one best view. Further, this approach is based on the assumption that it is best to minimize conflict and debate by coalescing support, agreement, and power behind one view (Pfeffer, 1981).

Certain biases may occur with this approach. Social pressures caused by peer pressure and the power of others will be evident. Escalating commitment to a particular view may also be present. The illusion of control (Langer, 1975) will also be influential since certain groups will be perceived as experts and expected to know more about the situation than others.

Decisive Approach

The Decisive approach extends the Political approach one step further by suggesting that there are inherent inconsistencies in the way people experience information. Their ability to make sense out of symptoms is based on past actions, successes and understandings of cause and effect (Bougon, et. al., 1977). Weick (1969) argues that it is only through managers' perceptions of the environment that the environment can be sensed and understood by the organization. Hambrick and Snow (1977) reinforce this view by suggesting how imperfect environmental scanning, selective perception and biased viewpoints distort information into managerial perceptions which guide strategic decision-making. They also point out how experience and past strategy-performance relationships can influence strategy formulation through the interplay of managerial perception with the current strategic problem.

Thus individual interpretations of problems are not accurate because other variables such as recency, frequency and availability of information (Kahneman and Tversky, 1974) and associated cognitive biases become important (Einhorn and Hogarth, 1981). Furthermore, everyone has ready made solutions that they fit to situations and in fact use these solutions to structure or formulate the problem (Bartunek, 1984; Cohen, March, Olsen, 1972; Starbuck and Hedberg, 1977).

Consequently deciding on the problem's nature is not particularly important: it is too nebulous and too time-consuming. It is also an illusion that management can control the many interacting contigencies

that affect the firm's future. Biases introduced in this approach are
emotional stress, social pressures, prior hypothesis bias, and illusion
of contol. Therefore management should not worry about resolving the
nature of the problem but should decide on an _action_ to be taken, do
it, and then assess what has happened (Salancik and Meindl, 1984).
These are the action generators that Starbuck describes (1983).

FUTURE RESEARCH SUGGESTIONS

Although these categorizations of strategic problem formulation
exist in the research literature, there has been little empirical
testing of alternative models. What is known is that the formulation
of strategic problems influences the firm's strategic choices, that
firms operate in environments of varying levels of uncertainty, and
that firms faced with higher levels of environmental uncertainty will
tend to confront a broader range of unanticipated events. What we do
not know is to what extent these models accurately describe the stra-
tegic problem formulation process and under what conditions.

Therefore, in the following paragraphs an inventory of research
propositions is presented to guide future research. This research
probably requires the extensive use of field research methods in order
for researchers to develop a deep, 'fine-grained' understanding of
problem formulation processes.

Low Environmental Uncertainty

Under environmental conditions of low uncertainty, the signals
indicating a problem would tend to be clear and unconfusing. They
would be viewed similarly by many people and there would be consensus

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about the nature of the problem. Realistically this condition exists most commonly in situations where the strategic problem is defined through government legislation or other stakeholder groups. Under these conditions we might expect the Rational or the Avoidance models to be used. This expectation is formalized in terms of Proposition 1 below.

> Proposition 1: When the level of environmental uncertainty (whether macroeconomic, technological, organizational or industry-based) is relatively low, problem formulation is a simpler, consensual task in which decision-makers tend to act in accordance with the prescriptions of either Rational or problem Avoidance models of problem formulation.

High Environmental Uncertainty

When the indicators of a strategic problem provide weak, conflicting, and/or discontinuous signals, much subjectivity exists in the interpretation of the signals and in the conduct of the problem formulation process. Consequently, there will be varying views about the problem's nature and consensus is often ruled out. Further, as environmental uncertainty increases, there will be unanticipated events and additional disagreement about the problem's nature and existence. Under these conditions, strategic problem formulation skills become most important and require the balancing of alternative problem viewpoints.

Proposition 2 below stresses the more flexible skills required for problem formulation in conditions involving significant environmental uncertainty.

