The Structure of "Unstructured" Decision Processes

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A field study of 25 strategic decision processes, together with a review of the related empirical literature, suggests that a basic structure underlies these "unstructured" processes. This structure is described in terms of 12 elements: 3 central phases, 3 sets of supporting routines, and 6 sets of dynamic factors. This paper discusses each of these elements in turn, and then proposes a general model to describe the interrelationships among them. The 25 strategic decision processes studied are then shown to fall into 7 types of path configurations through the model.•

How do organizations go about making "unstructured," "strategic" decisions? Researchers of administrative processes have paid little attention to such decisions, preferring instead to concentrate on routine operating decisions, those more accessible to precise description and quantitative analysis. As a result, the normative models of management science have had a significant influence on the routine work of the lower and middle levels of organizations and almost no influence on the higher levels. But it is at the top levels of organizations where better decision-making methods are most needed; excessive attention by management scientists to operating decisions may well cause organizations to pursue inappropriate courses of action more efficiently.

Although there is a body of normative literature on techniques for strategic decision making, for example, strategy planning, models of the firm, cost-benefit analysis, the evidence from empirical studies of their application indicates that all too often these techniques have made little real difference in the decisional behavior of organizations (Grinyer and Norburn, 1975; Hall, 1973; Whitehead, 1967). These techniques have been unable to cope with the complexity of the processes found at the strategy level, about which little is known.

This paper defines a *decision* as a specific commitment to action (usually a commitment of resources) and a *decision process* as a set of actions and dynamic factors that begins with the identification of a stimulus for action and ends with the specific commitment to action. *Unstructured* refers to decision processes that have not been encountered in quite the same form and for which no predetermined and explicit set of ordered responses exists in the organization. And *strategic* simply means important, in terms of the actions taken, the resources committed, or the precedents set. This paper uses empirical research to suggest a basic framework that describes unstructured, strategic decision processes. The suggested framework embodies the results of our own study of 25 such decision processes, as well as evidence from published empirical studies.

I. INTRODUCTION TO STRATEGIC DECISION MAKING

Published Research on Decision Processes

Most of the empirical literature can be neatly classified into three groups: research by cognitive psychologists on individual decision making in game situations, research by social psychologists on group decision making in the laboratory, and

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research by management theorists and political scientists on organizational decision making in the field.

The research on individual decision making, perhaps best represented by the Newell and Simon book *Human Problem Solving* (1972), relies largely on eliciting the verbalizations of decision makers' thought processes as they try to solve simplified, fabricated problems, such as in cryptarithmetic or chess. These are then analyzed to develop simulations of their decision processes. This research indicates that, when faced with a complex, unprogrammed situation, the decision maker seeks to reduce the decision into subdecisions to which he applies general purpose, interchangeable sets of procedures or routines. In other words, the decision maker deals with unstructured situations by factoring them into familiar, structurable elements. Furthermore, the individual decision maker uses a number of problem solving shortcuts—"satisficing" instead of maximizing, not looking too far ahead, reducing a complex environment to a series of simplified conceptual "models."

Thus, we can conclude from the studies of individual decision making that decision processes are programmable even if they are not in fact programmed: although the processes used are not predetermined and explicit, there is strong evidence that a basic logic or structure underlies what the decision maker does and that this structure can be described by systematic study of his behavior.

Much of the large body of research on group decision making, carried out primarily in the social psychology laboratory, is of little use to us here, for two reasons. First, it is concerned not with the structure of the decision process so much as with the interactions among the participants. Second, because the structure of the strategic decision process is determined by its very complexity, oversimplification in the laboratory removes the very element on which the research should be focused.

In field research on organizational decision making, an early study of an unstructured business decision process by Cyert, Simon, and Trow (1956) at Carnegie-Mellon University stimulated some follow-up studies that have produced a number of insights. Cyert and March (1963) reported on 4 decision processes; 2 were further analyses of parts of the EDP equipment decision process described in the Cyert, Simon, and Trow study, while 2 were new studies. Carter (1971a and 1971b) analyzed 3 decision processes related to computer equipment and 3 related to acquisitions, all in one firm. In Australia, Dufty and Taylor (1962) studied in detail the decision process of a transportation company that had to transfer certain employees after a merger; while in West Germany, Witte (1972) analyzed the documentary evidence from 233 decision processes involving the acquisition of data processing equipment.

In the public arena, Gore (1956) analyzed the processes of 33 decisions made by federal field offices in the state of Washington, while Snyder and Paige (1959) examined "the U.S. decision to resist aggression in Korea." Finally, Pfiffner (1960) reported on the study of Nicolaidis (1960) of 332 "policy" decision processes in the public sector. A ninth study

(Soelberg, 1967), not strictly organizational but nonetheless important in its results, analyzed how a group of candidates for master's degrees decided what job to take after graduation.

Research on 25 Strategic Decision Processes

This paper reports on empirical evidence collected over the span of five years by more than 50 teams of four to five students taking courses in management policy at the master's degree level. Each team studied an organization for three to six months. One assignment was to isolate one strategic decision made by the organization, describe the decision process in narrative form, and then "program" it. The assignment read in part: "By 'program,' the instructor means describe the steps included in the decision in enough detail so that you can represent the decision in flow chart form as you would a computer program." The groups were given a list of guiding questions, which eventually numbered 21, to encourage them to view the decision process comprehensively. Typical questions were: What was the source of the initial stimulus? Were stimuli frequent and/or intense? Were specific constraints and objectives established early? Where did management seek solutions? Were many alternative solutions proposed or did management "satisfice" by taking and testing alternatives one at a time? To what extent was each step or subroutine programmed?

Students were also exposed to some of the field literature cited above, but were encouraged to reject or extend the theory as they saw fit. Many chose to do so. The teams typically conducted structured interviews based on the guiding questions, with a number of the decision makers and other people involved in the process; the interviews took place either after the decision was made or near the termination of the process. Some groups also analyzed documentation when available. At the conclusion of the series of interviews, the teams reconstructed the decision processes and drew general conclusions vis-à-vis the theory. A typical report comprised 2,500 words plus figures, although many were far longer.

How reliable is such a data base for research? The strategic decision process may be researched by observation, by study of organizational records, and by interview or questionnaire. Investigation of records is often impossible because strategic decision processes seldom leave reliable traces in the files of the organization.[1] As Barnard (1966: 192–193) noted:

> Not the least of the difficulties of appraising the executive functions or the relative merits of executives lies in the fact that there is little direct opportunity to observe the essential operations of decision. It is a perplexing fact that most executive decisions produce no direct evidence of themselves and that knowledge of them can only be derived from the cumulation of indirect evidence. They must largely be inferred from general results in which they are merely one factor, and from symptomatic indications of roundabout character.

Observation is certainly a powerful and reliable method, but extremely demanding of research resources because strategic decision processes typically span periods of years; often forced to study the process after completion, therefore, the researcher is obliged to rely heavily on interviewing. The best trace of the completed process remains in the minds of those people who carried it out.

1 The studies by Snyder and Paige (1958) and Witte (1972) are interesting exceptions.

Table 1

25 Decisio

Decisio

1 Change tiremen policy in small el tronic fi
2 Acquisi distribu agency keting b
3 Institut new for treatme hospital
4 Purchas seat on exchang
5 Firing o announ
6 Merger sulting f
7 Acquisit jet aircra for regio airline
8 Purchas new rad equipme hospital
9 Purchas new swi equipme telecom tion co.
10 Purchas new DP for muni pality
11 Purchas new DP for firm
12 Develop of new T program
13 Develop of new b for brew
14 Develop of bid in industria market
15 Develop new elec product
16 Develop promotio program racetrac
17 Develop new sup in hotel
18 Develop new con terminal port
19 Develop new ma deodora
20 Develop urban re program
21 Develop new run airport
22 Develop new bui for new program
23 Develop new lab for univ
24 Develop new pla small fir
25 Develop new he building bank

Totals

Table 1

25 Decision Processes Studied

	Decision	Duration Years	Type of Organization	Type of Decision Process: By Stimulus	By Solution	By Process	Number of Steps Reported: Rec.	Diag.	Search	Design	Eval. Choice	Auth.	Interrupts	Branches and (re)cycles
1	Change of retirement age policy in small electronic firm	>4	Mfg.	Problem	Given	Simple Interrupt	3	1	–	–	1	–	2	1
2	Acquisition of distribution agency by marketing board	<1	Inst.	Problem	Given	Simple Interrupt	1	1	–	–	3	1	2	1
3	Institution of new form of treatment in hospital	>4	Inst.	Problem-Crisis	Given	Political Design	1	1	–	5	3	–	6	5
4	Purchase of seat on stock exchange	>4	Serv.	Opportunity	Modified	Political Design	1	–	1	3	5	4	3	8
5	Firing of radio announcer	<1	Serv.	Problem	Given	Basic Sr.	1	1	1	–	3	–	–	1
6	Merger of consulting firm	<1	Serv.	Crisis	Ready-Made	Basic Sr.	1	–	2	–	3	–	–	2
7	Acquisition of jet aircraft for regional airline	1–2	Serv.	Problem	Ready-Made	Basic Sr.	1	–	3	–	3	–	2	4
8	Purchase of new radiology equipment for hospital	1–2	Inst.	Problem	Modified	Modified Search	1	1	1	2	1	5	–	6
9	Purchase of new switching equipment for telecommunication co.	?	Govt.	Opp.-Prob.	Modified	Modified Search	1	–	2	2	2	3	–	3
10	Purchase of new DP system for municipality	1–2	Govt.	Opp.-Prob.	Modified	Modified Search	1	1	–	3	5	3	1	7
11	Purchase of new DP system for firm	1–2	Serv.	Problem	Modified	Modified Search	1	1	4	2	2	2	–	6
12	Development of new TV program	<1	Serv.	Problem	Custom-Made	Basic Design	1	–	–	2	2	–	–	1
13	Development of new beer for brewery	1–2	Mfg.	Opportunity	Custom-Made	Basic Design	1	–	1	2	3	1	1	2
14	Development of bid in new industrial market	<1	Mfg.	Opportunity	Custom-Made	Basic Design	1	1	1	3	4	–	–	3
15	Development of new electronics product	1–2	Mfg.	Opp.-Prob.	Custom-Made	Basic Design	1	1	1	3	3	–	–	3
16	Development of promotional program for racetrack	<1	Serv.	Problem	Custom-Made	Basic Design	1	1	–	4	3	–	1	3
17	Development of new supper club in hotel	<1	Serv.	Opportunity	Custom-Made	Basic Design	1	–	–	3	2	3	–	3
18	Development of new container terminal in port	?	Govt.	Opp.-Prob.	Custom-Made	Basic Design	1	1	1	3	6	1	1	3
19	Development of new market for deodorant	<1	Mfg.	Opportunity	Custom-Made	Basic Design	1	2	–	2	7	1	–	6
20	Development of urban renewal program	>4	Govt.	Opp.-Prob.	Custom-Made	Imp. Des.	1	1	–	2	2	–	1	1
21	Development of new runway for airport	2–4	Govt.	Opp.-Prob.	Custom-Made	Imp. Des.	1	–	–	4	1	4	4	5
22	Development of new building for new college program	1–2	Inst.	Problem Crisis	Custom-Made	Dynamic Design	1	–	3	3	5	–	2	4
23	Development of new laboratory for university	2–4	Inst.	Problem	Custom-Made	Dynamic Design	2	1	–	4	2	3	3	5
24	Development of new plant for small firm	>4	Mfg.	Problem Crisis	Custom-Made	Dynamic Design	1	–	4	4	6	1	3	6
25	Development of new headquarters building for bank	>4	Serv.	Problem Crisis	Custom-Made	Dynamic Design	1	–	–	7	6	–	4	6
Totals							28	15	25	63	83	33	36	95

Tapping the memories of the decision makers could introduce two forms of error, distortion and memory failure. There is no reason to suspect any systematic distortion in this study, and we feel that the possibility of random distortion was reduced in many cases by multiple interviewing. As for memory failure, there is no doubt that some information on false starts or unsuccessful steps during the decision processes went unreported. However, it should be noted that the decision processes chosen for study were typically recently completed ones; they were selected because they were interesting to the managers involved and the later parts, at least, remained fresh in the managers' minds. In general, this research proceeded on the premise that what the student teams captured really happened, but that not all that happened was necessarily captured by the student teams.

