THE USES AND LIMITATIONS OF ANALYSIS IN THE DEPARTMENT OF DEFENSE

Ph.D. Thesis Proposal

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ABSTRACT

This is a proposal to study the role of systems analysis in the policy level decision processes of the Department of Defense. It is prompted by two major developments relevant to the management of large enterprises in government and industry. The first is the increasing rate of technological and social change facing modern enterprises. The second is the growth of mathematical and other analytical techniques applicable to managment decision.

The rapid technological change has increased the uncertainties, the complexities, and the size of the resource commitments involved in the decisions faced by top management. This has increased the need for improved decision processes at the policy level of enterprise. At the same time, the mathematical techniques of operations research that have been so useful in the operational problems of the firm have not been significantly useful in dealing with the major decision problems at the policy level. This suggests that we need a better understanding of the uses and limitations of analysis in decision processes at the policy level if we are to improve those processes.

Analytical approaches to decision-making have been applied at the policy level in DOD to a greater extent than in most governmental and industrial enterprise, and the art of this application is probably better developed there than anywhere else. By studying the uses and limitations of analysis in DOD, it should be possible to suggest how analysis can be made more useful in policy level decision processes, how to achieve a wider acceptance and use of analytic approaches among top management, and what directions for research on analytic techniques might be most fruitful for application at the policy level.

The major obstacles to the application of analytic techniques to top management decision processes appear to be that 1) objectives are not well defined and their clarification is in fact a part of the decision process; 2) the conceptual structure of the problems are poorly defined and full of uncertainties; 3) judgement and experience are essential components of the decisions; and 4) bargaining among the principal participants is an important characteristic of the decision process.

The emphasis in the research will be on the uses of analysis by the principal participants and its limitations in meeting their needs; on the interaction between the systems analyst and the decision-makers; and on the extent to which systems analysis approaches to decision have become accepted and institutionalized in the Department.

There will be four distinct phases of research. The first phase

will be the reconstruction of two or three major decisions that have involved substantial use of systems analysis and a number of principal participants from different organizations within the Department. This would be accomplished by a review of the relevant documents and interviews with the principals involved, including the analysts. The second phase is the observation of a decision process as it occurs. This will in fact be done at the same time as the first phase. It will be accomplished in essentially the same way, except that more contact with the principals should be possible.

The third phase is the interpretation of the observations in terms of existing theories of decision and the suggestion of new theoretical concepts based on the observations and a review of the current theories. It is impossible to observe without interpreting, of course, so some of this phase will occur during the observations and reconstructions.

The final phase of the study is the suggestion of guidelines for better and wider uses of analysis in the top management decision processes of large enterprises and the suggestion of areas of research into improved analytical techniques that appear most likely to be useful at the policy level.

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I. INTRODUCTION

This research is motivated by three developments in the management of large technology-based enterprises. The first is the growing need for explicit analyses of high quality to provide a sounder basis for decision-making at the top management level. The second is the rapid growth in the development of quantitative techniques relevant to managerial decisions. Third is the growing body of theory about decision-making by individuals and in large organizations.

Operations research has been very useful in many important operational problems, but its application to more comprehensive decision problems typical of the top management level has been quite limited. Theories of decision-making have developed largely along a four-way split: descriptive - normative and operational - behavioral. As a result, there is essentially no useful theoretical framework to guide the decision-maker in making the major decisions of his organization where operational and organizational factors are intertwined.

In parallel with this development of quantitative decision techniques and theories of decision-making for the last six years has been Robert McNamara's management of the Department of Defense. The Office of the Secretary of Defense (OSD) has applied analytic approaches to decision-making at the top management level to a greater extent than perhaps any other large public or private organization. The art of this application is probably better developed there than anywhere. In spite of the publicity, however, neither computers nor the more advanced mathematical decision techniques have played a significant role in analyses of the major decisions of the Department.

We are faced, then, with the following situation: There is a growing need to develop improved analytic methods that can provide better bases for policy level decisions in large organizations. Most of the quantitative techniques currently available or under research are applicable to these decisions only on an ad hoc basis if at all. There is a fundamental schism between the operational and the behavioral theories of management decision-making that becomes especially serious at the policy level of an organization. High quality analyses at that level require a mixture of quantitiative analysis, expert opinion, and judgement in a way we still do not understand very well. In spite of all this, however, systems analysis as practiced in OSD has been outstandingly useful.