> Proposition 2: When the level of environmental uncertainty is relatively high, problem formulation skills become cru-cial. In these conditions, problem formulation becomes a

negotiated outcome in which the problem perspectives of
alternative actors must be balanced by key decision makers.
Understanding the alternative perspectives involves the
examination of a range of problem formulation models.

A major research gap also exists in determining how firms which

perform successfully in conditions of high uncertainty sense and for-

mulate strategic problems. Certain research hypotheses suggest them-

selves. For example, do these firms attach little meaning to the

stimuli and thus, take actions? Do these diverse stimuli become part

of the conceptual map of the organization and eventually create link-

ages of cause-effect relationships? Do these firms define the problems

in terms of old problems that have already been solved through the

firm's success programs? However, the research literature on organi-

zational learning and adaptation (Fiol and Lyles, 1985) suggests that

successful problem formulation is closely related to organizational

learning capabilities. This is formulated in terms of Proposition 3

below.

Proposition 3: Successful organizations facing high situa-
tional complexity and uncertainty, learn to adapt over time
to unanticipated environmental events. Consequently, as
organizations learn, they are likely to develop strong
skills in identifying strategic issues and formulating
strategic problems.

Insert Table 2 about here

Characteristics of Problem Formulations

Theoretically the characteristics of good strategic problem for-

mulators and poor problem formulators can be readily identified.

Table 2 summarizes some of these characteristics and suggests further

research propositions. For example, good problem formulators can be expected to have had many past experiences with unanticipated events which help to build new conceptual maps (Hedberg, 1974), a decentralized communication system, and a planning culture that generates multiple scenarios regarding unexpected events. Furthermore, good problem formulators would tend to utilize inquiry methods that generate multiviews of the problem's nature and a strong debate regarding differences in views (Churchman, 1971; Lyles and Mitroff, 1980; Mitroff and Betz, 1972).

In addition, it may be possible to formulate research propositions about good organizational-level problem formulation. For example, successful firms may have assembled a repertoire of responses that range from adopting past success response programs, designing new programs, unlearning past programs through to generating appropriate actions. Organizations that learn and adapt over time show this behavior repertoire (Starbuck, 1983, Fiol and Lyles, 1985). Thus successful firms might be expected to utilize all of the available problem formulation models as part of their repertoire and to identify when to use each one based on the situation. Testing this theoretical argument is fruitful ground for future research on strategic problem formulation.

CONCLUSIONS

The problem formulation models discussed in this paper represent a range of realistic, but conflicting, ideas about strategic problem formulation. Each is based on different assumptions and effectiveness criteria and incorporates different biases. Discovering which

approach captures the essence of strategic problem formulation best is a difficult exercise. It is perhaps better to identify the fit between managerial, empirical and subjective viewpoints in making a choice about the problem's nature.

Strategic choice is regarded as a process involving a match between managerial perception about the problem and the evidence about the problem which emerges from more concrete analytical and formal modelling processes such as environmental analysis, industry analysis and so forth. Strategic problem formulation must also weigh evidence drawn from analytic frameworks alongside the viewpoints emerging from behavioral, social, political and organizational processes in arriving at an appropriate problem formulation. It is suggested here that strategic problem formulation (which conditions strategic choice) must involve the balancing of these alternative problem viewpoints and perspectives.

References

Abell, P. The many faces of power and liberty: revealed reference and autonomy and teleological explanation. <u>Sociology</u>, 1977, 11, 1, 3-24.

Ackoff, R. L. <u>Redesigning the future</u>. New York: Wiley, 1974.

Ackoff, R. L. Systems, organizations, and interdisciplinary research. In Emery, F. E. (ed.), <u>Systems thinking</u>. Baltimore: Penguin, 1969.

Allison, G. T. <u>Essence of decision: explaining the Cuban missile crisis</u>. Boston: Little, Brown, 1971.