Our own analysis of the data of these student reports proceeded iteratively, in three steps. The first involved 28 decision processes and sought to determine the basic structure of the strategic decision process. The second focused on 20 other decision processes reported by student teams in later courses, typically in more detail. Here the initial structure was elaborated and a number of hypotheses were tested. The final step examined more intensively 25 decision processes of the first two studies, 9 from the first and 16 from the second. Two researchers independently reduced each decision process to a sequence of routines and dynamic factors, and data were generated that supported a number of the hypotheses advanced in this paper. The criteria for including a decision process in the final study were clear indications that the outcome was perceived as strategic, that is, important, by the organization that produced it and that the description was sufficiently complete and detailed for the purpose of the study.

Characteristics of Strategic Decision Making

Certain characteristics of strategic decision making are indicated by analyzing the 25 decision processes. Table 1 shows these decisions categorized in various ways. Six were made in manufacturing firms, 9 in service firms, 5 in quasi-government institutions, and 5 in government agencies. Typically, the processes spanned long time periods—8 lasted less than one year, 7 one to two years, 2 two to four years, and 6 greater than four years; time data could not be inferred accurately from two reports. The decisions varied widely: an airline choosing new jet aircraft, a radio station firing a star announcer, a consulting firm negotiating a merger after losing its major client, a hospital instituting a new form of treatment after intense political activity, and so on. Most decisions involved some kind of new equipment or facility or a venture into a new market, product, or service.

These 25 descriptions suggest that a strategic decision process is characterized by novelty, complexity, and open-endedness, by the fact that the organization usually begins with little understanding of the decision situation it faces or the route to its solution, and only a vague idea of what that solution might be and how it will be evaluated when it is developed. Only by groping through a recursive, discontinu-

ous process involving many difficult steps and a host of dynamic factors over a considerable period of time is a final choice made. This is not the decision making under *uncertainty* of the textbook, where alternatives are given even if their consequences are not, but decision making under *ambiguity,* where almost nothing is given or easily determined.

Decisions Categorized by Process, Solution, or Stimulus

The decisions studied here were categorized (a) by the stimuli that evoked them, (b) by their solutions, and (c) by the process used to arrive at them. All three proved to be important for this study.

Decisions may be categorized by the stimuli that evoked them along a continuum. At one extreme are *opportunity* decisions, those initiated on a purely voluntary basis, to improve an already secure situation, such as the introduction of a new product to enlarge an already secure market share. At the other extreme are *crisis* decisions, where organizations respond to intense pressures. Here a severe situation demands immediate action, for instance, seeking a merger to stave off bankruptcy. Thus, opportunity and crisis decisions may be considered to form the two ends of the continuum. *Problem* decisions may then be defined as those that fall in between, evoked by milder pressures than crises.[2] The 25 decisions were categorized as follows: 1 crisis decision, 5 opportunity decisions, and 9 problem decisions; 4 decisions were categorized as problem-crises and 6 as opportunity-problems. During the development of a solution, a given decision process can shift along the continuum because of a delay or a managerial action: an ignored opportunity can later emerge as a problem or even a crisis, and a manager may convert a crisis to a problem by seeking a temporary solution, or he may use a crisis or problem situation as an opportunity to innovate.

Decisions may be classified by solution in four ways. First, the solutions may be *given* fully-developed at the start of the process. Second, they may be found *ready-made,* that is, fully-developed, in the environment during the process, as in the case of purchasing jet aircraft. Third, *custom-made* solutions may be developed especially for the decision, for example, construction of a new headquarter's building. Finally, the solution may combine ready-made and custom-made features—ready-made solutions are *modified* to fit particular situations, such as adapting equipment for special-purpose application. The 25 decisions included 4 given, 2 ready-made, 14 custom-made, and 5 modified solutions.

The third method of categorizing decisions is by the process used to arrive at them. A categorizing scheme of process is discussed at length in the final section of the paper.

The Phases of Decision Making

A number of frameworks have been put forward to describe the phases of decision making. In 1910, John Dewey suggested five phases of reflective thought: (1) suggestion, wherein the mind leaps to a possible solution; (2) intellectualization of the felt difficulty into a problem or question; (3) development of hypotheses; (4) reasoning or mental elabora-

2 One decision can be evoked by another, for example a new building must be found to house a new project. Such derivative decisions may be thought of as problem decisions by our definition.

tion of these; and (5) testing of the hypotheses (Dewey, 1933: 107). Using this as a cue, various other frameworks have been proposed, with the number of phases ranging from three to eight or more. Perhaps most well known is Simon's intelligence-design-choice trichotomy (Simon, 1965: 54).

In his research, Witte (1972) addressed the issue of the "phase theorem," seeking to discover whether distinct phases do exist and whether they follow a simple sequence as suggested in most of the literature. He found that the 233 decision processes dealing with data processing equipment did indeed "consist of a number of different operations that occur at different points in time" (p. 166), with an average of 38 and a maximum of 452. The sequence of five phases, however, problem recognition to gathering of information to development of alternatives to evaluation of alternatives to choice, was not supported for his whole sample or even for the subsample of the most efficient decisions. Witte found that the decision process consisted of a plurality of sub-decisions, and when he tested the phase theorem in terms of the subdecisions, he again found no support for the sequence.

Witte carried out his tests by dividing the decision processes into 10 equal time intervals and then noting the level and type of activity in each. He did not test problem recognition which by definition started the process. He found that communication activity dominated every time interval and that the total level of activity peaked at the beginning and end of the whole process, but was lower in the middle periods. He also found that the number of choices peaked at the end. Witte concluded (p. 180):

> We believe that human beings cannot gather information without in some way simultaneously developing alternatives. They cannot avoid evaluating these alternatives immediately, and in doing this they are forced to a decision. This is a package of operations and the succession of these packages over time constitutes the total decision-making process.

The framework used in this paper agrees with Witte's basic conclusions. We find logic in delineating distinct phases of the strategic decision process, but not in postulating a simple sequential relationship between them. Our central framework resembles the Simon trichotomy, although we define the phases differently, using the terms *identification, development,* and *selection.* We describe these three phases in terms of seven central "routines." In addition, we note the existence of three sets of routines that support the central phases, *decision control, communication,* and *political,* as well as six sets of dynamic factors that help to explain the relationship among the central and supporting routines. Together, these constitute the 12 basic elements of the strategic decision process. Each is discussed below together with its treatment in the literature, the data yielded in our study, as well as some hypotheses generated and some anecdotal material for illustration.

II. ELEMENTS OF THE STRATEGIC DECISION PROCESS

The Identification Phase in Strategic Decision Making

The identification phase of decision making comprises two routines in the framework of this paper: *decision recognition,* in which opportunities, problems, and crises are recognized

and evoke decisional activity, and *diagnosis,* in which management seeks to comprehend the evoking stimuli and determine cause-effect relationships for the decision situation.

Decision Recognition Routine

Most strategic decisions do not present themselves to the decision maker in convenient ways; problems and opportunities in particular must be identified in the streams of ambiguous, largely verbal data that decision makers receive (Sayles, 1964: 163; Mintzberg, 1973: 67–71). The need for a decision is identified as a difference between information on some actual situation and some expected standard. In a study of these differences, Pounds (1969) found that these standards were based on past trends, projected trends, standards in some comparable organization, the expectations of other people, and theoretical models.

In at least 18 of the 25 cases in the present study, the decision processes were evoked by many stimuli, originating both inside and outside the organization. In many cases, low amplitude stimuli were collected, cumulated, and stored over a period of years—in one case, 25 years—before a more intensive signal finally evoked action.

Problem, opportunity, and crisis decisions are most clearly distinguished in the recognition routine. The opportunity decision is often evoked by an idea, perhaps a single stimulus, although it may remain dormant in the mind of an individual until he is in a position to act on it. There were 6 clear cases of this in the 25 decision processes. Crisis decisions are typically triggered by single stimuli. They present themselves suddenly and unequivocally, and require immediate attention, as in the cases, for example, of a fire or a bankruptcy. Problem decisions typically require multiple stimuli. Decision makers, presumably, wish to read the situation before taking action.

An interesting phenomenon in recognition is that of matching. A decision maker may be reluctant to act on a problem for which he sees no apparent solution; similarly he may hesitate to use a new idea that does not deal with a difficulty. But when an opportunity is matched with a problem, a manager is more likely to initiate decision making action.

What exactly determines the moment of action? The determining factor may be viewed as the relationship between the cumulative amplitude of stimuli and an action threshold. The amplitude of each stimulus depends on a number of factors, including the influence of its source, the interest of the decision maker in it, the perceived payoff of taking action, the uncertainty associated with it, and the perceived probability of successful termination of the decision. When stimuli are cumulated, we would expect their combined amplitude to be a function of the amplitude of each, as well as their pattern and frequency of occurrence. We can hypothesize that the perceived amplitude of an unattended stimulus decays over time; that quick reinforcement of one stimulus by another magnifies their perceived combined amplitudes; and that the greater the frequency, clarity, or consistency of related stimuli, the greater their perceived combined amplitude.

Our study reveals little about threshold levels, but Radomsky (1967) found that a manager's threshold level shifts continuously according to his workload and the number and type of decision processes in his active inventory. A manager faced with a number of crises presumably does not look for problems, while one faced with only a few mild problems is likely to search actively for opportunities. Thus, there is the need to reassess the increasingly popular point of view in the descriptive literature that organizations tend to react to problems and avoid uncertainty rather than seek risky opportunities (Cyert and March, 1963; Braybrooke and Lindblom, 1963). Based on our evidence, a more balanced and supportable conclusion would be that strategic decision making comprises both the exploitation of opportunities and the reaction to problems and crises, perhaps with the latter behavior more prevalent. Of 25 decisions chosen for study, 5 could be termed pure opportunities, and 6 opportunity-problems. The remaining 14 were categorized as problems, crises, or problem-crises.

Diagnosis Routine

Once a cumulation of stimuli reaches a threshold level, a decision process is initiated, and resources are mobilized to deal with it. At this point, the decision maker is faced with an array of partially ordered data and a novel situation. No strategic decision situation comes to him preformulated. We hypothesize that the first step following recognition is the tapping of existing information channels and the opening of new ones to clarify and define the issues. This behavior is prevalent in our study, with evidence reported for 18 of the 25 decision processes. Such behavior represents a first step in the diagnosis routine.

It is difficult to imagine strategic decision making without some form of diagnosis. Nevertheless, substantive discussion of this routine is almost totally absent in both the descriptive and normative literature. Two exceptions in the normative literature are Bonge (1972) and Emory and Niland (1966: 50, 66). Also, Drucker (1971) argues that a careful attention to diagnosis is one factor that distinguishes Japanese from American decision makers.