We need to develop analytic techniques better suited to top management decision-making, to widen the acceptance of analytic approaches to decision-making in an organization, and to bridge the gap between

the behavioral and operational theroies of management decision. A prerequisite to these developments is a better understanding of the uses and limitations of analysis for decisions at the policy level of large organizations. An excellent way of achieving this would be to study intensively the role of systems analysis in the top management decision processes of the Department of Defense.

II. PROBLEM DEFINITION

A. Terminology

The purpose of this research is to discover why systems analysis has not proven more useful in the decision processes of top management and how it might be made more useful. I will be dealing, then, with those particularly significant decision problems that have to do with the character of the organization over the reasonably foreseeable future. These constitute what Anthony (1) calls the strategic planning problem:

> Strategic planning is the process of deciding on objectives of the organization, on changes in these objectives, on the resources used to attain these objectives, and on the policies that are to govern the acquisition, use, and disposition of these resources.

"It connotes big plans, important plans, plans with major consequences." In spite of the military use of the word, I will refer to these decisions as the strategic decisions of the organization.

Strategic decisions are usually very poorly structured; part of the decision is deciding what is to be decided and how it is to be decided. It is useful to draw a distinction between decision and choice. Choice is the selection of a specific alternative from a collection of alternatives, while decision refers to the broader process of arriving at a choice situation in addition to the choice itself. Analyses for strategic decision problems must deal with more than just the choice component of decision if they are to be significantly useful. Therefore, this study will be concerned with decision processes rather than with choice alone.

In a large organization, the decision process involves a number of people. The decision-maker is the individual who makes the final choice or is responsible for that choice. A principal is one of the major participants in the decision process, usually by reason of his position and responsibilities in the organization. An analyst is one who participates in the decision process by preparing analyses for one of the principals. Others who are responsible to one of the principals will be called subordinates, even though they may in fact have large responsibilities in the organization. This appears to be a useful nomenclature in spite of the inevitable overlaps and ambiguities.

Decisions at the policy level require consideration of the principals' personal and sub-organizational goals as well as the performance of the organization as an operational entity. These two broad categories of goals will be designated behavioral and operational.

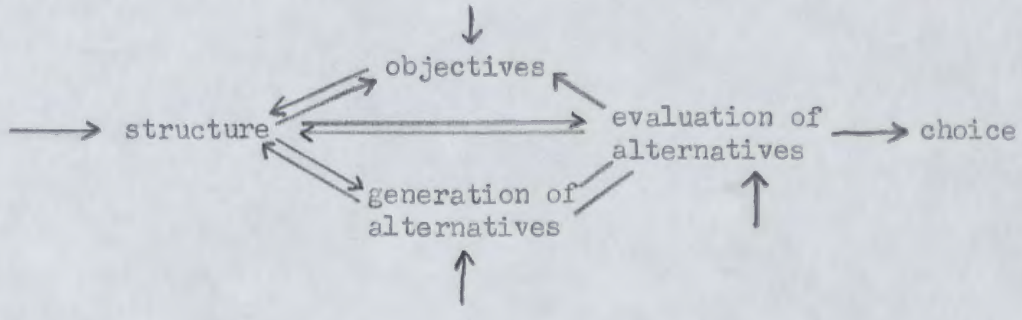
As a final definition, analysis will mean the explicit process of defining objectives, structuring the problem, and generating and evaluating alternatives. As practiced in OSD, this is called systems analysis. As defined, analysis differs from the summaries of data and background studies commonly prepared for top management decisions. Objectives are defined more explicitly and more operationally. Relationships among variables are made more explicit and are related to a structure for the problem as a whole. The synthesis and evaluation of alternatives is explicitly iterative. Quantitative measures of effectiveness and costs are employed whenever possible to help compare alternatives.

B. Analysis for Strategic Decisions

Strategic decision problems can arise in a number of ways: new objectives may be adopted or imposed; new alternatives may arise in the form of new technology or new markets; the external environment may change significantly; or new techniques may arise for evaluating alternatives. Although strategic decisions usually involve the future of the organization, they should not be confused with the common conception of long-range planning. Projected goals and budgets usually cannot be related meaningfully to the major operational decision problems that face top management and that involve major commitments, constraints, and opportunities for the organization in the future. It is these strategic decisions that in fact determine the future course and success of the organization, and the process by which top management recognizes and resolves these decisions is what we mean by the strategic planning process.