Andrews, K. R. <u>Concept of corporate strategy</u>. Homewood, Il.: Irwin, Inc., 1980.

Ansoff, H. I. <u>Implanting strategic management</u>. Englewood Cliffs, N.J.: Prentice Hall, 1984.

Axelrod, R. M. (ed.) <u>Structures of decision: the cognitive maps of political elites</u>. Princeton: Princeton University Press, 1976.

Barnard, C. I. <u>Functions of an executive</u>. Cambridge: Harvard University Press, 1938.

Bartunek, Jean M. Changing interpretive schemes and organizational restructuring: the example of a religious order. <u>Administrative Science Quarterly</u>, 1984, 29, 355-372.

Berger, P. L. and Luckmann, T. <u>Social constriction of reality</u>. New York: Doubleday, 1967.

Billings, R. S., Milburn, T. W. and Schaalman, M. L. A model of crisis perception: a theoretical and empirical analysis. <u>Administrative Science Quarterly</u>, 1980, 25, 300-316.

Bougon, M., Weick, K. E. and Binkhorst, D. Cognition in organizations: an analysis of the Utrecht Jazz Orchestra. <u>Administrative Science Quarterly</u>, 1977, 22, 606-639.

Bower, J. L. <u>Managing the resource allocation process: a study of corporate planning and investment</u>. Boston: Harvard University Press, 1970.

Braybrooke, D. and Lindblom, C. E. <u>A strategy of decision</u>. New York: Free Press, 1970.

Bruner, J. S. and Kresch, T. (eds.) Perception and personality. Durham, N.C.: Duke University, 1950.

Burgelman, R. A. A process model of internal corporate venturing in the diversified major firm. Administrative Science Quarterly, 1983, 28, 223-244.

Butler, R. J., Astley, W. G., Hickson, D. J., Mallory, D. J. and Wilson, D. C. Strategic decision making: concepts of content and process. International Studies of Management and Organization, 1979, 9, 4, 5-36.

Churchman, C. W. Design of Inquiring Systems. New York: Basic, 1971.

Cohen, M. D., March, J. G., Olsen, J. P. A garbage can model of organizational choice. Administrative Science Quarterly, 1972, 17, 1-25.

Cowan, D. Theoretical model of the problem recognition process. University of Notre Dame, unpublished Working Paper, 1984.

Cyert, R. M. and March, J. G. A behavioral theory of the firm. Englewood Cliffs, N.J.: Prentice Hall, 1963.

Einhorn, H. J. and Hogarth, R. M. Behavioral decision theory: processes of judgment and choice. Annual Review of Psychology, 1981, 32, 53-88.

Fahey, L. and King, W. Environmental scanning for corporate planning. Business Horizons, 1977, 20, 61-71.

Fiol, C. M. and Lyles, M. A., Organization Learning. Academy of Management Review, 1985, forthcoming.

Freeman, R. E. Strategic management: A stakeholder approach. Boston: Pitman, 1984.

Hambrick, D. C. and Mason, P. A. Upper echelons: The organization as a reflection of its top managers. Working paper SE27, Strategy Research Center, Columbia University, July, 1983.

Hambrick, D. and Snow, C. A contextual model of strategic decision making in organizations. Academy of Management Proceedings, 1977, 109-112.

Hayes, J. R. and Simon, H. A. Psychological differences among problem isomorphs. In Costellan, et. al., eds., Cognitive theory. Hillsdale, N.J.: Lawrence Erlbaum, 1977.

Hedberg, B. Reframing as a way to cope with organizational stagnation. Working paper. Berlin: International Institute of Management, 1974.

Herden, R. P. and Lyles, M. A. Individual attributes and the problem conceptualization process. Human Systems, 1981, 2, 275-284.

Hermann, C. F. Threat, time and surprise: a simulation of international crisis. pp. 187-211. In Charles F. Hermann (ed.), International Crisis: Insights from Behavioral Research. N.Y.: Free Press, 1972.