Diagnosis need not be a formal, explicit routine. We find evidence of a formal diagnostic step, for example, the creation of an investigating committee or task force or the request that consultants analyze a new issue, in 14 of the 25 decision processes. In the remaining 11 cases, diagnosis was presumably an informal or implicit activity, simply not reported. There is some evidence from our study that formal diagnosis is most common in the mild problem range of the opportunity-problem-crisis continuum. An explicit diagnostic step is reported in the case of 2 out of 5 opportunity decision processes, 4 out of 6 opportunity-problems, 7 out of 9 problems, 1 out of 4 problem-crises, and 0 out of 1 crises. Perhaps opportunities do not require much investigation—there is nothing to correct, only something to improve—while intense problems and crises may produce time and cognitive pressures that discourage the use of formal diagnosis.

The Development Phase

The heart of the decision-making process is the set of activities that leads to the development of one or more solutions to a problem or crisis or to the elaboration of an opportunity. Our evidence supports the hypothesis that the greatest amount of decision-making resources are consumed in the development phase of the strategic decision process. In 22 of the 25 cases, there was considerable development activity, and this activity appeared to dominate the other two phases in 21 of the decision processes studied. In only 3 cases did the organizations begin with fully-developed solutions, and in one of these, the organization was drawn into development activity—redesign of its structure—to effect acceptance of its proposed solution.

Development may be described in terms of two basic routines, search and design. Search is evoked to find ready-made solutions; design is used to develop custom-made solutions or to modify ready-made ones. This distinction is fundamental—the difference between what psychologists call convergent and divergent thinking. It is one thing to find a needle in a haystack, quite another to write a fugue (Reitman, 1964).

Search Routine

Evidence of search is found in 13 of the 25 decisions, with a total occurrence of 25. Based on evidence of this study and that in the literature, four types of search behaviors can be isolated. (1) Memory search is the scanning of the organization's existing memory, human or paper. (2) Passive search is waiting for unsolicited alternatives to appear. Cyert and March (1963: 80) note that "not only are organizations looking for alternatives; alternatives are also looking for organizations." (3) Trap search involves the activation of "search generators" to produce alternatives, such as letting suppliers know that the firm is looking for certain equipment (Soelberg, 1967). (4) Active search is the direct seeking of alternatives, either through scanning a wide area or focusing on a narrow one.[3]

There is considerable support for the contention that search is a hierarchical, stepwise process. In general, one would expect the decision maker to begin with memory and passive search, and some convenient forms of trap search as well. Cyert and March (1963: 120–122) hypothesize that search begins in local or immediately accessible areas, with familiar sources. Numerous examples of this appeared in our study. Initial failure in search leads presumably to use of more active search procedures and to search in more remote and less familiar areas. There is clear evidence of this in 8 of the 25 cases. Finally, it seems reasonable to hypothesize that faced with repeated failure in search for an acceptable ready-made solution, the organization turns where possible to design of a custom-made solution.

Design Routine

Use of the design routine is reported in 20 of the 25 decision processes. These decisions fall into two groups: those with

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Newell and Simon (1972) discuss a number of combinations of scanning and focusing, including "scan-search," "depth first," "breadth first," and "progressive deepening."

custom-made solutions and those with modified solutions, where search was used to narrow down the available ready-made alternatives and then design was used to modify these for special application.

The results of this study suggest that the design of a custom-made solution is a complex, iterative procedure, which proceeds as follows: the designers may begin with a vague image of some ideal solution. They factor their decision into a sequence of nested design and search cycles, essentially working their way through a decision tree, with the decisions at each node more narrow and focused than the last. Failure at any node can lead to cycling back to an earlier node. Thus a solution crystallizes, as the designers grope along, building their solution brick by brick without really knowing what it will look like until it is completed.[4]

Sixty-three instances of design activities, many of these themselves nested, are reported in the 20 cases where some design was present. For decision processes with custom-made solutions, design is reported an average of just over three times, while for those with modified solutions the average is 2.4.

The hypothesis with the strongest support in our study is that the organization designs only one fully-developed custom-made solution. For all 14 decision processes that led to custom-made solutions, although choices from among competing alternatives were sometimes made at single nodes, in every case only one decision tree was followed to its ultimate conclusion. That is, only one solution emerged from the design process. Snyder and Paige (1958: 320) support this finding, noting that "the decision makers were confronted [in this case at major nodes] with single sets of proposed courses of action rather than conflicting alternatives." In contrast, organizations that chose ready-made solutions typically selected them from among a number of alternatives and in the five cases of modified solutions, that is, search followed by design, two organizations produced only one fully-developed solution. In the other three cases, all their decisions involving modifications to standard electronic equipment, developed two full solutions. Apparently, because design of custom-made solutions is expensive and time consuming, organizations are unwilling to spend the resources on more than one alternative. In contrast, the cost of generating extra alternatives during the search routine is small, and when relatively little design is involved, as in modified solutions, organizations are prepared to fully develop a second solution to compare it with the first. (Soelberg (1967) discusses the notion of a "confirmation candidate.")

The Selection Phase

Selection is logically considered to be the last step in the decision process: however, because the development phase frequently involves factoring one decision into a series of subdecisions, each requiring at least one selection step, one decision process could involve a great number of selection steps, many of these intricately bound up with the development phase. Witte (1972) found an average of 6, and a maximum of 51 distinct choices in the decision processes he studied. These were distributed throughout the 10 equal time

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Reitman (1964), Klein (1962), and Manheim (1966) discuss design in terms similar to these. Unfortunately, however, there has been almost no attention to the design routine in the literature of administration.

periods, although they occurred more frequently in the last period.

The normative literature describes the selection phase in terms of three sequential routines: determination of criteria for choice, evaluation of the consequences of alternatives in terms of the criteria, and the making of a choice. In reality, selection seldom allows a neat delineation of these three routines, and our study suggests that it is more appropriate to describe it in terms of screen, evaluation-choice, and authorization.

Our study and those in the empirical literature suggest that selection is typically a multistage, iterative process, involving progressively deepening investigation of alternatives. Multistage selection appears in virtually everyone of the 20 cases of our study where selection was described in some detail. Two multistage patterns of the three routines occur in our study. First, the selection routines are applied sequentially to a single choice. Screening is used first to reduce a large number of ready-made alternatives to a few feasible ones; evaluation-choice is then used to investigate the feasible alternatives and to select a course of action; finally, authorization is used to ratify the chosen course of action at a higher level in the organizational hierarchy. In the second pattern, a single selection step is itself multistage or nested. An alternative may be evaluated in a general way, then in succeedingly more intense ways, or one choice can be subjected to authorization at successively higher levels in the organization.

In the 25 decision processes, evaluation-choice activity is noted in 83 instances, and authorization in 33. Hence, each decision process averaged almost 5 selection steps, 4.8 for custom-made solutions, 6.4 for modified solutions (more than half of these authorization), 2 for ready-made solutions, and 2.8 for given solutions.

Screen Routine

The screen routine is evoked when search is expected to generate more ready-made alternatives than can be intensively evaluated. Screening is discussed in the literature by Cyert and March (1963: 80), Cyert and MacCrimmon (1968: 580), and Soelberg (1967). It is a superficial routine, more concerned with eliminating what is infeasible than with determining what is appropriate. Screening appears to challenge the appropriateness of alternatives that have never been used before and to reduce the alternatives to a number that can be stored and later handled by time-constrained decision makers. The 25 cases report little evidence of screening, in all likelihood not because there was an absence of screening but because it was an implicit part of search: as ready-made alternatives appeared, they were quickly screened and either rejected immediately or stored.

Evaluation-Choice Routine

By far the largest part of the literature on the strategic decision process has focused on the evaluation-choice routine. This is rather curious since this routine seems to be far less significant in many of the decision processes we studied than diagnosis or design. Particularly in the case of the custom-made solution, evaluation-choice often appeared to be a kind

of trimming on the process, a ratification of the solution that was determined explicitly during design and in part implicitly during diagnosis as well.

The evaluation-choice routine may be considered to use three modes: judgment, bargaining, and analysis.[5] In judgment, one individual makes a choice in his own mind with procedures that he does not, perhaps cannot, explain; in bargaining, selection is made by a group of decision makers with conflicting goal systems, each exercising judgment; and in analysis, as described above, factual evaluation is carried out, generally by technocrats, followed by managerial choice by judgment or bargaining.

Our study reveals a number of interesting findings about these three modes. Judgment seems to be the favored mode of selection, perhaps because it is the fastest, most convenient, and least stressful of the three; it is especially suited to the kinds of data found in strategic decision making. Bargaining appears in more than half of the decision processes—typically where there was some kind of outside control or extensive participation within the organization and the issues were contentious.

The normative literature emphasizes the analytic mode, clearly distinguishing fact and value in the selection phase. It postulates that alternatives are carefully and objectively evaluated, their factual consequences explicitly determined along various goal, or value, dimensions and then combined according to some predetermined utility function—a choice finally made to maximize utility. A more pragmatic rendition of this view sees the analyst presenting his factual analyses of the consequences of various alternatives to the manager who determines the value trade-offs in his head and thereby makes a choice.

Our study reveals very little use of such an analytic approach, a surprising finding given the importance of the decision processes studied. Of the 83 instances of evaluation-choice activity, in only 18 could evaluation be distinguished from choice. (These cases occurred typically in large business organizations and concerned technical decisions; surprisingly, analysis was not more prevalent in the opportunity range.) In the typical situation, therefore, evaluation and choice are inextricably intertwined. The raw data, presumably facts and values, indistinguishably are plugged into a mind or a meeting, and a choice later emerges.

The other empirical studies also provide little evidence to support the prevailing normative views of decision making. Those who have addressed the issue of utility functions, notably Soelberg (1967) and Carter (1971a and 1971b) find no evidence to support their existence. These two researchers, as well as Cyert, Simon, and Trow (1956), note rather that the criteria used in decision processes are multiple and noncomparable. No study finds that even weightings on individual goal dimensions are established in advance of making choices; rather the weights are determined implicitly, in the context of making choices. Soelberg goes one step further and describes a confirmation period before the announcement of a decision during which the decision maker rationalizes to himself his implicit choice as well as the goals

5

This represents a modification of frameworks presented by March and Simon (1958: 213) and by Thompson and Tuden (1954).

it represents. Here the determination of criteria in effect follows the making of the choice.

Virtually every student of actual selection procedures agrees that the selection of strategic alternatives requires consideration of a great number of factors, most of them "soft," or nonquantitative; as a result they find that the evaluation-choice routine is in practice a crude one. A plethora of value and factual issues, few of them concrete, many involving emotions, politics, power, and personality must be considered. This is further complicated by dynamic factors and uncertainty. Thus, the evaluation-choice routine gets distorted, both by cognitive limitations, that is, by information overload, and by unintended as well as intended biases. This has been found to apply to all the modes of selection, including analysis. (See Snyder and Paige, 1958; Pfiffner, 1960; Cyert and March, 1963; Feldman and Kanter, 1965; Soelberg, 1967; Whitehead, 1967; Stagner, 1969; Carter, 1971a and 1971b; Kakar, 1971–72; and Newell and Simon, 1972.)