Strategic decision problems are characterized by: lack of a clear structure; overlapping, conflicting, and vaguely defined objectives; confusion of means and ends, of control variables and measures of effectiveness; intermingled questions of value and fact; and significant impact on the future of the organization and its sub-organizations.

A useful representation of the decision process is shown in the following diagram. The pre-choice categories are the domain of analysis for strategic decision problems. Objectives are evolved



in the light of available alternatives and the perceived structure of the problem. Structuring includes identifying relationships among variables (not necessarily mathematically) and the links between objectives and alternatives. New alternatives are generated in the context of perceived structure and the performance of existing alternatives. Choice is the selection of one alternative from those available either as the best or as at least good enough; it usually involves both a course of action and a tentative definition of a follow-on decision problem. The arrows in the above diagram from outside the process represent both external inputs to the process and ways in which new decision problems can arise.

Strategic decision problems, then, are large, complex and poorly structured, and the process by which we deal with them is not sequential but iterative. Intuitive choice among alternatives that have been generated in some haphazard way is clearly not the best way to deal with these problems. Good analysis can help clarify and define objectives, improve perception of the scope and structure of the problem, help devise improved alternatives, and provide a sounder basis for evaluating and choosing among alternatives. "For most of these questions, a mix of calculations, intuition, and experience is required. One of the biggest challenges facing us today is how to find ways of blending these factors better in those areas in which unaided calculation is weakest." (2)

The conceptual difficulty and the need for better analytic methods suggested above are compounded by the organizational character of the decision process. Strategic decision problems typically are so complex in structure and technical considerations that a decision-maker has neither the time nor the expertise to carry through significant analyses himself, and he must rely on a professional analyst to provide these analyses for him. Further, the decision process involves not just a single decision-maker and his analyst, but also a number of principals with differing organizational responsiblilities, competences, values, and perceptions of the environment.

It is clear that we need to find better ways to combine calculations, judgements, and experience to form a sound basis for decisions at the policy level. We also need to find better ways to telate the work of the analyst to the decision-makers' perception of the problem and better ways to use analysis in a decision process that involves a number of principals.

C. The Uses and Limitations of Analysis

It is tempting to argye that systematic and explicit analysis in a decision framework like that described above will result in

better decisions. There is little doubt that this is true for the relatively well-defined or repetitive problems typical of operations management. But is is not so obviously true for strategic decision problems where there are large uncertainties about structure and about the responses of the enemy or the competition and where the objectives are evolved in the decision process itself. Nevertheless, intelligent and imaginative uses of analysis can supplement experience and judgement to provide a better basis for decision than could be experience and judgement alone. It is particularly true at the policy level that analysis is not synonymous with decision-making but is a tool with certain uses and limitations that is available to the decision-maker.

Analysis can be used in the process of decision-reaching -- reaching a better conceptual understanding of the problem and deciding what should be done -- and in the process of bargaining -- interacting with other principals in the organizational process of deciding what will be done. In decision-reaching, the purpose of analysis is to provide the decision-maker with information that will improve his basis for decision. One of the primary uses of analysis in this context is the exploration of the interaction between means and ends; what are desirable objectives depends on what alternatives are available and how effective they are. Analysis can be used to suggest new or improved statements of objectives; to help clarify the structural relationships of the problem, including particularly the linkages between objectives and the control variables; and to generate and evaluate alternatives. Through a continuing cycle of this sort in which he assures that his judgements, experience, and values are reflected at each stage, the decision-maker can use analysis as a sounding board for improving his conceptual understanding of the problem, sharpening his judgement, clarifying and improving his objectives, and obtaining high quality alternatives to choose among.

The uses of analysis in the bargaining process are less often cited. Probably the most valuable use of analysis in that context is the achievement among the principals of a (relatively) common understanding of the problem and framework for discussing it. A corollary use is the education of other principals. Other uses include persuading, confuting, embarrassing, overwhelming, stalling, and the hiding of weak data or assumptions behind tangential or complicated analyses.