Hertz, D. B. and Thomas, H. Risk analysis and its applications. Chichester, England: John Wiley & Sons, 1983.

Hertz, D. B. and Thomas, H. Risk analysis: Important new tool for business planning. Journal of Business Strategy, Winter 1983 3, 3, 23-30.

Hogarth, R. M. and Makridakis, S. Forecasting and planning: an evaluation. Management Science, 1981, 27, 115-138.

Janis, I. L. and Mann, L. Decision-making: a psychological analysis of conflict, choice and commitment. N.Y.: Free Press, 1977.

Keen, P. G. and Wagner, G. R. "DDS: An executive mind-support system," Datamation, 1979 (November), 117-122.

Kepner, C. H. and Tregoe, B. B. The Rational Manager. N.Y.: McGraw-Hill, 1965.

Langer, E. J., Illusion of Control. Journal of Personality and Social Psychology, 1975, 32, 311-328.

Lenz, R. T. and Engledow, J. L., Environmental analysis units and strategic decision making: A field study of selected "leading-edge" corporations. Strategic Management Journal, 1985, forthcoming.

Lindblom, C. E. Science of 'muddling' through. Public Administration Review, 1959, 79-88.

Lubin, J. Presentation at Strategic Management Conference, University of Pittsburgh, Pittsburgh, 1977.

Lyles, M. A. Formulating strategic problems: empirical analysis and model development. Strategic Management Journal, 1981, 2, 61-75.

Lyles, M. A. and Mitroff, I. I. Organizational problem formulation: an empirical study. Administrative Science Quarterly, 1980, 25, 102-119.

MacCrimmon, K. R. and Taylor, R. N. Decision making and problem solving. pp. 1397-1453. In Marvin D. Dunnette (ed.) Handbook of Industrial and Organizational Psychology. Chicago: Rand McNally, 1976.

Mason, R. O. and Mitroff, I. I. Challenging strategic planning assumptions. New York: Wiley, 1981.

McCaskey, M. B. The Executive Challenge, Marshfield, Mass.: Pitman, 1982.

Mintzberg, H. The nature of managerial work. New York: Harper & Row, 1973.

Mintzberg, H., Raisinghani, D. and Theoret, A. The structure of 'unstructured' decision processes. Administrative Science Quarterly, 1976, 21, 246-275.

Mitroff, I. I. and Betz, F. Dialectic decision theory: a metatheory of decision making. Management Science, 1972, 19, 1, 11-24.

Mitroff, I. I. and Emshoff, J. R. On strategic assumption-making: a dialectic approach to policy and planning. Academy of Management Review, 1979, 4, 1-12.

Mitroff, I. I. and Mason, R. O. Structuring ill-structured policy issues: further explorations in a methodology for messy problems. Strategic Management Journal, 1980, 1, 331-342.

Morgan, G. and Ramirez, R. Action learning: a holographic metaphor for guiding social change. Human Relations, 1984, 37, 1-28.

Pfeffer, J. Power in organizations. Marshfield, Mass.: Pitman, 1981.

Pfeffer, J. and Salancik, G. R. External control of organizations. New York: Harper & Row, 1978.

Pfeffer, J., Salancik, G. R. and Leblebici, H. The effect of uncertainty on the use of social influence in organizational decision making. Administrative Science Quarterly, 1976, 21, 227-245.

Porter, M. E. Competitive strategy. New York: Free Press, 1980.

Pounds, W. F. Process of problem finding. Industrial Management Review, 1969, 11, 1-19.

Quinn, J. B. Strategies for change: logical incrementalism. Homewood, Il.: Irwin, 1980.

Raiffa, H. Decision Analysis. Reading, Mass.: Addison-Wesley, 1968.

Ramaprasad, A. and Mitroff, I. On formulating strategic problems. Academy of Management Review, 1984, 9(4), 597-605.