How do decision makers cope with the cognitive strain of selection? A number of researchers suggest various proxy means of choice, such as using imitation or tradition (Pfiffner, 1960: 130) or assessing the sponsor of an alternative instead of the alternative itself (Carter, 1971b; Mintzberg, 1973: 89). Both Soelberg (1967) and Carter (1971a and 1971b) propose elaborate schemes to describe how strategic choices are actually made. Soelberg, for example, distinguishes primary goals and secondary constraints in a theory that combines the notions of maximizing and satisficing. Soelberg believes that scaling is essentially disjoint: each alternative is evaluated independently along independent goal dimensions. On some criteria, the decision maker seeks merely satisfactory performance. On others, usually one, never more than three in Soelberg's view, he seeks to get as much as possible. In screening, the secondary constraints are used to reject alternatives. The alternatives that remain are then rated as acceptable, unacceptable, or marginal in terms of the primary goal's dimensions. The acceptable ones enter into an "active roster" where they are later compared with each other, unless an "outstanding" alternative is found, in which case search is terminated. In making this comparison, the decision maker prefers a dominant alternative, one that is best along all the primary goal dimensions. If none can be found, he uses crude internal scales such as "significantly better" and "a little better," to compare alternatives.

Authorization Routine

Decisions are authorized when the individual making the choice does not have the authority to commit the organization to a course of action. The decision must follow a tiered route of approval up the hierarchy and perhaps also out to parties in the environment that have the power to block it. Typically, authorization is sought for a completed solution, after final evaluation-choice; but, we also found instances of the seeking of authorization to proceed with a decision process, either at the outset or during development.

Authorization is common in strategic decision making; it is reported in 14 of the 25 cases under study, for a total of 33

instances. Of the 11 cases where authorization is not reported, 6 were business decisions made in autonomous organizations by the chief executive, and 4 were local decisions involving small resource commitments made by the top management of subsidiary organizations; the remaining case, decision 20, almost certainly involved authorization although it is not reported. In those cases where authorization took place and is reported, it involved the approval either of top management, in 12 instances; the board of directors, in 6 instances; a parent firm or owner, in 4 instances; a higher level of government, in 6 instances; and outside agencies, in 5 instances. Authorization was most common in government and institutions, appearing in 8 of 10 cases for a total of 21 instances; it is reported in only 6 of 15 manufacturing and service organizations, with a total of 12 instances.

Authorization appears to be a typically binary process, acceptance or rejection of the whole solution. Acceptance leads to presentation of the solution to the next highest level if necessary; rejection leads to its abandonment or redevelopment. In a few cases, conditional acceptance occurred, leading to a recycling of the solution through the development phase with every attempt made to overcome the objections without altering the essential features of the solution.

The authorization routine experiences difficulties beyond all of those found in evaluation-choice. The time for it is typically limited; at this level the decision must be considered in the light of other strategic decisions and overall resource constraints; outside political forces are often brought to bear on the decision at the point of authorization; and the authorizers generally lack the in-depth knowledge that the developers of the solution have. In capital budgeting as well as in less formal types of authorization, a major problem is presented by the fact that the choices are made by people who often do not fully comprehend the proposals presented to them. Thus, in authorization the comparative ignorance of the manager is coupled with the inherent bias of the sponsor (Carter, 1971a and 1971b; Pettigrew, 1972). This explains why empirical studies of capital budgeting have shown it to be a somewhat distorted, political process, far less analytical than the normative literature suggests (Carter, 1971a and 1971b; Bower, 1970).

Three Sets of Supporting Routines

Studies of strategic decision processes suggest that three sets of routines support the three central phases. Decision control routines guide the decision process itself; communication routines provide the input and output information necessary to maintain decision making; and political routines enable the decision maker to work his way to a solution in an environment of influencing and sometimes hostile, forces.

Decision Control Routines

Faced with a decision situation, not only does the decision maker execute the steps leading to a solution, but he also plans his approach and allocates the organizational resources to get there. This metadecision making, decision making about the decision process itself, is analogous to program control in a time-shared computer system.

Decision control activities are difficult to study because they tend to be implicit and informal, taking place in the mind of the decision maker, and to leave little trace of themselves. Nevertheless, a number of researchers note their existence, including Newell and Simon, who refer to problem planning "to guide action in exploring a problem space" (1972: 82), and Cyert, Simon, and Trow (1956: 247). We consider decision control to comprise two basic routines—*decision planning* and *switching*.

In a few of the cases in our study, explicit reference is made to decision planning or to the existence of informal decision plans. When faced with a new decision situation, the decision maker presumably attempts to establish some preliminary bounds on the decision space. He may determine a rough schedule for solution, a development strategy, and an estimate of the resources he is prepared to commit to developing the solution; he may establish some preliminary constraints and perhaps develop an image of an ideal solution as well (Soelberg, 1967: 210). But like so much else in strategic decision making, these decision plans typically appear to be informal and flexible, modified and clarified as the decision process progresses.

Broad planning has to be converted into specific action. In the switching routine, the decision maker directs his attention to the next step, to choosing the appropriate routine such as diagnosis or search, to determining what resources to commit to it, and to evoking the actual routine. Subsequently, he monitors the results to update his decision plan.

Decision Communication Routines

We have already seen evidence of an active stream of communication throughout the decision process: scanning the environment for stimuli, searching intensively for diagnostic information and for information about alternatives and their consequences, transmitting information up the hierarchy to facilitate authorization, and monitoring the progress of the decision process itself. Witte (1972) found that communication activities dominated every phase of unstructured decision making.

Three communication routines can be delineated. The *exploration* routine involves the general scanning for information and the passive review of what comes unsolicited. It is likely used to identify decision situations, to build conceptual models, and to develop a general data base for decision making. The *investigation* routine involves the focused search and research for special-purpose information. Investigation appears to be used to find or confirm information during diagnosis, search, and evaluation-choice activities. There is evidence that investigation in strategic decision processes relies largely on informal, verbal channels of communication (Aguilar, 1967; Snyder and Paige, 1958: 373; Mintzberg, 1973: 38–44, 70). We hypothesize that investigation is most active during diagnosis and the earlier stages of development, and again during the early stages of evaluation-choice. In 15 of our cases, information collection appeared to be most active during development, and in a further 5.5 cases, during diagnosis. In 1.5 cases it appeared most active during selection. (In

some cases, two phases appeared to be equal, and in 3, we could draw no obvious conclusion from the data.) Cyert, Simon, and Trow (1956: 247) found that the largest share of manhours in the decision process they studied was devoted to gathering information to determine the consequences of alternatives, and Witte (1972) found that communication followed a U-shaped curve, most active toward the beginning and end of the decision processes.

The third communication routine is *dissemination.* We find evidence that the greater the number of persons involved or interested in the outcome of the decision, the more time the decision makers spend disseminating information about its progress. This relationship was especially evident in six cases in our study where many individuals were involved, notably where authorization was a significant part of the selection phase rather than a formality. We also find anecdotal evidence that the further along the decision process, the greater the dissemination of information about it. In effect, the clearer the solution becomes and the more committed to it is the decision maker, the greater is his propensity to communicate information about it to ensure its eventual acceptance.

Political Routines

There is considerable evidence that political activities are a key element in strategic decision making: Pettigrew (1972), Carter (1971a and 1971b), and Bower (1970: 68) emphasize the internal political activities for strategic decisions in business organizations while Gore (1964: 290–291) and others point out the sources of internal and external political pressures in public organizations. Political activities reflect the influence of individuals who seek to satisfy their personal and institutional needs by the decisions made in an organization. These individuals may be inside or outside the organization; what ties them to the decision process is their belief that they will be affected by the outcome. Their political activities serve to clarify the power relationships in the organization; they can also help to bring about consensus and to mobilize the forces for the implementation of decisions. We find eight cases in our study that involved intense political activity and a number of others involving such activity of a less intense nature. Our study suggests a relationship between such activity and the duration of the decision process. By conservative estimates, assuming the decisions lasting longer than 4.0 years averaged 5.0 years and those of less than 1.0 year averaged .8 years, these eight decisions averaged 3.6 years whereas the others averaged 1.6 years.

Political activity generally manifests itself in the use of the *bargaining* routine among those who have some control over choices.[6] We found two cases where bargaining occurred early in the decision process, when principals within the organizations disputed the need to recognize the issue in the first place. One of these cases led to long delays until the issue was resolved and the other led to a rearrangement of the power structure by the chief executive to eliminate the sources of resistance, in effect a political design activity. In two other cases, intensive bargaining among insiders took place during development and selection; in four cases, bargaining took place between the organization and outsiders

…ther form of bargaining takes place in …sion making, between the organiza… and its suppliers, and concerns the …e and arrangements for inputs. Such …aining—perhaps it should be called …rating to distinguish it—is not inher… political in nature

when the latter confronted and temporarily blocked proposed decisions late in the final selection phase. Apparently, when concerned centers of power are disregarded during development, they are likely to confront the organization late in the selection phase. In three cases, such confrontation resulted in renewed development activity intended to modify the solutions in line with the objections, while in the fourth case, the organization directly resisted the pressures to change its solution.

Organizations sometimes try to preempt this resistance late in the selection phase by disseminating information about the solution during the development and early selection phases or by inviting the potential dissidents to participate in the development phase. Gore (1964), Carter (1971a and 1971b), Bower (1970), and Pfiffner (1960) refer to one or both of these behaviors, which we call, respectively, the *persuasion* and the *coöptation* routines. In general, we may conclude that the more important and contentious the outcome of a decision and the more the influence over choice rests outside the organization, the greater the emphasis on selection and communication processes in general and the bargaining and persuasion routines in particular.

Dynamic Factors

The delineation of steps in almost any strategic decision process shows that there is not a steady, undisturbed progression from one routine to another; rather, the process is dynamic, operating in an open system where it is subjected to interferences, feedback loops, dead ends, and other factors. "One gets the picture of everything chasing after everything else, trying to adjust to it . . ." (Diesing, 1967: 186). These dynamic factors are perhaps the most characteristic and distinguishing features of decision processes that are strategic. It is therefore surprising that they are hardly mentioned in the literature.

We find in our study that dynamic factors influence the strategic decision process in a number of ways. They delay it, stop it, restart it. They cause it to speed up, to branch to a new phase, to cycle within one or between two phases, and to recycle back to an earlier point in the process. We shall discuss six groups of dynamic factors: *interrupts,* which are caused by environmental forces, *scheduling delays* and *timing delays and speedups,* which are effected by the decision maker, and *feedback delays, comprehension cycles,* and *failure recycles,* which are largely inherent in the decision process itself.

Interrupts. Of the 25 decision processes, 15 are reported to have experienced a total of 36 sudden events that interrupted them and caused changes in pace or direction. In 7 of the cases, unexpected constraints were met, typically late in the selection phase, causing delays and usually forcing the organizations to cycle back to the development phase. One firm, for example, met a capital requirement difficulty and had to rework its capital structure, while another faced the sudden expropriation of the plant that it had just bought.

In 16 cases, the decision processes encountered political impasses that caused temporary delays. Typically, these took

place late in the decision process when inside or outside groups blocked proposals in the selection phase. In one case, civic groups used legal actions and government legislation to block a new airport runway, while in another, a conservative staff group in a hospital repeatedly blocked acceptance of a new form of treatment. In a number of these cases, the decision makers cycled back to development to modify the solution, to find another, or to engage in political design activity to remove the dissidents from positions of power. In other cases, bargaining took place, or the decision makers simply delayed until the blocking forces disappeared.

In six cases, decision processes encountered unexpected new options, proposals that stimulated new development or selection activity. Thus, some new options caused delays, by interrupting a process nearing termination, while others caused speedups, because the new option appeared to be so good that design was terminated and final evaluation-choice begun. In four cases, new options were accepted in place of those under consideration; in the remaining two cases, the new options were developed but not ultimately selected.

Finally, there were seven cases where interrupts resulted in a speedup of the decision process. Five of these came in response to the delaying interrupts discussed above: two removed unexpected constraints and three responded to political impasses. The two other cases, one involving a strike and the other the discovery of a competitor action, resulted in a speedup in the selection of proposals.