The most severe limitations of analysis in decision-reaching are in the interaction between the decision-maker and the analyst. Analyses are useful only to the extent that they effectively relate reality to the decision-maker's perception of the problem and of the environment. Yet analyses represent reality only partially, and they reflect the decision-maker's judgements, experience, and values only partially. This mismatch between the analysis and the decision-maker is probably the most serious limitation. It is compounded by the fact that the analyst and the decision-maker are likely to have differing areas of competence and differing ways of thinking about problems that are understood only

partially by the other. Another serious limitation is the question of whether analysis should be treated as an adjunct to the decision-maker's experience and judgement or as a framework within which they are to be expressed. Similarly, it is not clear whether analysis should be structured along dimensions most relevant to objectives, for which we have the best information, or with which the decision-maker is most familiar and confident. The analyst cannot expect to extract meaningful judgements from the decision-maker in the abstract, but must do so in the context of specific alternatives and a structure for evaluation. The results are inevitably biased because the definition of objectives is interactive with the evaluation of available alternatives.

In the bargaining process, the limitations of analysis appear to be due to the principals' differing perceptions of the environment and of the problem in relation to it, differing thought patterns and concepts of convincing argument, and differing organizational loyalties and responsibilities. Analysis tends to make these differences explicit. While it improves the informational basis for decision, analysis may make the choice seem more difficult and increase tensions and strife among the principals. Finally, analysis usually omits issues of power and leadership because they cannot be fitted into the analytic framework, even though these often are key components of the decision. It is not clear whether this is a limitation or a virtue.

There are other obstacles to the acceptance of analysis in an organization as a framework for discussion, bargaining, and decision that are not properly limitations of analysis as a tool for supplementing experience and judgement. These obstacles derive from the attitudes and values of people as members of a large organization or bureaucracy. Together with the uses and limitations of analysis described above, these appear to be the prime determinants of the extent to which analytic approaches to decision can be institutionalized at the policy level of a large organization. Probably the major obstacle of this kind is a simple lack of understanding of what systems analysis is and how it should be used in the strategic decision process. This can lead in turn to distrust and hostility toward systems analysis. It also leads to poor analyses that reinforce that hostility. Analysis may be viewed by many of the principals as a threat to their power and authority. This can be simply a result of unfamiliarity with the analytic approach. It can also be due to the shift toward judgemental inputs on specific issues of fact and value in the analysis rather than judgements directly about choice, and a consequent reduction in the sense of control over the outcome of the decision process. This is probably the source of much of the criticism of systems analysis as "decision by computer".

Another major obstacle arises from the tendency of the principals to cloak their bargaining about personal and suborganizational goals in the language of problems solving. (3) Forcing explicit statement of assumptions and judgements deprives the principals of a familiar and

accepted means of venting those goals. Principals and suborganizations tend to bypass analysis and become committed to specific alternatives because the acceptability of specific alternatives can be assessed in terms of suborganizational and personal goals more easily than can the uncertain outcome of the analysis, and because it is usually easier for the principals to reach agreement among themselves and within their suborganizations on the choice of an alternative than on the questions of fact and value implicit in that choice. The observation that analysis takes the passion out of the decision process can be traced to these factors. Finally, even though analysis improves the informational base for decision, it can increase the subjectively felt uncertainty of the principals by questioning objectives, assumptions, and conceptual structure and by focusing on the hard choices. Some of the principals will be able to cope with this increased uncertainty, but many are likely to feel it is not only unnecessary but unduly complicating.

D. Research Goals

The goal of developing improved strategic decision processes for an enterprise in an environment of increasing technological and social change provides the impetus for this thesis proposal. In particular, the focus is on the role of analysis in making the strategic decisions at the policy level of an enterprise such as a large corporation or department of government. The purpose is to suggest:

* how analysis can be made more useful in the strategic decision process
* how to achieve wider acceptance and use of analytic approaches to strategic decision problems
* what directions for research on analytic techniques might be most useful.