Rumelt, R. P. Evaluation of strategy: theory and models. pp. 196-212.
    In E. Schendel and C. W. Hofer. Strategic managment, a new view of
    business policy and planning. Boston: Little Brown, 1979.

Salancik, G. R. and Meindl, J. R. Corporate attributions as strategic
    illusions of management control. Administrative Science Quarterly,
    1984, 29, 238-254.

Schwenk, C. R. Cognitive simplification processes in strategic
    decision-making. Strategic Management Journal, 1984, 5, 111-128.

Schwenk, C. R. and Thomas, H. Formulating the mess: the role of decision
    aids in problem formulation. Omega, 11, 3, 1983, 239-252.

Schwenk, C. R. and Thomas, H. Effects of conflicting analyses on mana-
    gerial decision-making: A laboratory experiment, Decision Sciences,
    Vol. 14, 1983, 467-482.

Starbuck, W. H. Organizations as action generators. American
    Sociological Review, 1983, 48, 91-102.

Starbuck, W. H. and Hedberg, B. L. Saving an organization from a
    stagnating environment. pp. 249-58. In Hans B. Thorelli (ed.),
    Strategy + Structure = Performance. Bloomington: Indiana
    University Press, 1977.

Staw, B. M., Escalation of Commitment to a Course of Action. Academy
    of Management Review, 1981, 6, 577-587.

Taylor, R. Concepts, theory and techniques, psychological determinants
    of bounded rationality: implications for decision making strategies.
    Decision Science, 1975, 6, 3, 409-429.

Thomas, H. Strategic decision analysis: applied decision analysis
    and its role in the strategic management process. Strategic
    Management Journal, 1984, 5, 139-156.

Thompson, J. D. Organizations in action. New York: McGraw-Hill,
    1967.

Tversky, A. and Kahneman, D. Judgment under uncertainty; heuristics
    and biases. Science, 1974, 185, 1124-1131.

Tversky, A. and D. Kahneman. The framing of decisions and the psychology
    of choice. Science, 1981, 211, 453-458.

Vickers, G. Art of judgment. N. Y.: Basic, 1965.

Volkema, R. Problem formulation in planning and design. Management
    Science, 1983, 29(6), 639-652.

Wagner, G. R. "Enhancing creativity in strategic planning through com-
    puter systems." <u>Managerial Planning</u>, 1979 (July-August).

Weick, K. E. <u>Social psychology of organizing</u>. Reading, MA: Addison-
    Wesley, 1969.

TABLE 1

APPROACHES TO STRATEGIC PROBLEM FORMULATION

ALTERNATIVE APPROACHES

Criteria	Rational	Avoidance	Adaptive	Political	Decisive
Criteria	Rationality	Maintenance	Incrementalism Satisficing	Bargaining	Action Generation
Process	Sequential	Discontinuous	Discontinuous Cyclical	Cyclical	Random
Biases	' Wishful Thinking ' Rationalization	' Selective Perception ' Rationalization ' Wishful thinking ' Anchoring	' Escalating Commitment ' Illusion of Control ' Selective Perception	' Social Pressures ' Escalating Commitment ' Illusion of Control	' Emotional stress ' Social pressures ' Prior hypothesis bias ' Illusion of control
Assumptions	' Full Information ' One right formulation ' No biases inherent	' Important to maintain status quo ' If problem is ignored, it will go away ' Symptoms change	' Maintenance of status quo is important ' Environment is too uncertain to predict ' Change should be introduced very slowly	' Everyone has own view of problem ' People will act in own self interest ' There is no one correct view of problem ' Minimize conflict	' Environment is very dynamic ' Everyone is biased ' Actions are the most important management task
Evidence	Facts	Status Quo	Intuition	Power	Actions
Performance Outcome	True Definition	Maintenance of Status Quo	Incremental Change	Agreement	New situation

TABLE 1 (con't)