A number of interrupts we have described led to other interrupts; in effect, one interrupt specifically evoked another. Thus, we find 36 interrupts in 15 decision processes, an average of 2.4 each, and we hypothesize that interrupts beget interrupts.

Interrupts appear to be most common in high pressure environments. We find them in 4 of the 5 problem-crisis and crisis decision processes, a total of 15 times, but in only 11 of the 20 opportunity and problem decision processes, a total of 21 times. They were also more common in the public or quasi-public organizations, appearing in 8 of the 10 government and institutional organizations, a total of 20 times, compared with 7 of the 15 business organizations, a total of 16 times.

Here again we find a strong relationship with duration: decision processes without interrupts averaged 1.3 years, while those with delaying interrupts averaged 3.6 years. This is presumably related to the earlier finding that duration and political activity are related, since delaying interrupts and political activity are often found together. Hence we hypothesize that interrupts of a political nature significantly delay strategy decision processes.

Scheduling delays. Because managers are severely time-constrained, they factor complex decisions into manageable steps; this enables them to introduce scheduling delays so that they can attend to the multiplicity of tasks that always await their attention (Mintzberg, 1973: 31–35, 80–81). Hence, every step of the strategic decision process is separated by

significant time delays; presumably as a result, only 8 of 23 decision processes had a reported duration of less than one year.

Feedback delays. During a feedback delay, the decision maker awaits the results of the previous action taken. Each step in the strategic decision process involves a certain time-consuming activity; in addition, many steps require reaction. And in creative design processes, there may be a period of incubation before insight occurs (Lonergan, 1967). Thus, we would expect especially complex decision processes involving outsiders to span long time periods.

Timing delays and speedups. Timing is apparently a major factor in strategic decision making, yet it has hardly been studied, perhaps because it is almost always effected in one manager's mind. Hardwick and Landuyt (1966: 283), for example, surveyed 183 books in the area of administration and found only 10 that even mentioned timing or surprise. Managers may purposely speed up or delay a decision process to take advantage of special circumstances, to await support or better conditions, to synchronize action with another activity, to effect surprise, or to gain time. In general, managers try to time the initiation of decision steps to facilitate their smooth execution. In competitive and hostile environments, where the issues are contentious, we would expect to find a greater incidence of timing speedups and delays. In our study we find examples of speedups to beat a competitor to a market and delays to wait for resistance to subside. In the study of crisis decision processes, Schwartzman (1971) found that managers sought delays that would reduce the pressures; they tried to "buy time" by stalling, bluffing, or finding temporary solutions.

Comprehension cycles. Throughout this paper, strategic decision making has been described as a groping, cyclical process. Inherent in it are factors causing the decision process to cycle back to earlier phases. Pfiffner noted that "the decision-making process is not linear but more circular; it resembles 'the process of fermentation in biochemistry rather than the industrial assembly line' . . ." (1960: 129). By cycling within one routine or between two routines, the decision maker gradually comes to comprehend a complex issue. He may cycle within identification to recognize the issue; during design, he may cycle through a maze of nested design and search activities to develop a solution; during evaluation, he may cycle to understand the consequences of alternatives; he may cycle between development and investigation to understand the problem he is solving (Diesing, 1967: 187); he may cycle between selection and development to reconcile goals with alternatives, ends with means. The most complex and novel strategic decisions seem to involve the greatest incidence of comprehension cycles. We found specific evidence of cycling and recycling in all 25 decision processes, with a total of 95 occurrences. Two took place within the identification phase, 14 within development, and 25 within selection. In 1 case, there was recycling from development back to identification, in 50 cases from selection back to development, and in 3 cases from selection all the way back to identification.

failure recycles. Decision processes are sometimes blocked for want of an acceptable solution. Solutions may be rejected in evaluation-choice as having too low a payoff; they may meet constraints they cannot satisfy; they may simply not appeal to those expected to authorize them. Faced with no acceptable solution, the decision maker may simply delay until one appears or he may change his criteria so that a solution previously rendered unacceptable becomes acceptable. A more typical finding in our study, however, is that organizations faced with failure in finding or designing an acceptable solution cycle back to the development phase. We find 13 cases where the decision processes either entered a special design branch to remove a constraint, or developed a new solution or modified an existing one by following a new path from an earlier node of the decision tree. In some cases, a previously rejected alternative was reintroduced under the new conditions. Given the failure of a solution, it would appear that the decision maker first tries to branch to remove a constraint and thereby make the solution acceptable; if that is infeasible, he tries to recycle to the development phase to modify the solution; if that is not possible, he tries to develop a whole new solution; finally, if resources will not permit this or if he meets with continued failure, the decision maker will accept a previously unacceptable solution.

III. A GENERAL MODEL OF THE STRATEGIC DECISION PROCESS

The elements of the strategic decision process can now be brought to a common base. We have developed a general model of the process shown in Figure 1, that comprises the seven basic routines, as well as some of the dynamic factors discussed in this paper. We believe this model can be used to illustrate the structure of each of the 25 decision processes studied.

The "main line" through the center of the model shows the two routines that must be a part of any decision process, recognition of the situation and the evaluation-choice of a solution. The three modes of the evaluation-choice program are shown at X_3. In theory, therefore, the most basic decision process involves simply the recognizing of a given solution and then the evaluation and choice of it. Needless to say, we encountered no case quite that simple.

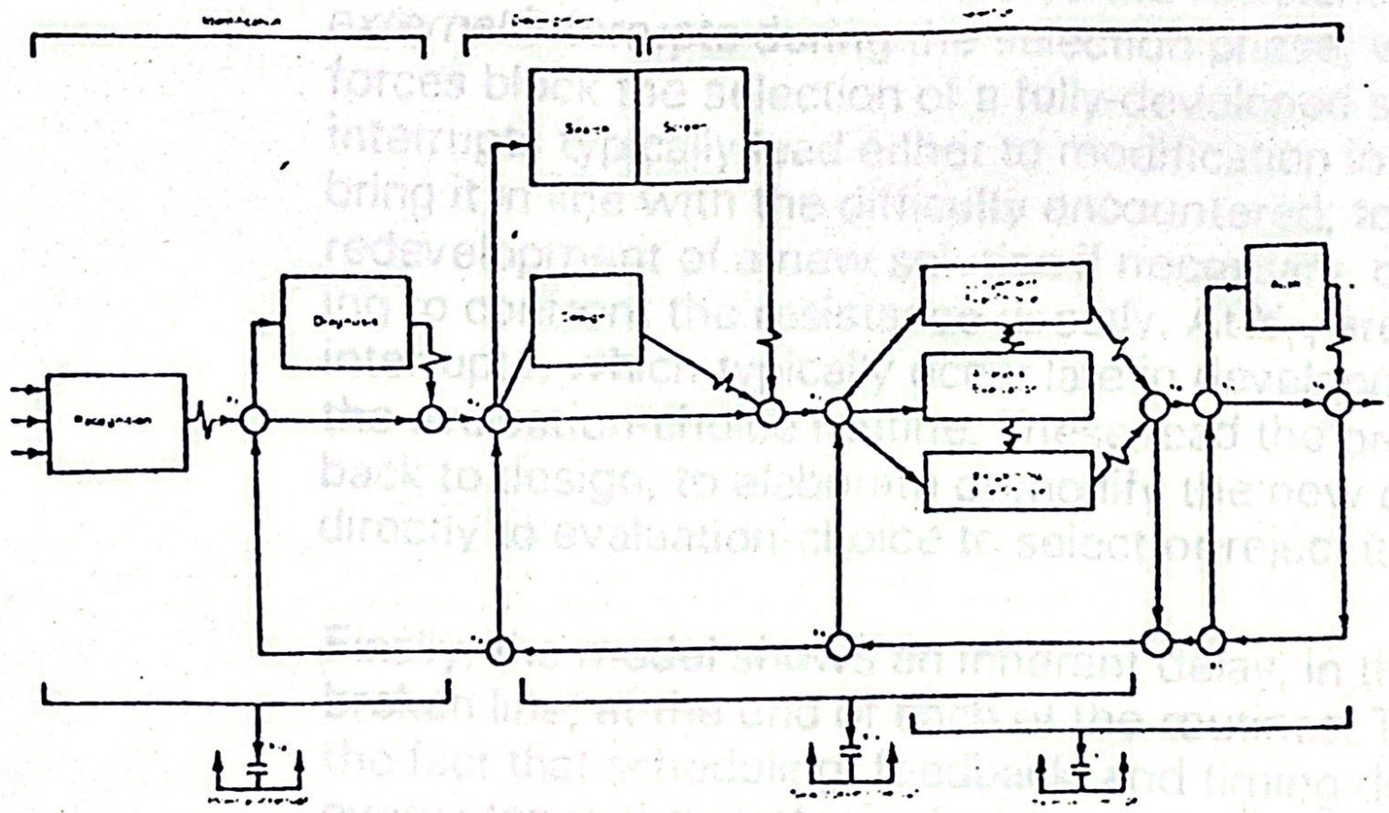


Figure 1. A general model of the strategic decision process.

Most decision processes involve development activity after recognition. Hence, at X_2, there is a branch off the main line into the search (and screen) routine to find a ready-made solution or into the design routine to develop a custom-made solution. In virtually all cases, in fact, development was a nested activity; hence, at X_4 the model contains a branch from the evaluation-choice routine back to the development phase at X_9 to initiate another search or design cycle. Modified solutions, as noted earlier, first follow one or more search cycles to find a ready-made solution, and then a series of design cycles, to modify it. In addition to nested development, nested selection also occurred frequently; hence at X_4 and X_8 there is a loop from the evaluation-choice routine back to itself.

Any decision process may or may not involve formal diagnosis or authorization. Hence, the model shows branches at X_1 and X_5 which take the process off the main line and later return it there when completed. In addition, authorization may be tiered, hence the loop at X_6 and X_7, and authorization to proceed may be sought after recognition or during development, resulting in a branch from the authorization routine at X_6 back to development at X_9. And there is evidence that the decision process may branch from selection at X_4 or X_6 all the way back to diagnosis to allow for reconsideration of the whole decision situation. All of these branches also represent the comprehension cycles for example, cycling within evaluation-choice at X_4 and X_8 and the failure recycles, from the evaluation-choice routines at X_4 or the authorization routine at X_6 back to redevelopment at X_9 to modify an unacceptable solution or develop a new one, or back to the evaluation-choice routine at X_8 to modify criteria.

Many strategic decision processes involve interrupts of one kind or another. The three most common ones are shown in the model. At X_{10} are *internal* or political interrupts in the identification phase, where there is disagreement on the need to make a strategic decision. Such interrupts come from within the organization and may lead either to cycling in the recognition routine, to resolve the disagreement by bargaining or persuasion, to delays, until the resistance subsides, or to political design activity, to remove the resistance. At X_{12} are *external* interrupts during the selection phase, where outside forces block the selection of a fully-developed solution. These interrupts typically lead either to modification in the design to bring it in line with the difficulty encountered, to complete redevelopment of a new solution if necessary, or to bargaining to confront the resistance directly. At X_{11} are *new option* interrupts, which typically occur late in development or during the evaluation-choice routine. These lead the process either back to design, to elaborate or modify the new option, or directly to evaluation-choice to select or reject it immediately.

Finally, the model shows an inherent delay, in the form of a broken line, at the end of each of the routines. This reflects the fact that scheduling, feedback, and timing delays separate every step in the strategic decision process. This model does not show the supporting routines, except for bargaining as a mode of selection; but decision control, communication, and

political routines can occur together with any of the routines shown in the model.