Our current knowledge of how to analyze strategic decision problems and how to fit them together to mold the future of the enterprise is slight. The theoretical foundations are weak and the principles or rules of thumb that have evolved are not specific enough to assure good analysis. In order to improve this situation, we need to improve our understanding of the role of analysis in the strategic decision process of a large enterprise, and the best way of doing so at present appears to be to study that in the organization where its application has been best developed. I propose to study the role of systems analysis in the policy level decision processes of the Department of Defense, focusing particularly on:

* the uses of analysis by the principal participants and its limitations in meeting their needs

* the interaction between the systems analyst and the decision-makers

* the extent to which systems analysis approaches have become accepted and institutionalized in the Department.

The uses and limitations and the interaction between the analyst and the decision-maker should suggest ways of making analysis more useful and directions for research into improved analytic techniques. The extent to which systems analysis has been institutionalized is interesting in itself as well as being an indication of how we might better overcome organizational obstruction of the use of systems analysis. All three topics should shed light on the theoretical aspects of top management decision.

III. METHODOLOGY

There will be four distinct phases of research:

* Reconstruction of two or three strategic decisions that have involved substantial use of systems analysis

* Observation of an ongoing decision that involves substantial use of systems analysis

* Interpretation of the observations in terms of existing theories of decision and suggestion of new theoretical formulations

* Identification of guidelines for better and wider uses of analysis at the policy level of large enterprises

Although all four phases will be carried on simultaneously to some extent, the first two will largely preceded the last two.

A. Selection of Cases

The cases chosen for reconstruction and observation should be chosen reasonably carefully. They should involve substantial use of formal systems analysis and should involve interactions between a number of principals and suborganizations within DOD. They should not be so controversial politically that the principals will be reluctant to discuss them, nor should they be so routine that organizational and personal interests are not aroused. The cases to be reconstructed should be recent so that most of the principal participants will still be around and recall the situation.

If all cases are to be in one program area, airlift - sealift decisions appear to be a good choice. If it seems preferable to consider more than one program, third-area forces would be a good contrast to the airlift - sealift program. The strategic offense and continental defense programs would be the most interesting to study, but political and security sensitivity of these areas probably precludes them.

B. Reconstruction and Observation

The mechanics of the observation and reconstruction process cannot be specified completely beforehand. This is frankly exploratory research, and the framework for studying these decisions will have to evolve during the study itself. However, it is desirable to have some initial framework to start from, such as the following:

1. Find a key participant in each case and get him to reconstruct as best he can the origins of the decision, the roles of the principal participants, and the flow of information among them.

2. Retrieve the written interchanges and internal working papers related to the decision. Piece together an initial description of the decision process and some tentative abstractions in order to get a good understanding of the decision and the setting in which it ocurred. This would involve identifying:

a. The interactions of the principals among one another,
b. Their uses of analysis in dealing with one another,
c. Their responses to analytic results,
d. Major sub-decisions,
e. The analyses performed in each principal's office,
f. Successive modifications of the analysis and the forces behind them.

3. Interview key principals, including analysts, about key issues. Questions should be well prepared in advance based on the initial description. Important areas to be explored in the interviews are the development of the analysis in response to the principals' uses of it, the role of the analysis in influencing their interactions among one another, and a sorting-out of organizational and operational motivations in explaining each principal's actions. In addition to discussion of specific situations, it will be important to discuss the role of analysis in policy level decision-making in general. This will be interesting in itself and will helpful in rounding out my theoretical framework.

4. Classify the characteristics of the analyses:
   a. Common and differing assumptions
   b. Judgements on fact and value, explicit and implicit
   c. How alternatives arise
   d. Techniques, rules of thumb, heuristics, and intuition
   e. Structuring or evaluating

5. Classify the uses, both stated and apparent, of analysis:
   a. Structuring the problem for discussion
   b. Providing inputs to choice
   c. Goal clarification and definition
   d. Bargaining material

6. Classify the limitations, both stated and apparent, of analysis:
   a. Imperfect representation of the situation
   b. Inappropriate models
   c. Procedures for dealing with multiple and overlapping goals
   d. Imperfectly defined objectives
   e. Inadequate data
   f. Computational constraints
   g. Unresolvable uncertainty
   h. Interpersonal conflict

The final step is to try to make some sense out of it all. This will require revising the above framework, seeking out information to clarify questionable points, and going back to talk with the principals to make sure no great violence has been done to the spirit of the process.