APPROACHES TO STRATEGIC PROBLEM FORMULATION

ALTERNATIVE APPROACHES

	Rational	Avoidance	Adaptive	Political	Decisive
Represen-tative References	Allison (1971) Raiffa (1968)	Cyert and March (1963) Janis and Mann (1977)	Quinn (1980) Lindblom (1959) Mintzberg, et. al (1976)	Cyert and March (1963) Hayes and Simon (1979) Lyles (1981)	Cohen, March and Olsen 1982 Starbuck and Hedberg (1977) Starbuck (1983)

TABLE 2

CHARACTERISTICS OF SUCCESSFUL AND UNSUCCESSFUL

STRATEGIC PROBLEM FORMULATORS

	Context	Defining	Skills
Successful	' General multiple scenarios of worst case ' Many past experiences with unanticipated events ' Decentralized	' Multiviews of problem's nature ' Strong discussion or debate ' Cognitive/ experimental ' Managerial abilities ' Tolerance for ambiguity ' Use of metaphor/analogy/ maps	' Past success programs ' Newly designed programs ' Unlearning ' Actions ' Discrimination skills
Unsuccessful	' Formalized environmental scanning and low scenario operation ' Few past experiences with unanticipated events ' Centralized	' Single view of problem's nature ' Consensus or mandated view	' Past success programs

AWARENESS PROCESSES OF ENVIRONMENTAL CHANGES

ENVIRONMENTAL
EVENTS

ANTICIPATED

UNANTICIPATED

FORMAL
SCANNING

INFORMAL
AWARENESS
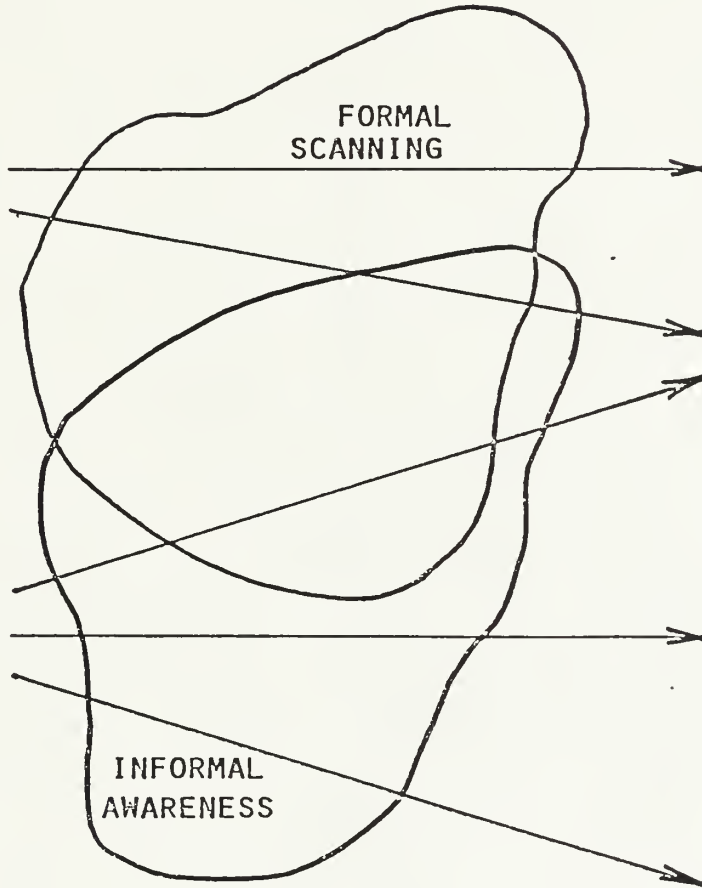
AWARENESS
MECHANISMS

ENVIRONMENTAL
SCANNING

↑

ISSUE
MANAGEMENT

↑

STRATEGIC
PROBLEM
FORMULATION

↑

NO MEANING
ATTACHED TO
UNEXPECTED
EVENT