Our final analysis led us to describe the 25 decision processes in terms of this model. Each was translated into a sequence of events, consisting of the central routines, interrupts, branches, and cycles. (Decision control and communication routines as well as scheduling and feedback delays were excluded as these occurred almost regularly. Timing speedups and delays were difficult to report on.) Because the narratives were not always consistently specific and because of some difficulties in interpretation (for example, is any deep probe to be called diagnosis?), such description was at times difficult. However, two researchers so described each process independently and we then assured ourselves that the two descriptions agreed in basic form and shape, even if not in every detail.

We found that all 25 decision processes could be represented in terms of the basic model, with minor additions which do not appear to be common.[7] We found further that decision processes fell into seven groupings according to the path configurations through the model. These appeared to depend in large part on the type of solution and the nature of the dynamic factors encountered. Interestingly, four of these seven types reflect the specific nature of the decision outcome (for example, all decisions of Type 4 involved new equipment). The seven path configurations are discussed below, more or less in order of complexity.

Type 1. Simple impasse decision processes. Decision processes 1 and 2 were the simplest of the study and the closest to the main line of the model. They involved no development activity at all. Both, however, met interrupts which complicated the flow of events.

Decision process 1 is shown in Figure 2. Here, a small manufacturing firm three times considered instituting a policy of mandatory retirement at age 65; twice the proposal was blocked in debate at the senior executive level, and a third time 10 years later in a period of recession, it was accepted.

Type 2. Political design decision processes. Decision processes 3 and 4 were similar to those of type 1 in that they were evoked by given solutions, but different in that the impasses were more difficult ones, and in both cases the

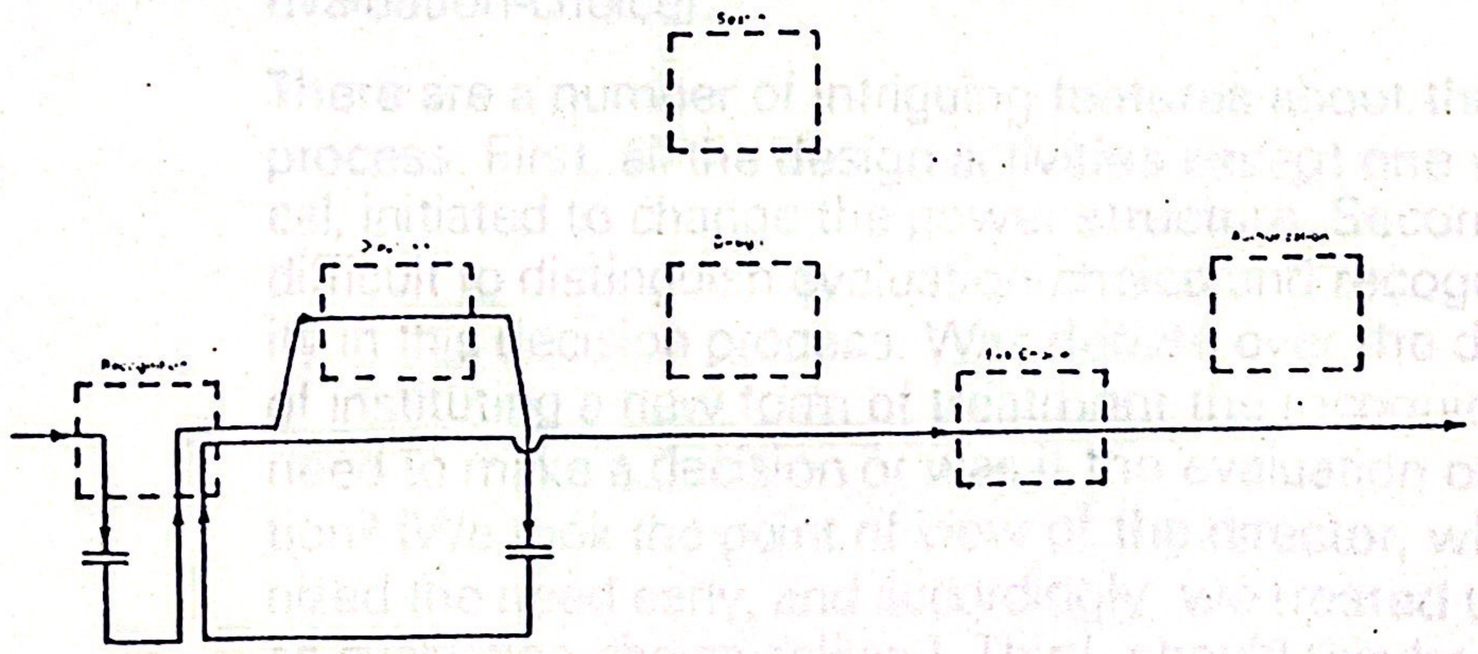


Figure 2. A simple impasse decision process—retirement at age 65 (decision process 1).

here is one consistent difference beween the reports and the model. In some cases, development activity was reported without selection activity following it. We assumed this to be an omission in the eports, and in the examples below, we always show development activity followed by evaluation-choice activity, unless there was an interrupt.

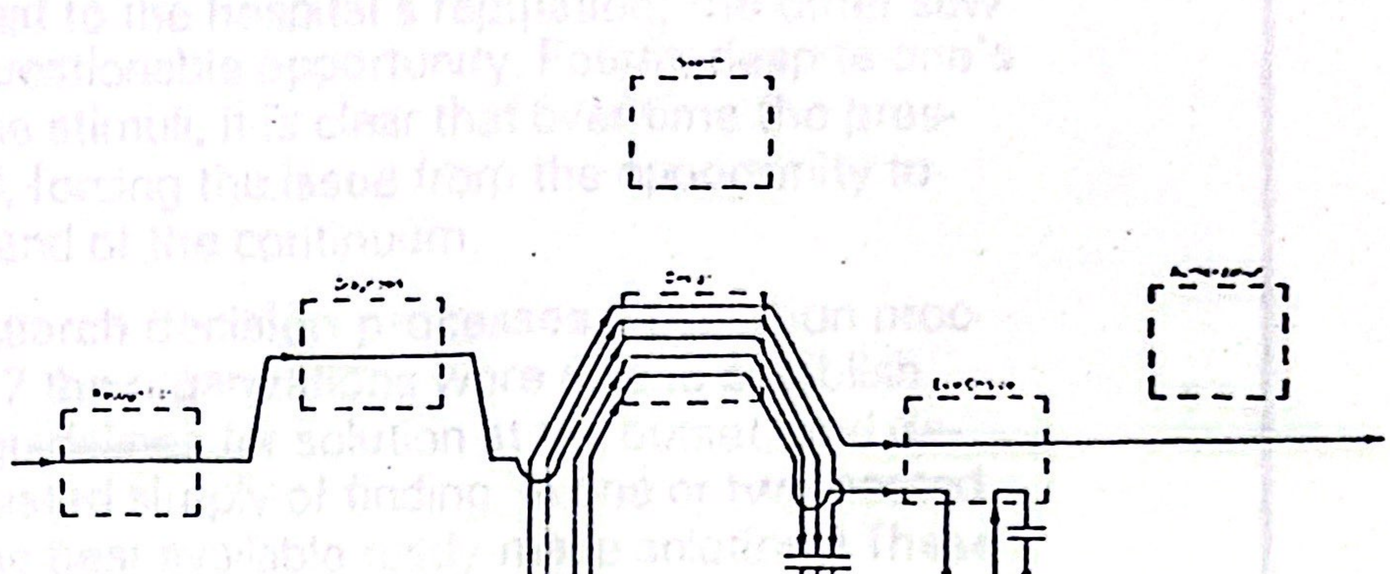


Figure 3. A political design decision process—a new hospital treatment (decision process 3).

organizations found it necessary to branch into extensive political design activity. Together, these two decision processes encountered 9 interrupts and involved 9 development and 12 selection steps.

Decision process 3 is shown in Figure 3. In this case, a preeminent hospital finally accepted a new form of treatment, involving a major shift in its philosophy after much political activity. The decision process began when a new director was appointed. He recognized the need for the new treatment and investigated it (diagnosis). However, after repeatedly meeting resistance from a group of conservative doctors, he engaged in a series of political design activities. First, he hired four doctors experienced with the new treatment, but was again blocked (interrupt). Subsequently, the head of nursing was replaced (political design) and other pressures built up, including an accusation of malpractice from a medical association (interrupt). A report on implementation was then prepared (design) and agreement was reached to implement the treatment in one public ward (evaluation-choice). Eighteen months later, there was a strike (interrupt) and because the new treatment was more effective under conditions of reduced staff, it was allowed in a second public ward (evaluation-choice). With increasing numbers of the new staff favoring the treatment, there was a sudden demand for full implementation and a threat to resign by one highly respected member of staff (two interrupts). Two doctors sympathetic to the treatment were then promoted to senior executive positions (political design) and the treatment was finally accepted in the private wards (final evaluation-choice).

There are a number of intriguing features about this decision process. First, all the design activities except one were political, initiated to change the power structure. Second, it is difficult to distinguish evaluation-choice and recognition activity in this decision process. Was debate over the desirability of instituting a new form of treatment the recognition of the need to make a decision or was it the evaluation of a solution? (We took the point of view of the director, who recognized the need early, and accordingly, we treated the debate as evaluation-choice activity). Third, should this be treated as an opportunity, problem, or crisis decision process? Here especially we can see that opportunities, problems, and

crises are to some extent in the eyes of the beholder. One group felt a threat to the hospital's reputation; the other saw no need for a questionable opportunity. Fourth, despite one's perception of the stimuli, it is clear that over time the pressures increased, forcing the issue from the opportunity toward the crisis end of the continuum.

Type 3. Basic search decision processes. In decision processes 5, 6, and 7 the organizations were able to establish relatively clear guidelines for solution at the outset, and development consisted simply of finding, in one or two nested search steps, the best available ready-made solution.[8] These were relatively straight-forward processes, involving only two interrupts, six search steps, and nine selection steps. Two of the processes lasted less than one year, and the other between one and two years.

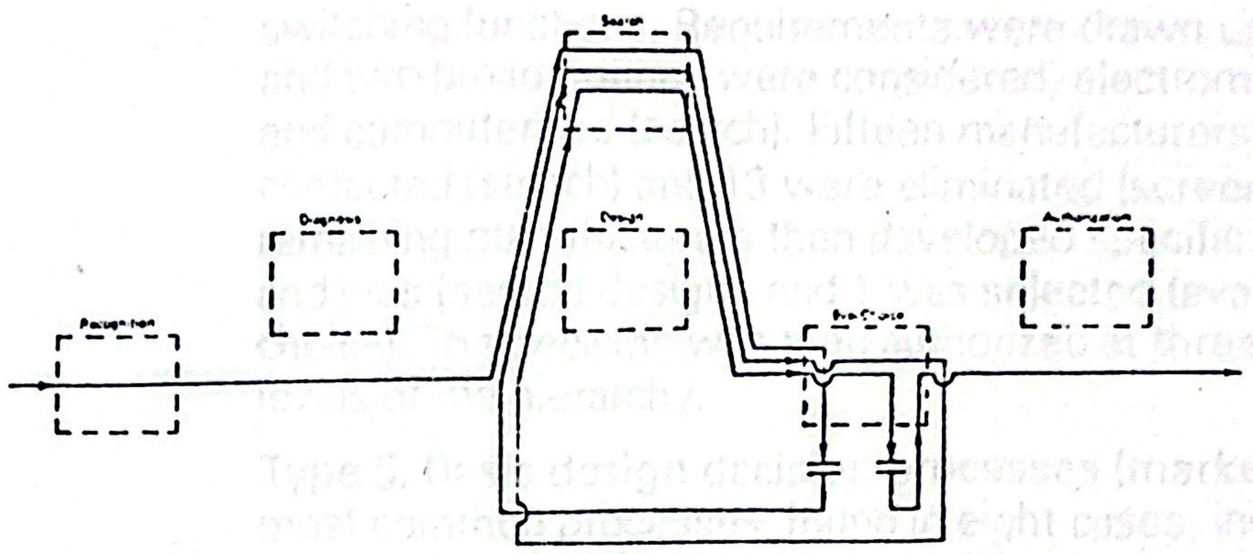


Figure 4. A basic search decision process—new jets for regional airline (decision process 7).