C. Interpretation and Generalization

Interpretation of the observed and reconstructed decision studies will in fact take place during the observation as much as following the first two phases of the research. Following the reconstructions, the first step will be to note the correspondences and deviations with current theories of decision. (The following section gives a brief discussion of these theories as they relate to strategic decisions.) The "noise" in the strategic decision processes of a large organization must be large, and each of the theories covers different dimensions of the decision process, so that a mapping of specific observations to a fit or deviation with theory will not be possible. It should be possible, however, to make some general statements about the strategic decision process in terms of the theories and to infer where the theories are least applicable.

The observations and interpretation described above probably are sufficient to make the effort worthwhile, especially if the extent to which the systems analysis approach has become institutionalized can be described. But the ultimate purpose is to find better ways of using analysis to make strategic decisions and to find better ways of instilling the analytic approach throughout the organization. The final part of the thesis will be an attempt to develop some new tools for dealing with strategic decision problems based on the observations. Proceeding more by induction than by deduction, I hope to develop some suggested guidelines for implementing analysis in an enterprise and some kind of theoretical framework that combines operational and behavioral considerations.

D. Potential Difficulties

This is at once a high-risk and a low-risk undertaking. It may end up with a useful advance in the theory of organizational decision-making or with a series of interesting observations. The observation and interpretation phases of the research, on the other hand, almost certainly will be of value. Limitations on the time of the principals will be a major constraint that will require a rather biased tradeoff of my time for theirs. It will be difficult for them to be open in talking about their values, goals, and motives, but for this initial research that is likely to cause difficulties only in occasional cases. Hostility on the part of the military may be a problem. Probably the best way around this potential difficulty is simple honesty; the services have a legitimate side of this issue that I want to get into my work to avoid a one-sided result.

Access to the principals and the relevant documents will be a problem. My Top Secret clearance at RAND is still active, and need-to-know can presumably can be arranged through Systems Analysis at DOD. Three possiblities for financial support are consulting for RAND, consulting or working directly for Systems Analysis, and support from the Sloan School. It is not clear which of these alternatives would be preferable in terms of access to the various parts of DOD. No particular problem is foreseen in writing the results since a classified working paper and an unclassified formal thesis or a classified thesis and an unclassified publication or book probably would be acceptable.

E. Schedule

This is a highly unstructured study, and detailed scheduling does not make much sense. Broadly, February through May would be spent on the field work of the reconstructed and observed cases.and on initial interpretation. This will necessitate two or three days a week in Washington for most of that period. June and July would be spent on improving the interpretations and clarifying suggested guidelines and theoretical concepts. August is reserved for writing the thesis. If this schedule suggests a rather intense desire to graduate in September, that is not accidental. However, I realize that this may have to slip in order to do the subject justice.

IV. THEORIES OF DECISION

A. Current Theories

Most current theories of decision are behavioral theories concerned with the behavior of people in an enterprise organized to achieve certain objectives or operational theories concerned with efficient selection of activities and allocation of resources to them in order to achieve those objectives. The classical economic theory of the firm is still one of the most comprehensive and elegant theories of economic efficiency. It offers a number of useful concepts, but as a guide for strategic decision problems it has major deficiencies. The single objective of profit maximization and the assumption of full information (at least of probability distributions) are unrealistic, and the behavioral and organizational aspects of policy level decisions are neglected as are problems of technological and social change.

Operations research is more properly a collection of techniques than a theory of decision, but it reflects a particular approach to decision-making. By concentrating on decision problems that can be modeled mathematically and that have well-defined objectives, operations research has found more application than has the classical economic theory. The limitations of OR for strategic decision problems are that the objectives are not well defined (and are in fact part of the problem) and that the conceptual structure of these problems is not understood well enough to be modelled completely.

In spite of their limitations, the concepts and techniques of economics and operations research can be applied usefully to decision problems at the policy level. This application is still more nearly an art than a theory at the present time, although a number of principles and rules of thumb have evolved. Their application is largely to specific sub-problems, and the really hard part of the analysis then becomes how to fit the models together with one another and with judgements in order to sharpen those judgements and formulate a balanced basis for decision. This process, when carried out with intelligence and imagination, is what we call systems analysis or policy analysis.

Theories of long-range planning also are operational theories of decision. Traditional long-range planning consists of projecting goals and budgets into the future, but the difficulty of relating this "plan" to specific decision problems and of adapting to change have made this type of planning relatively ineffectual. Strategic planning, on the other hand, focuses on the evolution of the enterprise over time through specific decisions that are made taking into account change and the future. This type of planning is almost the same thing as systems analysis in a program budgeting framework.

Behavioral theories of decision can be classified as sociological, social psychological, and administrative. Sociological theories deal with the bureaucratic aspects of organizations. Following Weber's development of bureaucratic theory, the emphasis in sociological theories has come to be on "the inescapable tension between individual and organizational goals." (4) These theories deal with goal differentiation conflict, and personality change. Social psychological theories generally are concerned with the impact of a particular variable on efficiency, morale, or productivity. They deal with relatively well defined and repetitive organizational operations. Administrative theories center on issues such as centralization and decentralization, side payments and the decision to participate, and individual perceptions and expectations.

In treating the goals of the organization as reasonably constant and determined from above, it was perhaps inevitable that behavioral theories came to focus on the reduction of tensions within the organization. They have been directed toward the interpersonal environment of the organization rather than toward individual decision problems. Operational theories, on the other hand, are very much problem oriented. The result is an almost complete gap between operational and behavioral theories of decision. Cyert and March (5) have done much to bridge this gap from a descriptive viewpoint. But in trying to develop improved decision processes and to expand the uses of analysis in strategic decision problems, the gap remains almost complete.

B. Alternative Theoretical Formulations

Much of the difficulty in applying theoretical concepts to improve decision processes at the policy level can be traced to this conflict between organizational and operational considerations. Just as there is a gap in the theory, decision-makers tend to treat these two types of problems separately. We could shrug off behavioral and organizational difficulties as so much clutter in the way of truly rational decision, but it is a significant clutter that is not likely to go away in the foreseeable future. Nor is it clear that the best interests of the enterprise would be served over the long run if we tried. On the other hand, it is not at all clear that tension reduction is so important as the behavioral theorists suggest at the policy level; the environment and the principals here are considerably different than at the operational level on which most of the behavioral theories are based. What we are after here, I think, is a basis for tradeoffs between operational effectiveness and organizational viability that is not too lop-sided and that is in some loose sense Pareto optimal.

One possible theoretical framework is the bargaining and mutual accommodation model to which is added systems analysis as one of the factors influencing the bargaining process. Lindblom (6) is the most eloquent advocate of this framework and even suggests that this bargaining process will produce optimal decisions in some sense while over-reliance on analysis will upset the "natural" equilibrium. At the most fundamental level, interpersonal bargaining is the basis for all organizational decisions. But this is hardly a useful framework for improving our decision-making abilities.

Another possible theoretical framework could be obtained by taking systems analysis within a program budgeting framework as the basic framework and incorporating at each step of the decision process the relevant organizational factors. In the evaluation and choice processes ad hoc tradeoffs between operational and organizational goals could be made. This is clearly a more improvement oriented framework than is the Lindblom type of framework. It is probably well-suited to policy level decision problems, but because bargaining is an integral part of those problems it may be preferable to treat organizational factors implicitly rather than explicitly in the actual application.

This latter framework is also consistent with a process model of decision. Process models of decision are models that represent decisions as a sequence of steps or processes. Simon's intelligence-design-choice is one such model.(7) The model described in Section II is another. Kolb's industrial dynamics model of proactive behavior is a process model. (8) Miller, Galanter, and Pribram also imply such a model in which the Image (conceptual structure of the problem and the environment) is manipulated by Plans (heuristics) and the control of thought processes passes from Plan to Plan according to meta-Plans. (9)

The value of a process model for organizational decisions is that it is oriented toward problem solving and also gives an instant framework on which to hang the organizational phenomena. Bargaining mechanisms and motivations can be distinguished at each sub-process and juxtaposed with the objectives, judgements, heuristics, optimization techniques, and search activities of analysis at each sub-process.

With the current information system vogue in management, it is worth noting that systems analysis as proacticed at DOD can be viewed as part of the top management information system. It is an active part of the system that structures and suggests and interacts with top management. This view of analysis, however, is probably most useful to the information specialist designing the rest of the information system for the enterprise. At the present time it makes more sense to treat analysis as part of the strategic decision process than as an informational input to that process.

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