Decision process 7, shown in Figure 4, is the most interesting of the three. A regional airline, having expanded into charter service, was forced to consider the acquisition of jet aircraft. Search was conducted, and a choice was made. But the board, out of concern over the choice made, brought in a new chief executive. He quickly cancelled the contract (interrupt), and began active search again. At the same time, he was approached by salesmen. A number of alternatives were rejected (screen). The remaining alternatives were investigated more intensively for performance and possible financing (evaluation), and for the availability of used aircraft of the preferred model types (search). There remained three feasible alternatives for new aircraft, and negotiations for financing now began. Suddenly, a foreign airline went into receivership, and two used aircraft of the desired type became available at a good price with attractive financing (new option interrupt). The president acted quickly to purchase them (evaluation-choice).

Type 4. Modified search decision processes (equipment). Four of the 25 decision processes were characterized by development activity in which ready-made alternatives were modified through limited design activity. Interestingly, all 4 dealt with the purchase of systems of sophisticated technological equipment.[9] All 4 processes entailed extensive cycling in development, between 3 and 5 instances, and together they had 7 search and 9 design steps. All 4 required the authorization, for a total of 13 instances.

8
The decisions studied by Soelberg (1967) of the students' choice of job fit into this category.

9
The decision processes studied by Witte (1972) and by Cyert, Simon, and Trow (1956) fit into this grouping as well.

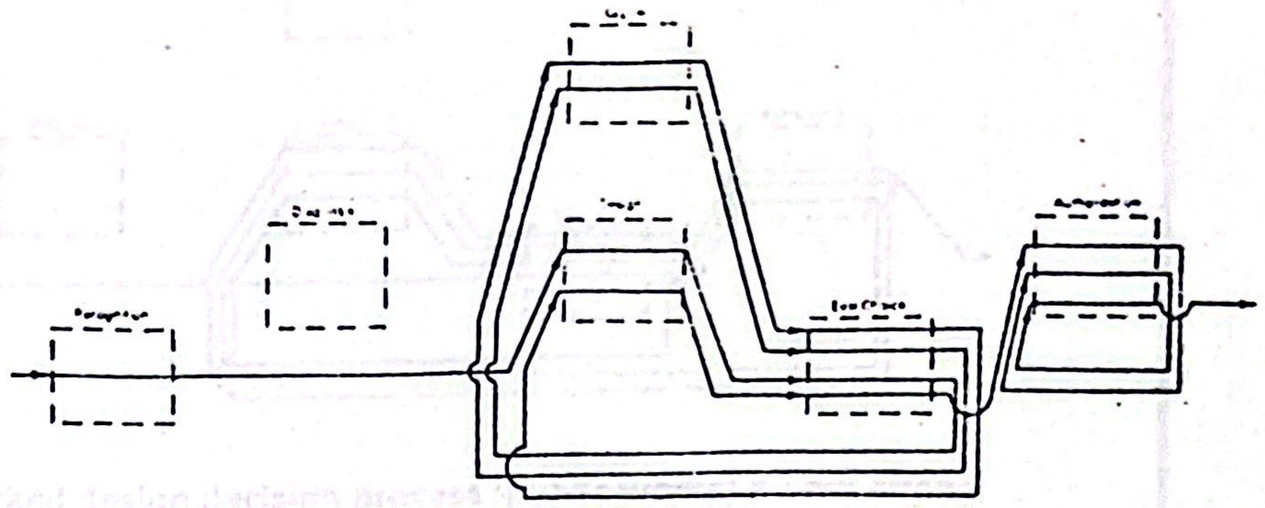


Figure 5. A modified search decision process (equipment) new electric switching equipment (decision process 9).

In decision process 9, shown in Figure 5, a telecommunication organization found it necessary to automate one of its switching functions. Requirements were drawn up (design), and two broad options were considered, electromechanical and computerized (search). Fifteen manufacturers were then contacted (search) and 13 were eliminated (screen). The 2 remaining manufacturers then developed specific systems and bids (nested design), and 1 was selected (evaluation-choice). The decision was then authorized at three successive levels of the hierarchy.

Type 5. Basic design decision processes (marketing). The most common processes, found in eight cases, involved extensive design activity, which typically led to complex and innovative custom-made solutions. There is little evidence of interrupts, only three instances, or of political activity. All processes were evoked by opportunities or relatively mild problems, and all were of relatively short duration. Most interesting, every case dealt with a marketing issue: four new products or services, three new markets, and a new promotional program. Seven of the eight organizations were private firms, while the eighth involved a container terminal built by a government-owned port authority. Clearly these were commercial decisions taken by business, or business-like, organizations, and measurable factors of profit clearly outweighed any political considerations.

Decision process 17, one of the simplest cases, is shown in Figure 6. A hotel found itself with a large, vacant room in the evenings. Because kitchen staff had to be maintained for another restaurant, it was decided to do something with the

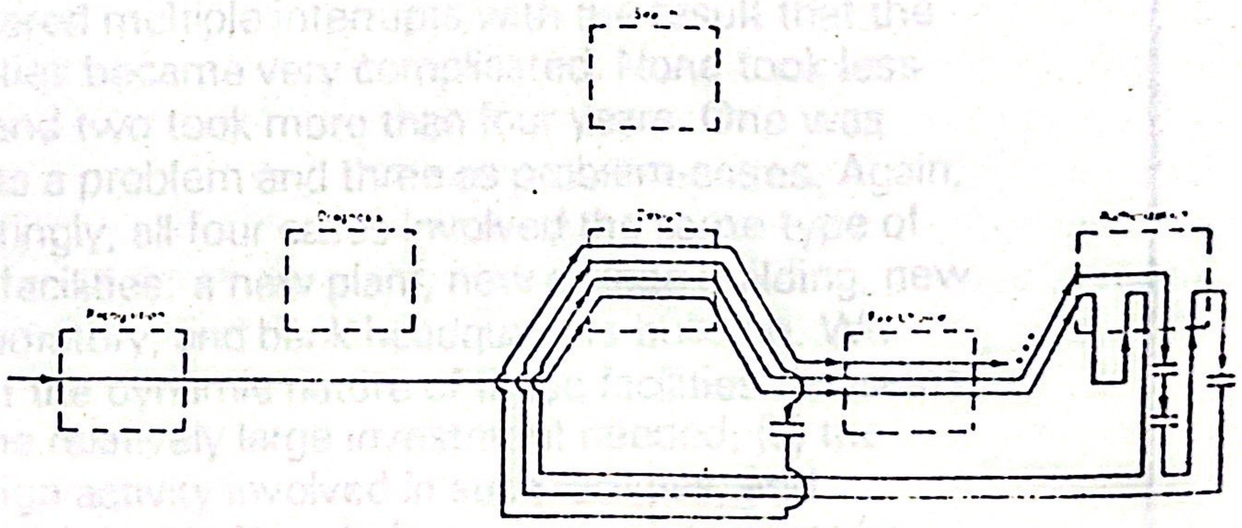


Figure 6. A basic design decision process (marketing) a new supper club for a hotel (decision process 17).

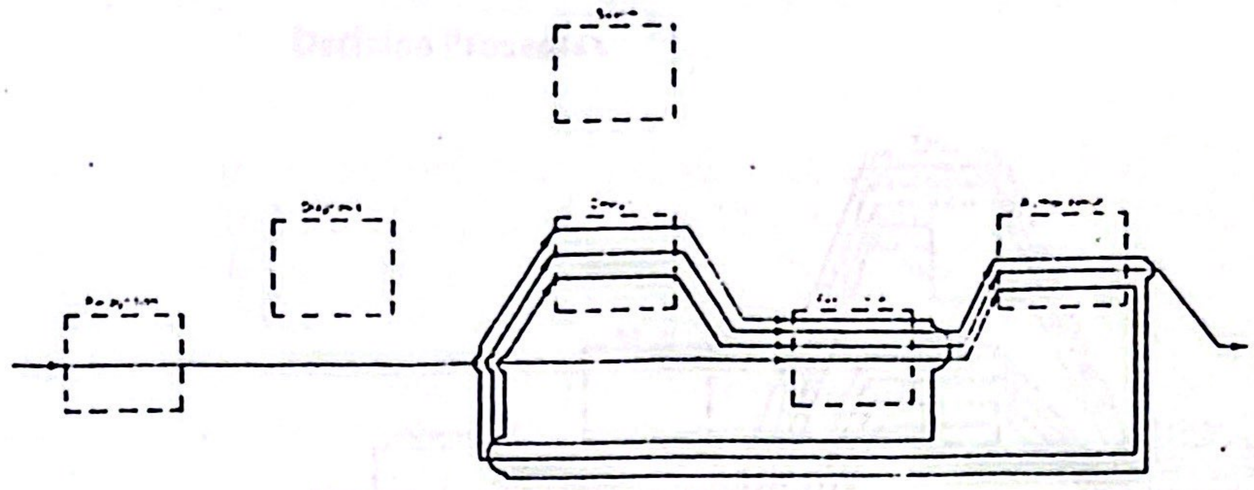


Figure 7. A blocked design decision process (public works) a new airport runway (decision process 21).

room. This proposal was authorized by the owner of the hotel. One executive of the hotel decided that a supper club should be opened (design). Another executive favored a British pub, but the supper club idea prevailed (evaluation-choice). The decision process then involved a series of nested design cycles, many followed by authorization by the owner.

Type 6. Blocked design decision processes (public works). Two processes were identical to type 5 decision processes until they entered the final stages of the selection process. Then both proposed solutions met strong resistance from outside groups. Both were public works projects developed by government agencies, and both were resisted by groups of citizens who protested the disruptions these projects would cause.

Decision process 20 involved resistance to a neighborhood redevelopment plan, and decision process 21, resistance to an extended airport runway. In decision process 21, shown in Figure 7, the runway extension was necessary if the airport was to maintain its status. The announcement of the completed design was the signal for a series of attacks on the organization and its proposal. First a civic group proposed an alternative plan, but that was found unacceptable. Then, bills were introduced in the legislature to block the original proposal. Finally, law suits were instituted to render the proposal illegal on a technicality. The organization chose to meet most of these threats through direct confrontation bargaining. (At the time of the study, the decision process was not yet completed.)

Type 7. Dynamic design decision processes (facilities). The dynamic design decision processes are the most complex of the decision processes encountered. Processes 22 to 25 followed a basic design or modified search pattern, but all four encountered multiple interrupts with the result that the flow of activities became very complicated. None took less than a year, and two took more than four years. One was categorized as a problem and three as problem-crises. Again, most interestingly, all four cases involved the same type of output, new facilities: a new plant, new college building, new university laboratory, and bank headquarters building. We conclude that the dynamic nature of these facilities decisions reflects (a) the relatively large investment needed, (b) the complex design activity involved in such facilities, and, paradoxically, (c) the likelihood of new option interrupts because of the availability of ready-made structures.

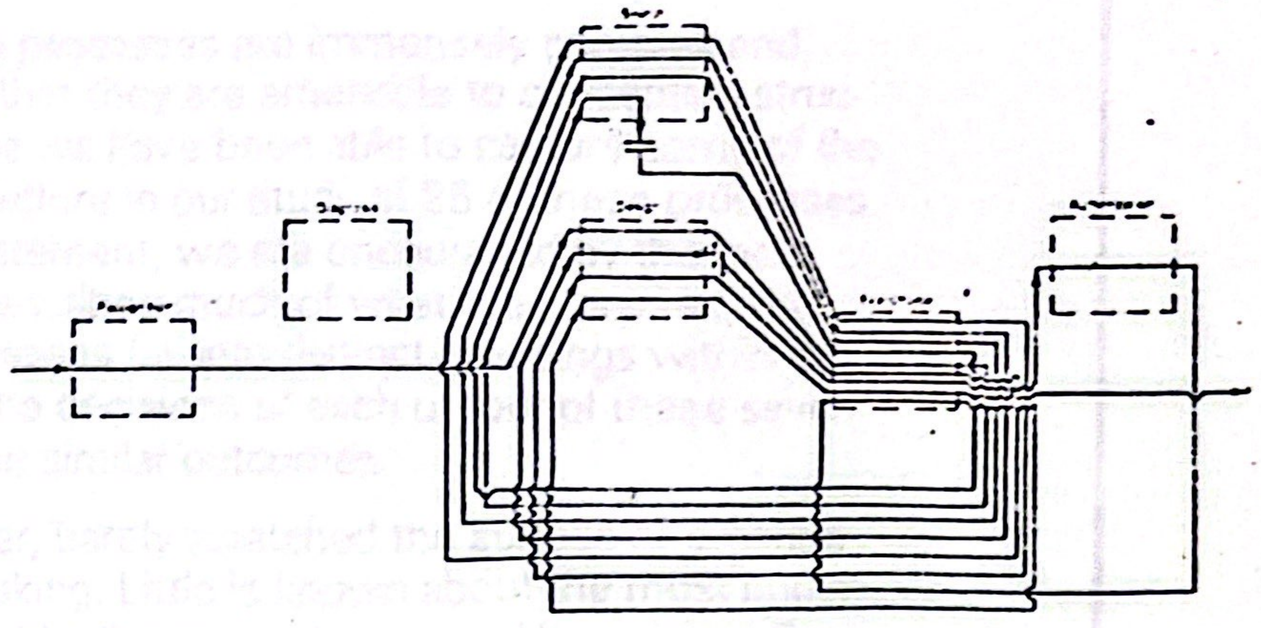


Figure 8. A dynamic design decision process (facilities) a new plant for a small firm (decision process 24).

Decision process 24 is diagrammed in Figure 8. Here a small manufacturing firm was faced with a series of pressures that indicated that its plant was obsolete. A proposal to sell the building was developed (design), and a real estate agent then contacted (search), but no buyers were found. It was then realized that the city might expropriate the land (interrupt), and an agent was hired to negotiate a good price should that occur. Meanwhile, a neighboring firm moved out, and their adjoining parking lot was acquired to provide room for expansion or to increase the expropriation value of the property (evaluation-choice). At the same time, the firm employed architects to investigate two alternatives, but rejected both proposals as too expensive (evaluation-choice). At the same time, the firm employed architects to investigate two alternatives, but rejected both proposals as too expensive (evaluation-choice), and attention was then focused on moving. Three alternative sites were found (search), and employees were polled and road networks investigated (evaluation). One area proved to be the most desirable, and when an existing facility was found there at a good price (search), it was identified as a favorite candidate and purchased (evaluation-choice). The company planned the modification of the building (design), and commenced the alteration. Two months later, however, the provincial government expropriated at the same time both the old plant and the new and gave the firm a short time to vacate (interrupt). Now the firm faced a crisis. It did, however, have a considerable source of funds from the expropriation and could consider buying land and building a new plant. Only one area was investigated, and a suitable site was located (search). The firm obtained rezoning sanctions from the municipal government, a mortgage from the bank (design), and the assurance that this property would not be expropriated (authorization). The site was purchased (evaluation-choice), and the engineering department, in consultation with the architect, prepared building plans, (design); the plans were quickly finalized (evaluation-choice). To summarize, what started as a basic design decision process, type 5, reverted to a dynamic design process, type 7, because of a governmental interrupt.

CONCLUSION

In this paper we have tried to show at the same time that

strategic decision processes are immensely complex and dynamic and yet that they are amenable to conceptual structuring. We believe we have been able to capture some of the flavor of their structure in our study of 25 of these processes. In making this statement, we are encouraged by the facts that one model describes much of what we observed, that the decision processes fall into distinct groupings within the model, and that the decisions of each of four of these seven groupings involved similar outcomes.

We have, however, barely scratched the surface of organizational decision making. Little is known about the most important routines, notably diagnosis, design, and bargaining. Diagnosis is probably the single most important routine, since it determines in large part, however implicitly, the subsequent course of action. Yet researchers have paid almost no attention to diagnosis, preferring instead to focus on the selection routines, which often appear to be just a trimming on the overall decision process. Furthermore, while we have addressed ourselves to the question of how organizations make single strategic decisions, we have not looked at the interrelationships among such decisions over time in the same organization, in effect the process of strategy formulation. The empirical study of strategy formulation has also been neglected in the literature. Another major gap in the literature is the relationship between decision process and structure. The literature still lacks a single acceptable theory to describe how decision processes flow through organizational structures. In fact, it does not even provide a helpful typology of the kinds of decisions made in organizations, especially of those decisions that are found between the operating decisions of the bottom of the hierarchy and the strategic decisions of the top. All of these gaps in the literature seriously block us from achieving even an elementary understanding of how organizations function; all are greatly in need of empirical research.

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REFERENCES

Aguilar, Francis J.
1967 Scanning the Business Environment. New York: Macmillan.

Barnard, Chester I.
1966 The Functions of the Executive. Cambridge, Mass.: Harvard University Press.

onge J. W.
972 "Problem recognition and diagnosis: basic inputs to business policy." Journal of Business Policy: 45–53.

Bower, Joseph L.
1970 Managing the Resource Allocation Process. Cambridge, Mass.: Harvard University, Graduate School of Business Administration, Division of Research.

Braybrooke, David, and Charles E. Lindblom
1963 A Strategy of Decision. New York: Free Press.

Carter, E. Eugene
1971a "Project evaluations and firm decisions." The Journal of Management Studies: 253–279.
1971b "The behavioral theory of the firm and top level corporate decisions." Administrative Science Quarterly: 413–428.

Cyert, Richard M., and Kenneth B. MacCrimmon
1968 "Organizations." In E. Aronson and G. Lindzey, (eds.), The Handbook of Social Psychology, 2nd ed. Reading, Mass.: Addison-Wesley.

Cyert, Richard M., and James G. March
1963 A Behavioral Theory of the Firm. Englewood Cliffs, N.J.: Prentice-Hall.

Cyert, Richard M., Herbert A. Simon, and Donald B. Trow
1956 "Observation of a business decision." Journal of Business: 237–248.

Dewey, John
1933 How We Think, new ed. Boston: D.C. Heath.

Deising, Paul
1967 "Noneconomic Decision-Making." In M. Alexis and C. Z. Wilson, (eds.), Organizational Decision-Making: 185–200. Englewood Cliffs, N.J.: Prentice-Hall.

Drucker, Peter F.
1971 "What we can learn from Japanese management." Harvard Business Review (March-April): 110–122.

Dufty, N. F., and P. M. Taylor
1962 "The implementation of a decision." Administrative Science Quarterly: 110–119.

Emory, C. William, and Powell Niland
1968 Making Management Decisions. Boston: Houghton Mifflin.

Feldman, Julian, and Herschel E. Kanter
1965 "Organizational decision making." In James G. March, (ed.), Handbook of Organizations, (chapter 14). Chicago: Rand McNally.

Gore, William J.
1956 "Administrative decision making in federal field offices." Public Administration Review: 281–291.

Gore, William J.
1964 Administrative Decision-Making: A Heuristic Model. New York: John Wiley.

Grinyer, Peter H., and David Norburn
1975 "Planning for existing markets: perception of executives and financial performances." The Journal of the Royal Statistical Society, Series A: 70–97.

Hall, William K.
1973 "Strategic planning models: are top managers really finding them useful?" Journal of Business Policy: 33–42.

Hardwick, C. T. and B. F. Landuyt
1966 "Timing and surprise." In Administrative Strategy and Decision Making. Cincinnati, Ohio: South Western Publishing Company, Second Edition (chapter 1).

Kakar, S.
1971–"Rationality and irrationality
1972 in business leadership." Journal of Business Policy: 39–44.

Klein, Burton H.
1962 "The decision making problem in development." In The Rate and Direction of Innovative Activity: 477–508. Princeton, N.J.: Princeton University Press.

Lonergan, Bernard J. F.
1967 Insight: a Study of Human Understanding. New York: Philosophical Library.

Manheim, Marvin L.
1966 Hierarchical Structure: A Model of Design and Planning Processes. Cambridge, Mass.: M.I.T. Press.

March, James G., and Herbert A. Simon
1958 Organizations. New York: John Wiley.

Mintzberg, Henry
1973 The Nature of Managerial Work. New York: Harper and Row.

Newell, Allen, and Herbert A. Simon
1972 Human Problem Solving. Englewood Cliffs, N.J.: Prentice-Hall.

Nicolaidis, Nicholas George
1960 Policy Decision and Organization Theory. D.P.A. thesis, University of Southern California.

Pettigrew, Andrew M.
1972 "Information control as a power resource." Sociology: 187–204.

Pfiffner, John M.
1960 "Administrative rationality." Public Administration Review: 125–132.

Pounds, William F.
1969 "The process of problem finding." Industrial Management Review (Fall): 1–19.

Radomsky, John
1967 The Problem of Choosing a Problem. M.S. thesis, Sloan School of Management, Massachusetts Institute of Technology.

Reitman, William R.
1964 "Heuristic decision procedures, open constraints, and the structure of ill-defined problems." In M. W. Shelley and G. L. Bryan, (eds.), Human Judgments and Optimality: 282–315. New York: John Wiley.

Sayles, Leonard R.
1954 Managerial Behavior: Administration in Complex Organizations. New York: McGraw-Hill.

Schwartzman, Ruben
1971 Crisis Decision Making. MBA thesis, McGill University, Montreal.

Simon, Hebert A.
1965 The Shape of Automation. New York: Harper and Row.

Snyder, Richard C., and Glenn D. Paige
1958 "The United States decision to resist aggression in Korea: the application of an analytical scheme." Administrative Science Quarterly: 341–378.

Soelberg, Peer O.
1967 "Unprogrammed decision making." Industrial Management Review (Spring): 19–29.

Stagner, Ross
1969 "Corporate decision making: an empirical study." Journal of Applied Psychology: 1–13.

Thompson, James D., and A. Truden
1964 "Strategies, structures, and processes of organizational decision." In H. J. Leavitt and R. Pondy, (eds.), Reading in Managerial Psychology. Chicago: University of Chicago Press.

Whitehead, Clay Thomas
1968 Uses and Limitations of Systems Analysis. Ph.D. dissertation, Sloan School of Management, Massachusetts Institute of Technology.

Witte, Eberhard
1972 "Field research on complex decision-making processes—the phase theorem." International Studies of Management and Organization: 156–182.